

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION**

Washington, D.C. 20549

FORM 10-Q

(Mark One)

☒ **Quarterly report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934**

for the quarterly period ended **March 31, 2023**

Or

☐ **Transition report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934**

for the transition period from _____ to _____
Commission File Number **000-24085**

AXT, INC.

(Exact name of registrant as specified in its charter)

DELAWARE
(State or other jurisdiction of
Incorporation or organization)

94-3031310
(I.R.S. Employer
Identification No.)

4281 Technology Drive, Fremont, California 94538
(Address of principal executive offices) (Zip code)

(510) 438-4700
(Registrant's telephone number, including area code)

Securities registered pursuant to Section 12(b) of the Act:

Title of each class:	Trading Symbol	Name of each exchange on which registered:
Common Stock, \$0.001 par value	AXTI	The NASDAQ Stock Market LLC

Indicate by check-mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check-mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

Indicate by check-mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer ☐

Accelerated filer ☒

Non-accelerated filer ☐

Smaller reporting company ☒
Emerging growth company ☐

If an emerging growth company, indicate by check-mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check-mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). YES ☐ NO ☒

Indicate the number of shares outstanding of each of the issuer's classes of common stock, as of the latest practicable date.

Class	Outstanding at May 1, 2023
Common Stock, \$0.001 par value	43,586,892

AXT, INC.
FORM 10-Q
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PART I. FINANCIAL INFORMATION

Item 1. Financial Statements (unaudited)

AXT, INC. CONDENSED CONSOLIDATED BALANCE SHEETS (Unaudited, in thousands, except per share data)

	<u>March 31,</u> <u>2023</u>	<u>December 31,</u> <u>2022</u>
ASSETS		
Current assets:		
Cash and cash equivalents	\$ 35,436	\$ 34,948
Restricted cash	9,457	6,400
Short-term investments	7,016	9,339
Accounts receivable, net of allowances of \$307 and \$307 as of March 31, 2023 and December 31, 2022	21,345	29,252
Inventories	91,678	89,629
Prepaid expenses and other current assets	12,070	13,977
Total current assets	177,002	183,545
Long-term investments	1,642	2,118
Property, plant and equipment, net	162,524	161,017
Operating lease right-of-use assets	1,659	1,761
Other assets	23,796	21,631
Total assets	\$ 366,623	\$ 370,072
LIABILITIES, REDEEMABLE NONCONTROLLING INTERESTS AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	\$ 6,766	\$ 10,084
Accrued liabilities	13,201	18,164
Bank loans	52,821	47,078
Total current liabilities	72,788	75,326
Noncurrent operating lease liabilities	1,275	1,322
Other long-term liabilities	4,222	3,678
Total liabilities	78,285	80,326
Commitments and contingencies (Note 16)		
Redeemable noncontrolling interests (Note 18)	44,920	44,846
Stockholders' equity:		
Preferred stock Series A, \$0.001 par value; 2,000 shares authorized; 883 shares issued and outstanding as of March 31, 2023 and December 31, 2022 (Liquidation preference of \$7,743 and \$7,699 as of March 31, 2023 and December 31, 2022)	3,532	3,532
Common stock, \$0.001 par value; 70,000 shares authorized; 43,586 and 43,554 shares issued and outstanding as of March 31, 2023 and December 31, 2022	44	44
Additional paid-in capital	236,192	235,308
Accumulated deficit	(17,507)	(14,159)
Accumulated other comprehensive loss	(2,260)	(3,118)
Total AXT, Inc. stockholders' equity	220,001	221,607
Noncontrolling interests	23,417	23,293
Total stockholders' equity	243,418	244,900
Total liabilities, redeemable noncontrolling interests and stockholders' equity	\$ 366,623	\$ 370,072

See accompanying notes to condensed consolidated financial statements.

AXT, INC.
CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS
(Unaudited, in thousands, except per share data)

	Three Months Ended March 31,	
	2023	2022
Revenue	\$ 19,405	\$ 39,653
Cost of revenue	14,295	26,345
Gross profit	5,110	13,308
Operating expenses:		
Selling, general and administrative	5,952	6,450
Research and development	3,595	3,159
Total operating expenses	9,547	9,609
Income (loss) from operations	(4,437)	3,699
Interest expense, net	(397)	(183)
Equity in income of unconsolidated joint ventures	1,034	1,125
Other income (expense), net	282	(9)
Income (loss) before provision for income taxes	(3,518)	4,632
Provision for income taxes	148	660
Net income (loss)	(3,666)	3,972
Less: Net (income) loss attributable to noncontrolling interests and redeemable noncontrolling interests	318	(807)
Net income (loss) attributable to AXT, Inc.	\$ (3,348)	\$ 3,165
Net income (loss) attributable to AXT, Inc. per common share:		
Basic	\$ (0.08)	\$ 0.07
Diluted	\$ (0.08)	\$ 0.07
Weighted-average number of common shares outstanding:		
Basic	42,498	41,871
Diluted	42,498	42,662

See accompanying notes to condensed consolidated financial statements.

AXT, INC.
CONDENSED CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS)
(Unaudited, in thousands)

	Three Months Ended	
	March 31,	
	2023	2022
Net income (loss)	\$ (3,666)	\$ 3,972
Other comprehensive income (loss), net of tax:		
Change in foreign currency translation gain, net of tax	887	590
Change in unrealized gain (loss) on available-for-sale debt investments, net of tax	111	(172)
Total other comprehensive income, net of tax	998	418
Comprehensive income (loss) attributable to AXT, Inc.	(2,668)	4,390
Less: Comprehensive loss (income) attributable to noncontrolling interests and redeemable noncontrolling interests	178	(898)
Comprehensive income (loss) attributable to AXT, Inc.	<u>\$ (2,490)</u>	<u>\$ 3,492</u>

See accompanying notes to condensed consolidated financial statements.

AXT, INC.
CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS
(Unaudited, in thousands)

	Three Months Ended March 31,	
	2023	2022
Cash flows from operating activities:		
Net income (loss)	\$ (3,666)	\$ 3,972
Adjustments to reconcile net income (loss) to net cash used in operating activities:		
Depreciation and amortization	2,118	1,983
Amortization of marketable securities premium	7	23
Stock-based compensation	915	1,088
Loss on disposal of equipment	5	24
Equity in income of unconsolidated joint ventures	(1,034)	(1,125)
Deferred tax assets	(10)	(8)
Changes in operating assets and liabilities:		
Accounts receivable	7,982	(4,915)
Inventories	(1,466)	(2,586)
Prepaid expenses and other current assets	1,965	810
Other assets	(1,055)	(341)
Accounts payable	(3,351)	(2,299)
Accrued liabilities	(1,568)	(4,867)
Other long-term liabilities, including royalties	(2,376)	(665)
Net cash used in operating activities	(1,534)	(8,906)
Cash flows from investing activities:		
Purchases of property, plant and equipment	(3,616)	(6,294)
Proceeds from sales and maturities of available-for-sale debt securities	2,903	—
Net cash used in investing activities	(713)	(6,294)
Cash flows from financing activities:		
Proceeds from common stock options exercised	8	—
Proceeds from bank loans	18,372	10,718
Payments on bank loans	(12,810)	(2,799)
Proceeds from capital increase in subsidiary shares from noncontrolling interest	203	—
Net cash provided by financing activities	5,773	7,919
Effect of exchange rate changes on cash and cash equivalents, and restricted cash	19	12
Net increase (decrease) in cash and cash equivalents, and restricted cash	3,545	(7,269)
Cash and cash equivalents, and restricted cash at the beginning of the year	41,348	36,763
Cash and cash equivalents, and restricted cash at the end of the period	\$ 44,893	\$ 29,494
Supplemental disclosure of non-cash flow information:		
Conversion of related party borrowings to Additional Paid-in Capital	\$ —	\$ 1,887
Investment in subsidiary shares from noncontrolling interest	\$ 72	\$ 410

See accompanying notes to condensed consolidated financial statements.

AXT, INC.
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Unaudited)

Note 1. Basis of Presentation

The accompanying condensed consolidated financial statements of AXT, Inc. ("AXT," the "Company," "we," "us," and "our" refer to AXT, Inc. and all of its consolidated subsidiaries) are unaudited, and have been prepared in accordance with accounting principles generally accepted in the United States of America ("U.S. GAAP") for interim financial information and with the instructions to Form 10-Q and Article 10 of Regulation S-X. Accordingly, this interim quarterly financial report does not include all disclosures required by U.S. GAAP. In the opinion of our management, the unaudited condensed consolidated financial statements reflect all adjustments, consisting only of normal recurring adjustments, considered necessary to present fairly the financial position, results of operations and cash flows of AXT and our consolidated subsidiaries for all periods presented.

Our management has made a number of estimates and assumptions relating to the reporting of assets and liabilities and the disclosure of contingent assets and liabilities to prepare these condensed consolidated financial statements in conformity with U.S. GAAP. Due to the COVID-19 pandemic, there has been uncertainty and disruption in the global economy and financial markets. These estimates and assumptions may change as new events occur and additional information is obtained. Actual results could differ materially from those estimates.

The results of operations for the three months ended March 31, 2023 are not necessarily indicative of the results to be expected in the future or for the full fiscal year. It is recommended that these condensed consolidated financial statements be read in conjunction with our consolidated financial statements and the notes thereto included in our 2022 Annual Report on Form 10-K filed with the Securities and Exchange Commission (the "SEC") on March 16, 2023.

The condensed consolidated financial statements include the accounts of AXT, and our consolidated subsidiaries, Beijing Tongmei Xtal Technology Co., Ltd. ("Tongmei"), AXT-Tongmei, Inc. ("AXT-Tongmei"), Baoding Tongmei Xtal Technology Co., Ltd. ("Baoding Tongmei"), ChaoYang Tongmei Xtal Technology Co., Ltd. ("ChaoYang Tongmei"), ChaoYang LiMei Semiconductor Technology Co., Ltd. ("ChaoYang LiMei"), ChaoYang XinMei High Purity Semiconductor Materials Co., Ltd. ("ChaoYang XinMei"), Nanjing JinMei Gallium Co., Ltd. ("JinMei"), ChaoYang JinMei Gallium Ltd. ("ChaoYang JinMei"), ChaoYang ShuoMei High Purity Semiconductor Materials Co., Ltd. ("ChaoYang ShuoMei"), MaAnShan JinMei Gallium Ltd., ("MaAnShan JinMei") and Beijing BoYu Semiconductor Vessel Craftwork Technology Co., Ltd. ("BoYu"). All significant inter-company accounts and transactions have been eliminated. Investments in business entities in which we do not have controlling interests, but have the ability to exercise significant influence over operating and financial policies (generally 20-50% ownership), are accounted for by the equity method. As of March 31, 2023 and December 31, 2022, we have five companies accounted for by the equity method. For the majority-owned subsidiaries that we consolidate, we reflect the portion we do not own as either noncontrolling interests in stockholder's equity or as redeemable noncontrolling interests in temporary equity on our condensed consolidated balance sheets and in our condensed consolidated statements of operations.

When market conditions are warranted, we intend to construct facilities at the ChaoYang LiMei location to provide us with additional production capacity. For the three months ended March 31, 2023, expenses associated with ChaoYang LiMei had a de minimis impact on our condensed consolidated financial statements.

In February 2021, Tongmei signed a joint venture agreement with certain investors to fund a new company, ChaoYang XinMei. The agreement called for a total investment of approximately \$3.0 million, of which Tongmei would fund approximately \$1.8 million for a 58.5 percent ownership of ChaoYang XinMei. In February 2021, the investors completed the initial funding of approximately \$1.5 million. Tongmei's portion of the investment was approximately \$ 0.9 million. In May 2021, the investors completed the funding of the remaining balance of approximately \$1.5 million. Tongmei's portion of the final investment was approximately \$0.9 million, for a total investment of approximately \$ 1.8 million for a 58.5 percent ownership of ChaoYang XinMei. In September 2021 and October 2021, ChaoYang XinMei received funding from a minority investor of \$0.9 million and \$1.0 million, respectively. In December 2021 and January

2022, ChaoYang XinMei received funding from Tongmei of \$ 1.4 million and \$1.4 million, respectively. In January 2022, the China local government certified this additional funding in ChaoYang XinMei as an equity investment. Tongmei's ownership remained at 58.5% after these equity investments. In April 2022, Tongmei entered into a capital increase agreement (the "Capital Increase Agreement") with minority investors to further invest \$4.5 million in ChaoYang XinMei. Tongmei's portion of the investment was approximately \$2.6 million, of which \$1.1 million was invested in April 2022 and \$0.8 million was invested in May 2022. The minority investors' portion of the investment was approximately \$ 1.9 million, of which \$0.7 million was invested in April 2022 and \$ 0.6 million was invested in May 2022. As a result, noncontrolling interests increased \$1.4 million and redeemable noncontrolling interests increased \$ 0.1 million. Tongmei's ownership remained at 58.5% after the April 2022 and May 2022 equity investments. In July 2022, Tongmei and the minority investors further invested \$0.8 million and \$0.6 million in ChaoYang XinMei, respectively. This completed the investment obligations under the Capital Increase Agreement. As a result, noncontrolling interests increased \$610,000 and redeemable noncontrolling interests increased \$57,000. Tongmei's ownership remained at 58.5% after the July 2022 equity investment.

In April 2022, ChaoYang JinMei signed a joint venture agreement with a certain investor to fund a new company, ChaoYang ShuoMei, our consolidated subsidiary. The agreement calls for a total investment of approximately \$4.4 million, of which ChaoYang JinMei will fund approximately \$3.3 million for a 75 percent ownership of ChaoYang ShuoMei. In July and August 2022, ChaoYang JinMei completed the initial funding of \$ 1.0 million in ChaoYang ShuoMei. In August 2022, the investor invested \$334,000 in ChaoYang ShuoMei. As a result, noncontrolling interests increased \$ 406,000 and redeemable noncontrolling interests increased \$73,000. In January 2023, ChaoYang ShuoMei received \$0.5 million in funding from ChaoYang JinMei and \$0.2 million in funding from one of the minority investors. As a result, noncontrolling interests increased \$0.2 million and redeemable noncontrolling interests increased \$ 36,000. ChaoYang JinMei's ownership of ChaoYang ShuoMei remained at 75% after these equity investments.

In April 2022, Tongmei signed a joint venture agreement with certain investors to fund a new company, ChaoYang KaiMei Quartz Co., Ltd ("ChaoYang KaiMei"). The agreement called for a total investment of approximately \$7.6 million, of which Tongmei would fund approximately \$ 3.0 million for a 40 percent ownership of ChaoYang KaiMei. In July 2022, the investors completed the initial funding of approximately \$2.2 million. Tongmei's portion of the investment was approximately \$0.9 million.

All activities for MaAnShan JinMei ceased during the first half of 2022 and the subsidiary was subsequently dissolved in May 2022. The dissolution of MaAnShan JinMei had a de minimis impact on the condensed consolidated results.

During the quarter ended December 31, 2020, Tongmei entered into two sets of definitive transaction documents, each consisting of a capital increase agreement along with certain supplemental agreements in substantially the same form (collectively, the "Capital Investment Agreements"), with several private equity investors in China.

In preparation for Tongmei's application for a listing of shares in an initial public offering (the "IPO") on the Shanghai Stock Exchange's Sci-Tech innovAtion boARd (the "STAR Market"), in late December 2020, we reorganized our entity structures in China. JinMei and BoYu and its subsidiaries were assigned to Tongmei and effectively merged with Tongmei although they retained their own respective legal entity status and are wholly owned subsidiaries of Tongmei. The 33% minority interest stakeholders of BoYu converted their ownership to a 7.59% minority interest in Tongmei. The 8.5% minority interest stakeholders, employees of JinMei, converted their ownership to a 0.38% minority interest in Tongmei. Further, a number of employees, key managers and contributors purchased a 0.4% minority interest in Tongmei. Additionally, Baoding Tongmei and ChaoYang Tongmei, were assigned to Tongmei as wholly owned subsidiaries. In 2020, the private equity funds (the "Investors") had transferred approximately \$48.1 million of new capital to Tongmei. An additional investment of approximately \$1.5 million of new capital was funded in January 2021. Under China regulations these investments must be formally approved by the appropriate government agency and are not deemed to be dilutive until such approval is granted. The government approved the approximately \$49 million investment in its entirety on January 25, 2021, at which time the Investors owned a redeemable noncontrolling interest in Tongmei of 7.28%. As of March 31, 2023, Tongmei's noncontrolling interests and redeemable noncontrolling interests totaled approximately 14.5%. AXT remains the controlling stakeholder of Tongmei and holds a majority of the board of director positions of Tongmei. In June 2021, AXT sold AXT-Tongmei to Tongmei for \$1. Since Tongmei is 85.5%

owned by AXT, and the transaction was between common interest holders, the transaction was accounted for at net book value and resulted in an increase of \$1.2 million to noncontrolling interests and \$ 1.2 million to redeemable noncontrolling interests.

Note 2. Investments and Fair Value Measurements

Our cash and cash equivalents consist of cash and instruments with original maturities of less than three months. Our investments consist of instruments with original maturities of more than three months. As of March 31, 2023 and December 31, 2022, our cash, cash equivalents and debt investments are classified as follows (in thousands):

	March 31, 2023				December 31, 2022			
	Amortized Cost	Gross Unrealized Gain	Gross Unrealized (Loss)	Fair Value	Amortized Cost	Gross Unrealized Gain	Gross Unrealized (Loss)	Fair Value
Classified as:								
Cash and restricted cash	\$ 44,893	\$ —	\$ —	\$ 44,893	\$ 41,348	\$ —	\$ —	\$ 41,348
Cash equivalents:								
Certificates of deposit ¹	—	—	—	—	—	—	—	—
Total cash, restricted cash and cash equivalents	44,893	—	—	44,893	41,348	—	—	41,348
Investments (available-for-sale):								
Certificates of deposit ²	6,440	—	(148)	6,292	6,440	—	(175)	6,265
Corporate bonds	2,410	—	(44)	2,366	5,320	—	(128)	5,192
Total investments	8,850	—	(192)	8,658	11,760	—	(303)	11,457
Total cash, restricted cash, cash equivalents and investments	\$ 53,743	\$ —	\$ (192)	\$ 53,551	\$ 53,108	\$ —	\$ (303)	\$ 52,805
Contractual maturities on investments:								
Due within 1 year ³	\$ 7,170			\$ 7,016	\$ 9,600			\$ 9,339
Due after 1 through 5 years ⁴	1,680			1,642	2,160			2,118
	<u>\$ 8,850</u>			<u>\$ 8,658</u>	<u>\$ 11,760</u>			<u>\$ 11,457</u>

1. Certificates of deposit with original maturities of less than three months.
2. Certificates of deposit with original maturities of more than three months.
3. Classified as "Short-term investments" in our condensed consolidated balance sheets.
4. Classified as "Long-term investments" in our condensed consolidated balance sheets.

We manage our debt investments as a single portfolio of highly marketable securities that is intended to be available to meet our current cash requirements. Certificates of deposit and corporate bonds are typically held until maturity.

Historically, the gross unrealized losses related to our portfolio of available-for-sale debt securities were immaterial, and primarily due to normal market fluctuations and not due to increased credit risk or other valuation concerns. There was an insignificant amount of gross unrealized losses on our available-for-sale debt securities as of March 31, 2023, and historically, such gross unrealized losses have been temporary in nature and we believe that it is probable the principal and interest will be collected in accordance with the contractual terms. We review our debt investment portfolio at least quarterly, or when there are changes in credit risks or other potential valuation concerns, to identify and evaluate whether an allowance for credit losses or impairment would be necessary. Factors considered in determining whether a loss is temporary include the magnitude of the decline in market value, the length of time the market value has been below cost (or adjusted cost), credit quality, and our ability and intent to hold the securities for a period of time sufficient to allow for any anticipated recovery in market value.

The following table summarizes the fair value and gross unrealized losses related to available-for-sale debt securities, aggregated by investment category and length of time that individual securities have been in a continuous unrealized loss position as of March 31, 2023 (in thousands):

	In Loss Position < 12 months		In Loss Position > 12 months		Total In Loss Position	
	Fair Value	Gross Unrealized (Losses)	Fair Value	Gross Unrealized (Losses)	Fair Value	Gross Unrealized (Losses)
As of March 31, 2023						
Investments:						
Certificates of deposit	\$ 2,113	\$ (47)	\$ 4,179	\$ (101)	\$ 6,292	\$ (148)
Corporate bonds	—	—	2,016	(44)	2,016	(44)
Total in loss position	<u>\$ 2,113</u>	<u>\$ (47)</u>	<u>\$ 6,195</u>	<u>\$ (145)</u>	<u>\$ 8,308</u>	<u>\$ (192)</u>

The following table summarizes the fair value and gross unrealized losses related to available-for-sale debt securities, aggregated by investment category and length of time that individual securities have been in a continuous unrealized loss position as of December 31, 2022 (in thousands):

	In Loss Position < 12 months		In Loss Position > 12 months		Total In Loss Position	
	Fair Value	Gross Unrealized (Loss)	Fair Value	Gross Unrealized (Loss)	Fair Value	Gross Unrealized (Loss)
As of December 31, 2022						
Investments:						
Certificates of deposit	\$ 2,118	\$ (42)	\$ 4,146	\$ (133)	\$ 6,264	\$ (175)
Corporate bonds	—	—	4,842	(128)	4,842	(128)
Total in loss position	<u>\$ 2,118</u>	<u>\$ (42)</u>	<u>\$ 8,988</u>	<u>\$ (261)</u>	<u>\$ 11,106</u>	<u>\$ (303)</u>

Restricted Cash

We maintain restricted cash in connection with cash balances temporarily restricted for regular business operations. In May 2022, Tongmei and the Bank of Beijing signed a credit facility for \$3.4 million. As a condition of the credit facility we must maintain a time deposit at the Bank of Beijing as collateral, and therefore we placed time deposits of \$2.9 million and \$1.0 million at the Bank of Beijing in April 2022 and May 2022, respectively. In December 2022, we placed another time deposit of \$2.5 million at the Bank of Beijing as collateral for a bank loan of \$ 2.3 million received by Tongmei in January 2023. In January 2023, our consolidated subsidiary, ChaoYang LiMei, placed a time deposit of \$3.0 million at the Bank of China as collateral for a bank loan of \$2.9 million received by Tongmei in January 2023. The bank loans have a term of 12 months, therefore the May 2022 bank loan, the January 2023 bank loans and the time deposits are classified as short-term in our condensed consolidated balance sheets. The time deposits have been excluded from the Company's cash and cash equivalents balance. As of March 31, 2023, \$9.5 million was included in restricted cash in our condensed consolidated balance sheets.

Investments in Privately-held Raw Material Companies

We have made strategic investments in private companies located in China in order to gain access at a competitive cost to raw materials that are critical to our substrate business (see Note 7). The investment balances for the non-consolidated companies are accounted for under the equity method and included in "Other assets" in the condensed consolidated balance sheets and totaled \$16.5 million and \$14.6 million as of March 31, 2023 and December 31, 2022, respectively. As of March 31, 2023, there were five companies accounted for under the equity method.

Fair Value Measurements

We invest primarily in money market accounts, certificates of deposits, corporate bonds and notes, and government securities. We review our debt investment portfolio for credit loss at least quarterly or when there are changes in credit risk or other potential valuation concerns. As of March 31, 2023 and December 31, 2022, the total unrealized loss, net of tax, included in accumulated other comprehensive income was immaterial. We believe it is probable the principal and interest will be collected in accordance with the contractual terms, and the unrealized loss on these securities was due to normal market fluctuations, and not due to increased credit risk or other valuation concerns. Accounting Standards Codification ("ASC") Topic 820, *Fair Value Measurements and Disclosures* ("ASC 820"), establishes three levels of inputs that may be used to measure fair value. Level 1 instrument valuations are obtained from real-time quotes for transactions in active exchange markets of the asset or identical assets. Level 2 instrument valuations are obtained from readily-available, observable pricing sources for comparable instruments. Level 3 instrument valuations are obtained from unobservable inputs in which there is little or no market data, which require us to develop our own assumptions. On a recurring basis, we measure certain financial assets and liabilities at fair value, primarily consisting of our short-term and long-term debt investments.

The type of instrument valued based on quoted market prices in active markets include our money market funds, which are generally classified within Level 1 of the fair value hierarchy. We classify our available-for-sale debt securities including certificates of deposit and corporate bonds as having Level 2 inputs. The valuation techniques used to measure the fair value of these financial instruments having Level 2 inputs were derived from bank statements, quoted market prices, broker or dealer statements or quotations, or alternative pricing sources with reasonable levels of price transparency.

We place short-term foreign currency hedges that are intended to offset the potential cash exposure related to fluctuations in the exchange rate between the United States dollar and Japanese yen. We measure the fair value of these foreign currency hedges at each month end and quarter end using current exchange rates and in accordance with U.S. GAAP. At quarter end, any foreign currency hedges not settled are netted in "Accrued liabilities" on the condensed consolidated balance sheet and classified as Level 3 assets and liabilities. As of March 31, 2023, the net change in fair value from the placement of the hedge to settlement at each month end during the quarter had a de minimis impact on the condensed consolidated results. There were no changes in valuation techniques or related inputs in the three months ended March 31, 2023. There have been no transfers between fair value measurements levels during the three months ended March 31, 2023.

The following table summarizes our financial assets and liabilities measured at fair value on a recurring basis in accordance with ASC 820 as of March 31, 2023 (in thousands):

	Balance as of March 31, 2023	Quoted Prices in Active Markets of Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:				
Investments:				
Certificates of deposit	\$ 6,292	\$ —	\$ 6,292	\$ —
Corporate bonds	2,366	—	2,366	—
Total	<u>\$ 8,658</u>	<u>\$ —</u>	<u>\$ 8,658</u>	<u>\$ —</u>

The following table summarizes our financial assets and liabilities measured at fair value on a recurring basis in accordance with ASC 820 as of December 31, 2022 (in thousands):

	Balance as of December 31, 2022	Quoted Prices in Active Markets of Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:				
Investments:				
Certificates of deposit	\$ 6,265	\$ —	\$ 6,265	\$ —
Corporate bonds	5,192	—	5,192	—
Total	\$ 11,457	\$ —	\$ 11,457	\$ —

Items Measured at Fair Value on a Nonrecurring Basis

Certain assets that are subject to nonrecurring fair value measurements are not included in the table above. These assets include investments in privately-held companies accounted for by the equity or cost method (see Note 7). We did not record any other-than-temporary impairment charges for these investments during the three months ended March 31, 2023 and 2022, respectively.

Note 3. Inventories

The components of inventories are summarized below (in thousands):

	March 31, 2023	December 31, 2022
Inventories:		
Raw materials	\$ 41,543	\$ 46,476
Work in process	46,943	39,956
Finished goods	3,192	3,197
	\$ 91,678	\$ 89,629

As of March 31, 2023 and December 31, 2022, carrying values of inventories were net of inventory reserves of \$25.9 million and \$24.7 million, respectively, for excess and obsolete inventory and \$ 50,000 and \$47,000, respectively, for lower of cost or net realizable value reserves.

Note 4. Property, Plant and Equipment, Net

The components of our property, plant and equipment are summarized below (in thousands):

	March 31, 2023	December 31, 2022
Property, plant and equipment:		
Machinery and equipment, at cost	\$ 64,263	\$ 62,797
Less: accumulated depreciation and amortization	(39,596)	(38,477)
Building, at cost	119,066	118,550
Less: accumulated depreciation and amortization	(21,355)	(20,403)
Leasehold improvements, at cost	7,551	7,430
Less: accumulated depreciation and amortization	(5,721)	(5,559)
Construction in progress	38,316	36,679
	\$ 162,524	\$ 161,017

As of March 31, 2023, the balance of construction in progress was \$ 38.3 million, of which \$29.4 million was related to our buildings in our new Dingxing and Kazuo locations, \$4.8 million was for manufacturing equipment purchases not yet placed in service and \$4.1 million was for construction in progress for our other consolidated

subsidiaries. As of December 31, 2022, the balance of construction in progress was \$ 36.7 million, of which \$27.2 million was for our buildings in our new Dingxing and Kazuo locations, \$5.4 million was for manufacturing equipment purchases not yet placed in service and \$4.1 million was for our construction in progress at our other consolidated subsidiaries.

Note 5. Accrued Liabilities

The components of accrued liabilities are summarized below (in thousands):

	March 31, 2023	December 31, 2022
Accrued compensation and related charges	\$ 3,039	\$ 4,774
Preferred stock dividends payable	2,901	2,901
Advances from customers	1,115	338
Accrued product warranty	915	669
Other tax payable	774	867
Payable in connection with construction in progress	753	4,135
Accrued professional services	663	930
Accrued income taxes	447	729
Current portion of operating lease liabilities	412	485
Other personnel-related costs	291	291
Accrual for sales returns	119	112
Other accrued liabilities	1,772	1,933
	<u>\$ 13,201</u>	<u>\$ 18,164</u>

Note 6. Related Party Transactions

ChaoYang Tongmei purchases raw materials from one of our equity investment entities, Donghai County Dongfang High Purity Electronic Materials Co., Ltd., for production in the ordinary course of business. As of March 31, 2023 and December 31, 2022, amounts payable of \$104,000 and \$103,000, respectively, were included in "Accounts payable" in our condensed consolidated balance sheets.

In September 2021 and October 2021, our consolidated subsidiary, ChaoYang XinMei received funding from a minority investor of \$0.9 million and \$1.0 million, respectively. As of December 31, 2021, \$1.9 million was included in short-term loan from noncontrolling interest in our condensed consolidated balance sheets. In December 2021 and January 2022, the same subsidiary received funding from Tongmei of \$1.4 million and \$1.4 million, respectively. In January 2022, the China local government certified this additional funding in ChaoYang XinMei as an equity investment. As a result, noncontrolling interests increased \$2.2 million and redeemable noncontrolling interests increased \$ 0.2 million. Short-term loan from noncontrolling interest decreased to \$0. In April 2022, Tongmei entered into the Capital Increase Agreement with minority investors to further invest \$4.5 million in ChaoYang XinMei. In April 2022 and May 2022, ChaoYang XinMei received funding from Tongmei of \$1.1 million and \$0.8 million, respectively, as equity investments. In April 2022 and May 2022, the minority investors invested \$0.7 million and \$0.6 million, respectively. As a result, noncontrolling interests increased \$1.4 million and redeemable noncontrolling interests increased \$ 0.1 million. Tongmei's ownership remained at 58.5% after these equity investments. In July 2022, Tongmei and the minority investors further invested \$0.8 million and \$0.6 million in ChaoYang XinMei, respectively. This completed the investment obligations under the Capital Increase Agreement. As a result, noncontrolling interests increased \$610,000 and redeemable noncontrolling interests increased \$57,000. Tongmei's ownership remained at 58.5% after the July 2022 equity investment.

In September 2022, our consolidated subsidiary, ChaoYang LiMei completed the sale of land and its attached buildings to our equity investment entity, ChaoYang KaiMei, for a total consideration of \$1.5 million. In January 2023, ChaoYang KaiMei paid the Company \$1.5 million. As of March 31, 2023, \$0 million was included in "Prepaid expenses and other current assets" in our condensed consolidated balance sheets.

Our Related Party Transactions Policy seeks to prohibit all conflicts of interest in transactions between related parties and us, unless they have been approved by our Board of Directors. This policy applies to all of our employees, directors, and our consolidated subsidiaries. Our executive officers retain board seats on the board of directors of the companies in which we have invested in our China joint ventures. See Note 7 for further details.

Note 7. Investments in Privately-Held Raw Material Companies

We have made strategic investments in private companies located in China in order to gain access at a competitive cost to raw materials that are critical to our substrate business. These companies form part of our overall supply chain strategy.

As of March 31, 2023, the investments are summarized below (in thousands):

Company	Investment Balance as of		Accounting Method	Ownership * Percentage
	March 31, 2023	December 31, 2022		
Nanjing JinMei Gallium Co., Ltd.	\$ 592	\$ 592	Consolidated	**85.5 %
ChaoYang JinMei Gallium Co., Ltd.	1,820	1,820	Consolidated	**85.5 %
Beijing BoYu Semiconductor Vessel Craftwork Technology Co., Ltd.	1,346	1,346	Consolidated	**85.5 %
ChaoYang ShuoMei High Purity Semiconductor Materials Co., Ltd.	1,496	1,000	Consolidated	****75.0 %
ChaoYang XinMei High Purity Semiconductor Materials Co., Ltd.	7,331	7,331	Consolidated	***58.5 %
	<u>\$ 12,585</u>	<u>\$ 12,089</u>		
Donghai County Dongfang High Purity Electronic Materials Co., Ltd.	\$ 1,876	\$ 1,887	Equity	**46 %
Beijing JiYa Semiconductor Material Co., Ltd.	6,559	6,381	Equity	39 %
Xiaoyi XingAn Gallium Co., Ltd.	6,007	5,094	Equity	**25 %
ChaoYang KaiMei Quartz Co., Ltd.	1,665	827	Equity	****40 %
Emeishan Jia Mei High Purity Metals Co., Ltd.	439	418	Equity	25 %
	<u>\$ 16,546</u>	<u>\$ 14,607</u>		

* These percentages reflect the ownership currently in effect upon the completion of the reorganization in China and the ownership in effect upon the completion of the new capital funding by private equity investors in January 2021.

** In preparation for Tongmei's application for a listing of shares in an IPO on the STAR Market, in late December 2020 we reorganized our entity structures in China. JinMei and BoYu and its subsidiaries, previously organized under AXT, Inc., were assigned to Tongmei and effectively merged with Tongmei although they retained their own respective legal entity status and are wholly owned subsidiaries of Tongmei. The 33% minority interest stakeholders of BoYu converted their ownership to a 7.59% minority interest in Tongmei. The 8.5% minority interest stakeholders, employees of JinMei, converted their ownership to a 0.38% minority interest in Tongmei. Further, a number of employees, key managers and contributors, purchased a 0.4% minority interest in Tongmei. In 2020, the Investors transferred approximately \$48.1 million of new capital to Tongmei. An additional investment of approximately \$1.5 million of new capital was funded in early January 2021. Under China regulations these investments must be formally approved by the appropriate government agency and are not deemed to be dilutive until such approval is granted. The government approved the approximately \$49 million investment in its entirety on January 25, 2021 at which time the Investors owned a redeemable noncontrolling interest in Tongmei of 7.28%. As of March 31, 2023, Tongmei's noncontrolling interests and redeemable noncontrolling interests totaled approximately 14.5%. AXT remains the controlling stakeholder of Tongmei and holds a majority of the Board of Director positions of Tongmei.

*** In February 2021, Tongmei signed a joint venture agreement with certain investors to fund ChaoYang XinMei.

**** In April 2022, ChaoYang JinMei signed a joint venture agreement with certain investor to fund a new company, ChaoYang ShuoMei.

***** In April 2022, Tongmei signed a joint venture agreement with certain investors to fund a new company, ChaoYang KaiMei.

Before August 1, 2020, our ownership of ChaoYang JinMei was 100%. In August 2020, we sold an 8.5% ownership interest to current members of the ChaoYang JinMei management team for approximately \$396,000. As a result, our ownership of ChaoYang JinMei decreased from 100% to 91.5%. As of August 2020, we referred to ChaoYang JinMei as a significantly controlled subsidiary instead of a wholly owned subsidiary. Our Chief Executive Officer is chairman of the JinMei board and we have appointed two other representatives to serve on the JinMei board.

In December 2020, we purchased shares equivalent to 4% of BoYu from the same third-party investor for \$ 1.6 million. As a result, our ownership of BoYu increased from 63% to 67%. We continue to consolidate BoYu as we have a controlling financial interest and have majority control of the board and accordingly no gain was recognized as a result of this equity transaction. Our Chief Executive Officer is chairman of the BoYu board and we have appointed two other representatives to serve on the board.

An additional step in the STAR Market IPO process involved certain entity reorganizations and alignment of assets under Tongmei. In this regard, our two consolidated raw material companies, JinMei and BoYu, and its subsidiaries, were assigned to Tongmei in December 2020. This increased the number of customers and employees attributable to Tongmei as well as increased Tongmei's consolidated revenue.

Although we have representation on the board of directors of each of the privately held raw material companies, the daily operations of each of these companies are managed by local management and not by us. Decisions concerning their respective short-term strategy and operations, ordinary course of business capital expenditures and sales of finished product, are made by local management with regular guidance and input from us.

For AXT's minority investment entities that are not consolidated, the investment balances are included in "Other assets" in our condensed consolidated balance sheets and totaled \$16.5 million and \$14.6 million as of March 31, 2023 and December 31, 2022, respectively. Our respective ownership interests in each of these companies are 46%, 40%, 39%, 25% and 25%. These minority investment entities are not considered variable interest entities because:

- all minority investment entities have sustainable businesses of their own;
- our voting power is proportionate to our ownership interests;
- we only recognize our respective share of the losses and/or residual returns generated by the companies if they occur; and
- we do not have controlling financial interest in, do not maintain operational or management control of, do not control the board of directors of, and are not required to provide additional investment or financial support to any of these companies.

In June 2022, we received a \$1.3 million dividend from BoYu. In July 2022, we received a \$ 1.5 million dividend from one of our equity investment entities, Xiaoyi XingAn Gallium Co., Ltd. ("Xiaoyi XingAn"). In August 2022, we received a \$125,000 dividend from one of our equity investment entities, Beijing JiYa Semiconductor Material Co., Ltd. ("JiYa"). All of these distributions were paid to the PRC companies and the minority shareholders.

AXT's minority investment entities are not consolidated and are accounted for under the equity method. The equity investment entities had the following summarized statements of operations information (in thousands) for the three months ended March 31, 2023 and 2022:

	Three Months Ended March 31,	
	2023	2022
Net revenue	\$ 7,974	\$ 10,734
Gross profit	\$ 2,906	\$ 5,999
Operating income	\$ 1,991	\$ 4,149
Net income	\$ 3,945	\$ 3,698

Our portion of the income and losses from these minority investment entities that are not consolidated and are accounted for under the equity method was an income of \$1.0 million and \$1.1 million, respectively, for the three months ended March 31, 2023 and 2022.

Note 8. Stockholders' Equity

Condensed Consolidated Statements of Stockholders' Equity (in thousands)

The changes in stockholders' equity by component for the three months ended March 31, 2023 are as follows:

	Preferred Stock	Common Stock	Additional Paid-In Capital	Accumulated Deficit	Accumulated Other Comprehensive Income (Loss)	AXT, Inc. Stockholders' Equity	Noncontrolling Interests	Total Stockholders' Equity
Balance as of December 31, 2022	\$ 3,532	\$ 44	\$ 235,308	\$ (14,159)	\$ (3,118)	\$ 221,607	\$ 23,293	\$ 244,900
Common stock options exercised	—	—	8	—	—	8	—	8
Investment in subsidiary with noncontrolling interest	—	—	(36)	—	—	(36)	239	203
Investment in subsidiary with redeemable noncontrolling interest	—	—	(36)	—	—	(36)	—	(36)
Noncontrolling interest portion of Tongmei stock- based compensation	—	—	33	—	—	33	(16)	17
Stock-based compensation	—	—	717	—	—	717	—	717
Tongmei stock- based compensation	—	—	198	—	—	198	—	198
Net loss	—	—	—	(3,348)	—	(3,348)	(169)	(3,517)
Other comprehensive income	—	—	—	—	858	858	70	928
Balance as of March 31, 2023	\$ 3,532	\$ 44	\$ 236,192	\$ (17,507)	\$ (2,260)	\$ 220,001	\$ 23,417	\$ 243,418

Net loss and other comprehensive income attributable to redeemable noncontrolling interests were \$ 149,000 and \$70,000, respectively, for the three months ended March 31, 2023 and are not shown in the table above.

The changes in stockholders' equity by component for the three months ended March 31, 2022 are as follows:

	Preferred Stock	Common Stock	Additional Paid-In Capital	Accumulated Deficit	Accumulated Other Comprehensive Income (Loss)	AXT, Inc. Stockholders' Equity	Noncontrolling Interests	Total Stockholders' Equity
Balance as of December 31, 2021	\$ 3,532	\$ 43	\$ 231,622	\$ (29,970)	\$ 6,302	\$ 211,529	\$ 18,317	\$ 229,846
Investment in subsidiary with noncontrolling interest	—	—	(410)	—	—	(410)	204	(206)
Noncontrolling interest portion of Tongmei stock- based compensation	—	—	17	—	—	17	(7)	10
Stock-based compensation	—	—	875	—	—	875	—	875
Tongmei stock- based compensation	—	—	213	—	—	213	—	213
Net income	—	—	—	3,165	—	3,165	389	3,554
Investment in subsidiary from noncontrolling interest	—	—	—	—	—	—	1,887	1,887
Other comprehensive income	—	—	—	—	327	327	45	372
Balance as of March 31, 2022	\$ 3,532	\$ 43	\$ 232,317	\$ (26,805)	\$ 6,629	\$ 215,716	\$ 20,835	\$ 236,551

Net income and other comprehensive income attributable to redeemable noncontrolling interests were \$ 418,000 and \$46,000, respectively, for the three months ended March 31, 2023 and are not shown in the table above.

There were no reclassification adjustments from accumulated other comprehensive income (loss) for the three months ended March 31, 2023 and 2022.

Stock Repurchase Program

On October 27, 2014, our Board of Directors approved a stock repurchase program pursuant to which we may repurchase up to \$5.0 million of our outstanding common stock. These repurchases can be made from time to time in the open market and are funded from our existing cash balances and cash generated from operations. During 2015, we repurchased approximately 908,000 shares at an average price of \$ 2.52 per share for a total purchase price of approximately \$2.3 million under the stock repurchase program. No shares were repurchased from 2016 through 2022. During the three months ended March 31, 2023, we did not repurchase any shares under the approved stock repurchase program. As of March 31, 2023, approximately \$2.7 million remained available for future repurchases under this program. Currently, we do not plan to repurchase additional shares.

Note 9. Stock-Based Compensation

We account for stock-based compensation in accordance with the provisions of ASC Topic 718, *Compensation-Stock Compensation* ("ASC 718"), which established accounting for stock-based awards exchanged for employee services. Stock-based compensation cost is measured at each grant date, based on the fair value of the award, and is recognized as expense over the employee's requisite service period of the award. All of our stock compensation is accounted for as an equity instrument.

The following table summarizes compensation costs related to our stock-based awards (in thousands, except per share data):

	Three Months Ended March 31,	
	2023	2022
Cost of revenue	\$ 105	\$ 113
Selling, general and administrative	632	811
Research and development	178	164
Net effect on net income (loss)	<u>\$ 915</u>	<u>\$ 1,088</u>

As of March 31, 2023, the unamortized compensation costs related to unvested stock options granted to employees under our stock option plan was approximately \$0.1 million, net of estimated forfeitures of \$12,000. These costs will be amortized on a straight-line basis over a weighted-average period of approximately 0.6 years and will be adjusted for subsequent changes in estimated forfeitures. We did not capitalize any stock-based compensation to inventory as of March 31, 2023 and December 31, 2022 due to the immateriality of the amount.

We estimate the fair value of stock options using the Black-Scholes option pricing model, consistent with the provisions of ASC 718. There were no options granted in the three months ended March 31, 2023 and 2022.

The following table summarizes the stock option transactions during the three months ended March 31, 2023 (in thousands, except per share data):

Stock Options	Number of Options Outstanding	Weighted- average Exercise Price	Weighted- average Remaining Contractual Life (in years)	Aggregate Intrinsic Value
Balance as of January 1, 2023	1,206	\$ 5.09	5.08	\$ 630
Granted	—	—	—	—
Exercised	(3)	2.30	—	—
Canceled and expired	—	—	—	—
Balance as of March 31, 2023	<u>1,203</u>	\$ 5.10	4.83	\$ 456
Options vested as of March 31, 2023 and unvested options expected to vest, net of forfeitures	1,203	\$ 5.10	4.83	\$ 455
Options exercisable as of March 31, 2023	1,114	\$ 5.26	4.69	\$ 373

The aggregate intrinsic value in the table above represents the total pretax intrinsic value, based on our closing price of \$3.98 on March 31, 2023, which would have been received by the option holder had all option holders exercised their options on that date.

Restricted stock awards

A summary of activity related to restricted stock awards for the three months ended March 31, 2023 is presented below (in thousands, except per share data):

Stock Awards	Shares	Weighted-Average Grant Date Share Value
Non-vested as of January 1, 2023	984	\$ 5.55
Granted	20	\$ 4.41
Vested	(9)	\$ 12.26
Forfeited	(3)	\$ 5.40
Non-vested as of March 31, 2023	<u>992</u>	\$ 5.46

As of March 31, 2023, the unamortized compensation costs related to unvested restricted stock awards was approximately \$4.5 million, which is to be amortized on a straight-line basis over a weighted-average period of approximately 1.4 years.

At-Risk, Performance Shares

In February 2022 and March 2023, the Company issued at-risk, performance shares classified as equity awards. Expense is recognized quarterly on a straight-line method over the requisite service period, based on the probability of achieving the specified financial performance metric, with changes in expectations recognized as an adjustment to earnings in the period of change. Compensation cost is not recognized for at-risk, performance shares that do not vest because service or performance conditions are not satisfied and any previously recognized compensation cost is reversed. At-risk, performance shares are eligible to receive dividend equivalents under the Company's 2015 Equity Incentive Plan (the "Plan"), as determined by the Board of Directors. The Company will recognize forfeitures as they occur.

The Company's at-risk, performance shares are classified as equity and contain performance and service conditions that must be satisfied for an employee to receive the shares. The financial performance metric for the at-risk, performance shares issued in February 2022 is based upon year-end 2021 actual results as compared to the Company's year-end actual results in 2022. The financial performance metrics for the at-risk, performance shares issued in March 2023 are based upon the Company's year-end actual results in 2023. All performance shares, if earned, are still subject to annual vesting over a four-year period, except that no shares are vested on the first anniversary because the performance measurement is based on year-end results for the year 2022 and 2023, respectively.

The fair value of the at-risk, performance shares is determined based on the closing price of the Company's common stock on the first day after the public issuance of the Company's earnings release for the most recent fiscal quarter, following the Compensation Committee and Board of Directors approval, which is considered the grant date. The fair value per share of the at-risk, performance shares classified as equity awards granted in February 2022 and March 2023 was \$7.83 and \$3.71, respectively.

On February 17, 2021, the Compensation Committee recommended, and the Board of Directors approved, the grant to Dr. Morris Young, our Chief Executive Officer, of 113,130 at-risk, performance shares under the Plan. On February 17, 2021, the Compensation Committee approved the grant to Gary Fischer, our Chief Financial Officer and Corporate Secretary, of 38,475 at-risk, performance shares under the Plan. On March 14, 2022, the Compensation Committee met and certified the year-over-year annual revenue growth rate achieved for fiscal year 2021, expressed as a percentage, was 44%. Therefore, all of the at-risk performance shares became eligible to vest.

On February 15, 2022, the Compensation Committee recommended, and the Board of Directors approved, the grant to Dr. Morris Young of 114,320 at-risk, performance shares under the Plan. On February 15, 2022, the Compensation Committee approved the grant to Gary Fischer of 32,100 at-risk, performance shares under the Plan. On February 14, 2023, the Compensation Committee met and certified the year-over-year annual revenue growth rate achieved for fiscal year 2022, expressed as a percentage, was 2.7%. Therefore, none of the at-risk performance shares became eligible to vest.

On March 15, 2023, the Compensation Committee recommended, and the Board of Directors approved, the grant to Dr. Morris Young of 223,590 at-risk, performance shares under the Plan. On March 15, 2023, the Compensation Committee approved, the grant to Gary Fischer of 77,600 at-risk, performance shares under the Plan. If the minimum financial metric is achieved, then based upon a performance formula, a corresponding portion of the 223,590 shares issued to Dr. Young would be eligible to vest and a corresponding portion of the 77,600 shares issued to Mr. Fischer would be eligible to vest. If the target financial metric is exceeded and an additional financial metric is achieved, additional shares above the target number of shares are earned based on such performance formula and the maximum number of additional shares earned is capped at 100% of the target. If the minimum financial metric is not achieved, then these awards are forfeited based upon the pre-determined revenue metric for the year ending December 31, 2023.

A summary of the status of our unvested at-risk, performance shares as of March 31, 2023 is presented below (in thousands, except per share data):

Stock Awards	Shares	Weighted-Average Grant Date Share Value
Non-vested as of January 1, 2023	76	\$ 15.37
Granted	13	\$ 3.71
Vested	—	\$ —
Forfeited	—	\$ —
Non-vested as of March 31, 2023	89	\$ 13.71

*The number of shares presented is based on achieving 150% of the targeted financial performance metric as defined in the at-risk, performance shares agreement.

** The first annual vesting was reported in Q4 2021, when 25% of the at-risk performance shares became eligible subject to review and confirmation by the Compensation Committee after year-end results were certified.

As of March 31, 2023, there was \$0.4 million of unrecognized compensation expense related to unvested at-risk, performance shares that is expected to be recognized over a weighted-average period of 1.2 years.

Note 10. Net Income (Loss) Per Share

Basic net income (loss) per share is computed using the weighted-average number of common shares outstanding during the periods less shares of common stock subject to repurchase and non-vested stock awards. Diluted net income (loss) per share is computed using the weighted-average number of common shares outstanding and potentially dilutive common shares outstanding during the periods. The dilutive effect of outstanding stock options and restricted stock awards is reflected in diluted earnings per share by application of the treasury stock method. Potentially dilutive common shares consist of common shares issuable upon the exercise of stock options and vesting of restricted stock awards. Potentially dilutive common shares are excluded from the computation of weighted-average number of common shares outstanding in net loss years, as their effect would be anti-dilutive to the computation.

A reconciliation of the numerators and denominators of the basic and diluted net income (loss) per share calculations is as follows (in thousands, except per share data):

	Three Months Ended March 31,	
	2023	2022
Numerator:		
Net income (loss) attributable to AXT, Inc.	\$ (3,348)	\$ 3,165
Less: Preferred stock dividends	(44)	(44)
Net income (loss) available to common stockholders	<u>\$ (3,392)</u>	<u>\$ 3,121</u>
Denominator:		
Denominator for basic net income (loss) per share - weighted-average common shares	42,498	41,871
Effect of dilutive securities:		
Common stock options	—	474
Restricted stock awards	—	317
Denominator for dilutive net income (loss) per common shares	<u>42,498</u>	<u>42,662</u>
Net income (loss) attributable to AXT, Inc. per common share:		
Basic	<u>\$ (0.08)</u>	<u>\$ 0.07</u>
Diluted	<u>\$ (0.08)</u>	<u>\$ 0.07</u>
Options excluded from diluted net income (loss) per share as the impact is anti-dilutive	<u>1,203</u>	<u>201</u>
Restricted stock excluded from diluted net income (loss) per share as the impact is anti-dilutive	<u>1,081</u>	<u>218</u>

The 883,000 shares of \$0.001 par value Series A preferred stock issued and outstanding as of March 31, 2023 and December 31, 2022, valued at \$3,532,000, are non-voting and non-convertible preferred stock with a 5.0% cumulative annual dividend rate payable when declared by the Board of Directors and a \$4 per share liquidation preference over common stock, which must be paid before any distribution is made to common stockholders. These preferred shares were issued to Lyte Optronics, Inc. stockholders in connection with the completion of our acquisition of Lyte Optronics, Inc. on May 28, 1999.

Note 11. Segment Information and Foreign Operations

Segment Information

We operate in one segment for the design, development, manufacture and distribution of high-performance compound and single element semiconductor substrates and sale of raw materials integral to these substrates. In accordance with ASC Topic 280, Segment Reporting, our chief operating decision maker has been identified as the Chief Executive Officer, who reviews operating results to make decisions about allocating resources and assessing performance for the Company. Since we operate in one segment, all financial segment and product line information can be found in the condensed consolidated financial statements.

Product Information

The following table represents revenue amounts (in thousands) by product type:

	Three Months Ended March 31,	
	2023	2022
Product Type:		
Substrates	\$ 13,489	\$ 31,745
Raw Materials and Other	5,916	7,908
Total	<u>\$ 19,405</u>	<u>\$ 39,653</u>

Geographical Information

The following table represents revenue amounts (in thousands) reported for products shipped to customers in the corresponding geographic region:

	Three Months Ended March 31,	
	2023	2022
Geographical region:		
China	\$ 8,102	\$ 17,480
Taiwan	2,471	6,859
Japan	1,535	2,807
Asia Pacific (excluding China, Taiwan and Japan)	1,091	1,756
Europe (primarily Germany)	3,570	6,394
North America (primarily the United States)	2,636	4,357
Total	<u>\$ 19,405</u>	<u>\$ 39,653</u>

Long-lived assets consist primarily of property, plant and equipment and operating lease right-of-use assets, and are attributed to the geographic location in which they are located. Long-lived assets, net of depreciation, by geographic region were as follows (in thousands):

	As of	
	March 31, 2023	December 31, 2022
Long-lived assets by geographic region, net of depreciation:		
North America	\$ 273	\$ 346
China	163,910	162,432
	<u>\$ 164,183</u>	<u>\$ 162,778</u>

Significant Customers

No customers represented 10% of our revenue for the three months ended March 31, 2023 and one customer, Landmark, represented 10% of our revenue for the three months ended March 31, 2022. Our top five customers, although not the same five customers for each period, represented 28% and 29% of our revenue for the three months ended March 31, 2023 and 2022, respectively.

We perform ongoing credit evaluations of our customers' financial condition, and limit the amount of credit extended when deemed necessary, but generally do not require collateral. No customers accounted for 10% of our accounts receivable balance as of March 31, 2023, and two customers accounted for more than 10% of our accounts receivable as of December 31, 2022.

Note 12. Commitments and Contingencies

Indemnification Agreements

We have entered into indemnification agreements with our directors and officers that require us to indemnify our directors and officers against liabilities that may arise by reason of their status or service as directors or officers, other than liabilities arising from willful misconduct of a culpable nature; to advance their expenses incurred as a result of any proceeding against them as to which they could be indemnified; and to obtain directors' and officers' insurance if available on reasonable terms, which we currently have in place.

Product Warranty

We provide warranties for our products for a specific period of time, generally twelve months, against material defects. We provide for the estimated future costs of warranty obligations in cost of sales when the related revenue is recognized. The accrued warranty costs represent the best estimate at the time of sale of the total costs that we expect to incur to repair or replace product parts that fail while still under warranty. The amount of accrued estimated warranty costs is primarily based on historical experience as to product failures as well as current information on repair costs. On a quarterly basis, we review the accrued balances and update the historical warranty cost trends.

The following table reflects the change in our warranty accrual which is included in "Accrued liabilities" in the condensed consolidated balance sheets, during the three months ended March 31, 2023 and 2022 (in thousands):

	Three Months Ended March 31,	
	2023	2022
Beginning accrued product warranty	\$ 669	\$ 743
Accruals for warranties issued	544	556
Adjustments related to pre-existing warranties including expirations and changes in estimates	25	(113)
Cost of warranty repair	(323)	(354)
Ending accrued product warranty	<u>\$ 915</u>	<u>\$ 832</u>

Contractual Obligations

In 2020, we and a competitor entered into a cross license and covenant agreement (the “Cross License Agreement”), which has a term that began on January 1, 2020 and expires on December 31, 2029. The Cross License Agreement is a fixed-cost cross license and not a variable-cost cross license that is based on revenue or units. Under the Cross License Agreement, we are obligated to make annual payments over a 10-year period.

Land Purchase and Investment Agreement

We have established a wafer process production line in Dingxing, China. In addition to a land rights and building purchase agreement that we entered into with a private real estate development company to acquire our new manufacturing facility, we also entered into a cooperation agreement with the Dingxing local government. In addition to pledging its full support and cooperation, the Dingxing local government will issue certain credits or rebates to us as we achieve certain milestones. We, in turn, agreed to hire local workers over time, pay taxes when due and eventually demonstrate a total investment of approximately \$90 million in value, assets and capital. The investment will include cash paid for the land and buildings, cash on deposit in our name at local banks, the gross value of new and used equipment (including future equipment that might be used for indium phosphide and germanium substrates production), the deemed value for our customer list or the end user of our substrates, for example, the end users of 3-D sensing VCSELs (vertical cavity surface emitting lasers), a deemed value for employment of local citizens, a deemed value for our proprietary process technology, other intellectual property, other intangibles and additional items of value. There is no timeline or deadline by which this must be accomplished, rather it is a good faith covenant entered into between AXT and the Dingxing local government. Further, there is no specific penalty contemplated if either party breaches the agreement. However, the agreement does state that each party has a right to seek from the other party compensation for losses. Under certain conditions, the Dingxing local government may purchase the land and building at the appraised value. We believe that such cooperation agreements are normal, customary and usual in China and that the future valuation is flexible. We have a similar agreement with the city of Kazuo, China, although on a smaller scale. The total investment targeted by AXT in Kazuo is approximately \$15 million in value, assets and capital. In addition, BoYu has a similar agreement with the city of Kazuo. The total investment targeted by BoYu in Kazuo is approximately \$8 million in value, assets and capital.

Purchase Obligations with Penalties for Cancellation

In the normal course of business, we issue purchase orders to various suppliers. In certain cases, we may incur a penalty if we cancel the purchase order. As of March 31, 2023, we do not have any outstanding purchase orders that will incur a penalty if cancelled by the Company.

Legal Proceedings

From time to time we may be involved in judicial or administrative proceedings concerning matters arising in the ordinary course of business. We do not expect that any of these matters, individually or in the aggregate, will have a material adverse effect on our business, financial condition, cash flows or results of operations.

Note 13. Other Income (expense), Net

Other income (expense), net for the three months ended March 31, 2023 and 2022, includes a grant of \$ 0.5 million and \$0.2 million, respectively, from a Chinese provincial government agency as an award for relocating to its province.

In addition, we incurred a foreign currency transaction exchange loss of \$ 213,000 and \$228,000 for the three months ended March 31, 2023 and 2022, respectively.

Note 14. Income Taxes

We account for income taxes in accordance with ASC Topic 740, Income Taxes ("ASC 740"), which requires that deferred tax assets and liabilities be recognized using enacted tax rates for the effect of temporary differences between the book and tax bases of recorded assets and liabilities. ASC 740 also requires that deferred tax assets be reduced by a valuation allowance if it is more likely than not that a portion of the deferred tax asset will not be realized.

We provide for income taxes based upon the geographic composition of worldwide earnings and tax regulations governing each region, particularly China. The calculation of tax liabilities involves significant judgment in estimating the impact of uncertainties in the application of complex tax laws, particularly in foreign countries such as China.

We recognize interest and penalties related to uncertain tax positions in income tax expense. Income tax expense for the three months ended March 31, 2023 includes no interest and penalties. As of March 31, 2023, we have no accrued interest and penalties related to uncertain tax positions. We file income tax returns in the U.S. federal, various states and foreign jurisdictions. Currently, there is no tax audit in any of the jurisdictions and we do not expect there will be any significant change to this.

Provision for income taxes for the three months ended March 31, 2023 was mostly related to our wholly owned China subsidiaries and our partially owned subsidiaries in China. Income taxes and certain state taxes, have been provided for our U.S. operations as most of the income in the U.S. had been fully offset by utilization of federal and state net operating loss carryforwards except for the newly created US subsidiary, AXT-Tongmei. Which has incurred tax expense.

Under the 2017 Tax Cuts and Jobs Act (TCJA), research and experimental ("R&E"), expenditures incurred or paid for tax years beginning after December 31, 2021 will no longer be immediately deductible for tax purposes. Instead, businesses are now required to capitalize and amortize R&E expenditures over a period of five years for research conducted within the U.S. or 15 years for research conducted in a foreign jurisdiction. We capitalize the R&E expense incurred by our Delaware corporation and amortize it over five years. We also capitalize the R&E expense incurred by our China subsidiaries and amortize it over 15 years.

On June 29, 2020, California Governor Gavin Newsom signed Assembly Bill 85 ("AB 85") into law as part of the California 2020 Budget Act, which temporarily suspends the use of California net operating losses and imposes a cap on the amount of business incentive tax credits that companies can utilize against their net income for tax years 2020, 2021, and 2022. We analyzed the provisions of AB 85 and determined there was no impact on our provision for income taxes for the current period and will continue to evaluate the impact, if any, AB 85 may have on the Company's condensed consolidated financial statements and disclosures.

Note 15. Revenue

Revenue Recognition

We manufacture and sell high-performance compound semiconductor substrates including indium phosphide, gallium arsenide and germanium wafers, and our consolidated subsidiaries sell certain raw materials, including high purity gallium (7N Ga), pyrolytic boron nitride (pBN) crucibles and boron oxide (B2O3). After we ship our products, there are no remaining obligations or customer acceptance requirements that would preclude revenue recognition. Our

products are typically sold pursuant to purchase orders placed by our customers, and our terms and conditions of sale do not require customer acceptance. We account for a contract with a customer when there is a legally enforceable contract, which could be the customer's purchase order, the rights of the parties are identified, the contract has commercial terms, and collectibility of the contract consideration is probable. The majority of our contracts have a single performance obligation to transfer products and are short term in nature, usually less than six months. Our revenue is measured based on the consideration specified in the contract with each customer in exchange for transferring products that are generally based upon a negotiated formula, list or fixed price. Revenue is recognized when control of the promised goods is transferred to our customer, which is either upon shipment from our dock, receipt at the customer's dock, or removal from consignment inventory at the customer's location, in an amount that reflects the consideration we expect to be entitled to receive in exchange for those goods.

We have elected to account for shipping and handling as activities to fulfill the promise to transfer the goods. Shipping and handling fees billed to customers in a sales transaction are recorded as an offset to shipping and handling expenses. Sales taxes and value added taxes in foreign jurisdictions that are collected from customers and remitted to governmental authorities are accounted for on a net basis and, therefore, are excluded from revenue.

We do not provide training, installation or commissioning services. We provide for future returns based on historical data, prior experience, current economic trends and changes in customer demand at the time revenue is recognized. We do not recognize any asset associated with the incremental cost of obtaining revenue generating customer contracts. As such, sales commissions are expensed as incurred, given that the expected period of benefit is less than one year.

Contract Balances

Contract assets are recorded when we have a conditional right to consideration for our completed performance under the contracts. Accounts receivables are recorded when the right to this consideration becomes unconditional. We believe the fair value of our accounts receivable approximates its carrying value due to its short maturities and nominal credit risk. We do not have any material contract assets as of March 31, 2023. In some contracts we require payment in advance of shipment, per a billing schedule reflected in our customer contracts, and the payment is recorded as a contract liability. The following table reflects the contract liabilities balance, which is included in "Accrued liabilities" on the condensed consolidated balance sheets, as of March 31, 2023 and December 31, 2022 (in thousands):

	March 31, 2023	December 31, 2022
Contract liabilities	\$ 1,115	\$ 338

During the three months ended March 31, 2023, the Company recognized \$286,000 of revenue that was included in the contract balances as of December 31, 2022.

Disaggregated Revenue

In general, revenue disaggregated by product types and geography (See Note 11) is aligned according to the nature and economic characteristics of our business and provides meaningful disaggregation of our results of operations. Since we operate in one segment, all financial segment and product line information can be found in the condensed consolidated financial statements.

Note 16. Bank Loans and Line of Credit

Our bank loans and credit facilities typically have a term of 12 months or less and are included in "Bank loan" in our condensed consolidated balance sheets. The following table represents bank loans as of March 31, 2023 and December 31, 2022 (in thousands, except interest rate data):

Subsidiary	Bank	Loan Detail	Interest Rate	Start Date	Due Date	December 31, 2022	March 31, 2023
Tongmei	Bank of China (1)	\$ 2,108	2.7 %	September-22	March-23	\$ 2,175	\$ -
		3,935	4.6 %	January-22	January-23	4,059	-
	Bank of China (5)	1,405	4.2 %	April-22	April-23	1,450	1,455
		1,848	3.5 %	January-23	January-24	-	1,848
	Bank of China (3)	2,184	2.8 %	March-23	March-24	-	2,184
		2,911	3.5 %	January-23	January-24	-	2,911
	Bank of Communications (2)	1,405	3.3 %	January-22	January-23	1,450	-
		1,405	3.3 %	January-22	January-23	1,450	-
	Bank of Communications (5)	1,450	3.3 %	December-22	December-23	1,450	1,455
		1,455	3.3 %	January-23	January-24	-	1,455
	China Merchants Bank (5)	4,367	3.7 %	January-23	January-24	-	4,367
		3,192	4.2 %	May-22	May-23	3,292	3,306
	Bank of Beijing (4)	2,290	4.2 %	January-23	January-24	-	2,290
		5,621	4.4 %	June-22	June-23	5,798	5,823
	Industrial Bank (5)	2,811	4.4 %	September-22	September-23	2,900	2,911
		1,405	4.8 %	June-22	June-23	1,450	1,455
	NingBo Bank (5)	1,405	4.8 %	August-22	August-23	1,450	1,455
		1,405	4.8 %	September-22	September-23	1,450	1,455
		1,406	4.5 %	November-22	November-23	1,450	1,455
		2,900	4.5 %	December-22	December-23	2,900	2,911
	Industrial and Commercial Bank of China (5)	1,382	4.5 %	January-23	January-24	-	1,382
		5,621	3.2 %	September-22	July-23	5,800	2,911
	NanJing Bank (5)	2,811	4.3 %	September-22	September-23	2,899	2,911
		1,265	4.3 %	November-22	November-23	1,305	1,311
BoYu	Industrial and Commercial Bank of China (6)	1,450	2.8 %	December-22	December-23	1,450	1,455
	Bank of China (5)	1,204	2.4 %	January-23	January-24	-	1,204
	NingBo Bank (5)	703	4.8 %	September-22	March-23	725	-
		1,406	3.6 %	November-22	May-23	1,450	1,455
		725	4.8 %	December-22	June-23	725	728
		\$ 728	3.6 %	March-23	September-23	-	728
Loan Balance						\$ 47,078	\$ 52,821

Collateral for the above bank loans and line of credit

- (1) Baoding Tongmei's land use rights and all of its buildings located at its facility in Dingxing, China.
- (2) ChaoYang Tongmei's land use rights and all of its buildings located at its facility in Kazuo, China.
- (3) ChaoYang LiMei time deposit.
- (4) AXT time deposit.
- (5) Not collateralized.
- (6) BoYu's land use rights and its building located at its facility in Tianjin, China and BoYu's accounts receivable.

Note 17. Leases

We lease certain equipment, office space, warehouse and facilities under long-term operating leases expiring at various dates through July 2029. The majority of our lease obligations relate to our lease agreement for a nitrogen system to be used during the manufacturing process for our facility in Dingxing, China. The equipment lease became effective in August 2019 and will expire in July 2029. There are no variable lease payments, residual value guarantees or any restrictions or covenants imposed by the equipment lease. The remainder relate to our lease agreement for our facility in Fremont, California with approximately 19,467 square feet, which was scheduled to expire in 2020. Under the terms of the facility lease agreement, in May 2020, we were granted an extension to the term of the lease for an additional three years. We are in the process of negotiating a new lease at our current location. We are reasonably certain to sign a new lease for a minimum term of three years in the coming months. There are no variable lease payments, residual value guarantees or any restrictions or covenants imposed by the facility lease. All other operating leases have a term of 12 months or less.

Leases are classified as either finance leases or operating leases. A lease is classified as a finance lease if any one of the following criteria are met: the lease transfers ownership of the asset by the end of the lease term, the lease contains an option to purchase the asset that is reasonably certain to be exercised, the lease term is for a major part of the remaining useful life of the asset or the present value of the lease payments equals or exceeds substantially all of the fair value of the asset. A lease is classified as an operating lease if it does not meet any one of these criteria. All of our leases

are classified as operating leases and substantially all of our operating leases are comprised of equipment and office space leases. None of our leases are classified as finance leases.

For all leases at the lease commencement date, a right-of-use asset and a lease liability are recognized. The right-of-use asset represents the right to use the leased asset for the lease term. The lease liability represents the present value of the lease payments under the lease.

The right-of-use asset is initially measured at cost, which primarily comprises the initial amount of the lease liability, plus any initial direct costs incurred, consisting mainly of brokerage commissions, less any lease incentives received. All right-of-use assets are reviewed for impairment. The lease liability is initially measured at the present value of the lease payments, discounted using the interest rate implicit in the lease or, if that rate cannot be readily determined, our secured incremental borrowing rate for the same term as the underlying lease.

Lease payments included in the measurement of the lease liability comprise the following: the fixed noncancelable lease payments, payments for optional renewal periods where it is reasonably certain the renewal period will be exercised, and payments for early termination options unless it is reasonably certain the lease will not be terminated early.

Lease expense for operating leases consists of the lease payments plus any initial direct costs, primarily brokerage commissions, and is recognized on a straight-line basis over the lease term.

We have elected not to recognize right-of-use assets and lease liabilities for short-term leases that have a term of 12 months or less. The effect of short-term leases on our right-of-use asset and lease liability was not material.

As of March 31, 2023, the maturities of our operating lease liabilities (excluding short-term leases) are as follows (in thousands):

Maturity of Lease Liabilities

2023	\$	413
2024		271
2025		271
2026		271
2027		271
Thereafter		427
Total minimum lease payments		1,924
Less: Interest		(237)
Present value of lease obligations		1,687
Less: Current portion, included in accrued liabilities		(412)
Long-term portion of lease obligations	\$	<u>1,275</u>

The weighted-average remaining lease term and the weighted-average discount rate for our operating leases as of each date is as follows:

	March 31, 2023	December 31, 2022
Weighted-average remaining lease term (years)	5.80	5.89
Weighted-average discount rate	4.61 %	4.61 %

Supplemental cash flow information related to leases where we are the lessee is as follows (in thousands):

	Three Months Ended	
	March 31,	
	2023	2022
Cash paid for amounts included in the measurement of lease liabilities:		
Operating cash flows from operating leases	\$ 147	\$ 147

The components of lease expense are as follows (in thousands) within our condensed consolidated statements of operations:

	Three Months Ended	
	March 31,	
	2023	2022
Operating lease	\$ 129	\$ 134
Short-term lease expense	34	36
Total	\$ 163	\$ 170

Note 18. Redeemable Noncontrolling Interests

As discussed in Note 1, during the quarter ended December 31, 2020, Tongmei entered into the Capital Investment Agreements with Investors that invested approximately \$48.1 million in the form of redeemable noncontrolling interests representing 7.06% of the outstanding shares of Tongmei. An additional investment of approximately \$ 1.5 million of new capital was funded in early January 2021. Under China regulations these investments must be formally approved by the appropriate government agency and are not deemed to be dilutive until such approval is granted. The government approved the entire approximately \$49 million investment on January 25, 2021, at which time the Investors owned a redeemable noncontrolling interest in Tongmei of 7.28%. The initial carrying amount of the redeemable noncontrolling interest was recorded at fair value on the date of issuance of Tongmei's common stock, net of issuance costs and presented in temporary equity on the condensed consolidated balance sheets. This classification is due to the existence of certain contingencies that could result in potential redemption at the fixed purchase price as described below. We currently do not believe that this is probable thus no amortization of the issuance costs has been recorded.

Pursuant to the Capital Investment Agreements with the Investors, each Investor has the right to require AXT to redeem any or all Tongmei shares held by such Investor at the original purchase price paid by such Investor, without interest, in the event the IPO fails to pass the audit of the Shanghai Stock Exchange, is not approved by the Chinese Securities Regulatory Commission ("CSRC") or Tongmei cancels the IPO application. The aggregate redemption amount is approximately \$49 million, subject to the foreign exchange rate variable at time of redemption.

Tongmei submitted its IPO application to the Shanghai Stock Exchange in December 2021 and it was formally accepted for review on January 10, 2022. The Shanghai Stock Exchange approved the IPO application on July 12, 2022. On August 1, 2022, the CSRC accepted for review Tongmei's IPO application. The STAR Market IPO remains subject to review and approval by the CSRC and other authorities. The process of going public on the STAR Market includes several periods of review and, therefore, is a lengthy process. Subject to review and approval by the CSRC and other authorities, Tongmei hopes to accomplish this goal in the coming months. The listing of Tongmei on the STAR Market will not change the status of AXT as a U.S. public company.

The components of the change in redeemable noncontrolling interests for the three months ended March 31, 2023 are presented in the following table (in thousands):

Balance as of January 1, 2023	\$ 44,846
Investment in subsidiary with redeemable noncontrolling interest	36
Equity issuance costs incurred	(70)
Stock-based compensation attributable to redeemable noncontrolling interests	(17)
Net loss attributable to redeemable noncontrolling interests	(149)
Effect of foreign currency translation on redeemable noncontrolling interests	204
Effect of foreign currency translation attributable to redeemable noncontrolling interests	70
Balance as of March 31, 2023	\$ 44,920

Note 19. Recent Accounting Pronouncements

In March 2022, FASB pronouncement ASU 2022-02, Financial Instruments-Credit Losses (Topic 326): Troubled Debt Restructurings and Vintage Disclosures was issued as an amendment to Accounting Standards Update 2016-13, Financial Instruments-Credit Losses. ASU 2022-02 aims to modify disclosure requirements for certain loan refinancings and restructurings by creditors. The amendment also require that an entity disclose current-period gross write offs by year of origination for financing receivables and net investments in leases within the scope of Subtopic 326-20, Financial Instruments—Credit Losses—Measured at Amortized Cost. The guidance is effective for fiscal years beginning after December 15, 2022, including interim periods within those fiscal years. Adoption of the new standard had a de minimis effect on our condensed consolidated financial statements.

In September 2022, FASB issued Accounting Standards Update No. 2022-04, Liabilities—Supplier Finance Programs (Subtopic 405-50): Disclosure of Supplier Finance Program Obligations, to enhance the transparency about the use of supplier finance programs for investors. The amendments in this Update require that a buyer in a supplier finance program disclose sufficient information about the program to allow a user of financial statements to understand the program's nature, activity during the period, changes from period to period, and potential magnitude. The guidance is effective for fiscal years beginning after December 15, 2022, including interim periods within those fiscal years. Adoption of the new standard had a de minimis effect on our condensed consolidated financial statements.

Note 20. Subsequent Event

In April 2023, each of Xiaoyi XingAn and JiYa, our equity investment entities, paid to us a dividend of \$ 1.8 million. We have no current intentions to distribute to our investors earnings under our corporate structure.

In April 2023, our consolidated subsidiary, ChaoYang XinMei received a subsidy of approximately \$ 730,000 from the provincial government in China. The aim of the fund is to support innovation in enterprises.

In May 2023, the Company entered into an agreement to divest 15% of its equity investments in Emeishan JiaMei High Pure Materials Co., Ltd. to a third party for approximately \$875,000. Upon completion of the sale, the Company's ownership in Emeishan JiaMei High Pure Materials Co., Ltd. will be reduced to 10%.

ITEM 2. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

This Quarterly Report on Form 10-Q contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. Statements relating to our expectations regarding results of operations, market and customer demand for our products, customer qualifications of our products, our ability to expand our markets or increase sales, emerging applications using chips or devices fabricated on our substrates, the development and adoption of new products, applications, enhancements or technologies, the life cycles of our products and applications, product yields and gross margins, expense levels, the impact of the adoption of certain accounting pronouncements, our investments in capital projects, ramping production at our new sites, potential severance costs with respect to the relocation of our gallium arsenide production lines, our ability to have customers re-qualify substrates from our new manufacturing location in Dingxing, China, our ability to utilize or increase our manufacturing capacity, and our belief that we have adequate cash and investments to meet our needs over the next 12 months are forward-looking statements. Additionally, statements regarding completing steps in connection with the proposed listing of shares of our wafer manufacturing company, Beijing Tongmei Xtal Technology Co., Ltd. ("Tongmei"), on the Shanghai Stock Exchange's Sci-Tech innovation board (the "STAR Market"), being accepted to list shares of Tongmei on the STAR Market, the timing and completion of such listing of shares of Tongmei on the STAR Market are forward-looking statements. Words such as "expects," "anticipates," "intends," "plans," "believes," "seeks," "estimates," "goals," "should," "continues," "would," "could" and similar expressions or variations of such words are intended to identify forward-looking statements, but are not the exclusive means of identifying forward-looking statements in this Quarterly Report on Form 10-Q. Additionally, statements concerning future matters such as our strategy and plans, industry trends and the impact of trends, tariffs and trade wars, the potential or expected impact of the COVID-19 pandemic on our business, results of operations and financial condition, mandatory factory shutdowns in China, changes in policies and regulations in China and economic cycles on our business are forward-looking statements.

Our forward-looking statements are based upon assumptions that are subject to uncertainties and factors relating to the company's operations and business environment, which could cause actual results to differ materially from those expressed or implied in the forward-looking statements contained in this Quarterly Report on Form 10-Q. These uncertainties and factors include, but are not limited to: the withdrawal, cancellations or requests for redemptions by private equity funds in China of their investments in Tongmei, the administrative challenges in satisfying the requirements of various government agencies in China in connection with the investments in Tongmei and the listing of shares of Tongmei on the STAR Market, continued open access to companies to list shares on the STAR Market, investor enthusiasm for new listings of shares on the STAR Market and geopolitical tensions between China and the United States. Additional uncertainties and factors include, but are not limited to: the timing and receipt of significant orders; the cancellation of orders and return of product; emerging applications using chips or devices fabricated on our substrates; end-user acceptance of products containing chips or devices fabricated on our substrates; our ability to bring new products to market; product announcements by our competitors; the ability to control costs and improve efficiency; the ability to utilize our manufacturing capacity; product yields and their impact on gross margins; the relocation of manufacturing lines and ramping of production; possible factory shutdowns as a result of air pollution in China; COVID-19 or other outbreaks of a contagious disease; the availability of COVID-19 vaccines; tariffs and other trade war issues; the financial performance of our partially owned supply chain companies; policies and regulations in China; and other factors as set forth in this Quarterly Report on Form 10-Q, including those set forth under the section entitled "Risk Factors" in Item 1A below. All forward-looking statements are based upon management's views as of the date of this Quarterly Report on Form 10-Q and are subject to risks and uncertainties that could cause actual results to differ materially from historical results or those anticipated in such forward-looking statements. Such risks and uncertainties include those set forth under the section entitled "Risk Factors" in Item 1A below, as well as those discussed elsewhere in this Quarterly Report on Form 10-Q and identify important factors that could disrupt or injure our business or cause actual results to differ materially from those predicted in any such forward-looking statements.

These forward-looking statements are not guarantees of future performance. Readers are cautioned not to place undue reliance on these forward-looking statements, which speak only as of the date hereof. Readers are urged to carefully review and consider the various disclosures made in this Quarterly Report on Form 10-Q, which attempt to advise interested parties of the risks and factors that may affect our business, financial condition, results of operations and prospects. We undertake no obligation to revise or update any forward-looking statements in order to reflect any development, event or circumstance that may arise after the date of this Quarterly Report on Form 10-Q. This discussion should be read in conjunction with Management's Discussion and Analysis of Financial Condition and Results of Operations included in our Annual Report on Form 10-K for the year ended December 31, 2022 and the condensed consolidated financial statements included elsewhere in this Quarterly Report on Form 10-Q.

Overview

AXT, Inc. ("AXT", "the company", "we," "us," and "our" refer to AXT, Inc. and its consolidated subsidiaries) is a worldwide materials science company that develops and produces high-performance compound and single element semiconductor substrates, also known as wafers. Two of our consolidated subsidiaries produce and sell certain raw materials some of which are used in our substrate manufacturing process and some of which are sold to other companies.

Our substrate wafers are used when a typical silicon substrate wafer cannot meet the performance requirements of a semiconductor or optoelectronic device. The dominant substrates used in producing semiconductor chips and other electronic circuits are made from silicon. However, certain chips may become too hot or perform their function too slowly if silicon is used as the base material. In addition, optoelectronic applications, such as LED lighting and chip-based lasers, do not use silicon substrates because they require a wave form frequency that cannot be achieved using silicon. Alternative or specialty materials are used to replace silicon as the preferred base in these situations. Our wafers provide such alternative or specialty materials. We do not design or manufacture the chips. We add value by researching, developing and producing the specialty material wafers. We have two product lines: specialty material substrates and raw materials integral to these substrates. Our compound substrates combine indium with phosphorous (indium phosphide: InP) or gallium with arsenic (gallium arsenide: GaAs). Our single element substrates are made from germanium (Ge).

InP is a high-performance semiconductor wafer substrate used in broadband and fiber optic applications, 5G infrastructure and data center connectivity. More recently, InP substrates are being used in certain consumer products, including biometric wearables and other health monitoring applications. In recent years, InP demand has increased. Semi-insulating GaAs substrates are used to create various high-speed microwave components, including power amplifier chips used in cell phones, satellite communications and broadcast television applications. Semi-conducting GaAs substrates are used to create opto-electronic products, including high brightness light emitting diodes (HBLEDs) that are often used to backlight wireless handsets and liquid crystal display (LCD) TVs and also used for automotive panels, signage, display and lighting applications. GaAs wafers could also be used for making vertical cavity surface emitting lasers (VCSELs) and micro-LEDs targeting improved screen technology. Ge substrates are used in applications such as solar cells for space and terrestrial photovoltaic applications.

Our supply chain strategy includes several consolidated raw material companies. One of these consolidated companies produces pyrolytic boron nitride (pBN) crucibles used in the high temperature (typically in the range 500 C to 1,500 C) growth process of single crystal ingots, effusion rings when growing OLED (Organic Light Emitting Diode) tools, epitaxial layer growth in MOCVD (Metal-Organic Chemical Vapor Deposition) reactors and MBE (Molecular Beam Epitaxy) reactors. We use these pBN crucibles in our own ingot growth processes and they are also sold in the open market to other companies. The second consolidated company converts raw gallium to purified gallium. We use purified gallium in producing our GaAs substrates and it is also sold in the open market to other companies for use in producing magnetic materials, high temperature thermometers, single crystal ingots, including gallium arsenide, gallium nitride, gallium antimonite and gallium phosphide ingots, and other materials and alloys. In addition to purified gallium, the second consolidated company also produces InP base material which we then use to grow single crystal ingots. Our substrate product group generated 79%, 75% and 79% of our consolidated revenue and our raw materials product group generated 21%, 25% and 21% for 2022, 2021 and 2020, respectively.

The following chart shows our substrate products and their materials, diameters and illustrative applications and shows our raw materials group primary products and their illustrative uses and applications.

Products

Substrate Group and Wafer Diameter	Sample of Applications
Indium Phosphide (InP) 2", 3", 4"	• Data center connectivity using light/lasers • 5G communications • Fiber optic lasers and detectors • Consumer devices • Passive Optical Networks (PONs) • Silicon photonics • Photonic Integrated circuits (PICs) • High efficiency terrestrial solar cells (CPV) • RF amplifier and switching (military wireless & 5G) • Infrared light-emitting diode (LEDs) motion control • Lidar for robotics and autonomous vehicles • Infrared thermal imaging
Gallium Arsenide (GaAs - semi-insulating) 1", 2", 3", 4", 5", 6"	• Wi-Fi devices • IoT devices • High-performance transistors • Direct broadcast television • Power amplifiers for wireless devices • Satellite communications • High efficiency solar cells for drones and automobiles • Solar cells
Gallium Arsenide (GaAs - semi-conducting) 1", 2", 3", 4", 5", 6"	• High brightness LEDs • Screen displays using micro-LEDs • Printer head lasers and LEDs • 3-D sensing using VCSELs • Data center communication using VCSELs • Sensors for industrial robotics/Near-infrared sensors • Laser machining, cutting and drilling • Optical couplers • High efficiency solar cells for drones and automobiles • Other lasers • Night vision goggles • Lidar for robotics and autonomous vehicles • Solar cells
Germanium (Ge) 2", 4", 6"	• Multi-junction solar cells for satellites • Optical sensors and detectors • Terrestrial concentrated photo voltaic (CPV) cells • Infrared detectors • Carrier wafer for LED
Raw Materials Group	
6N+ and 7N+ purified gallium	• Key material in single crystal ingots such as: - Gallium Arsenide (GaAs) - Gallium Nitride (GaN) - Gallium Antimonite (GaSb) - Gallium Phosphide (GaP)
Boron trioxide (B2O3)	• Encapsulant in the ingot growth of III-V compound semiconductors
Gallium-Magnesium alloy	• Used for the synthesis of organo-gallium compounds in epitaxial growth on semiconductor wafers
pyrolytic boron nitride (pBN) crucibles	• Used when growing single-crystal compound semiconductor ingots
pBN insulating parts	• Used as effusion rings growing OLED tools • Used in MOCVD reactors • Used when growing epitaxial layers in Molecular Beam Epitaxy (MBE) reactors

All of our products are manufactured in the People's Republic of China (PRC or China) by our PRC subsidiaries and PRC joint ventures. The PRC generally has favorable costs for facilities and labor compared with comparable facilities in the United States, Europe or Japan. Our supply chain includes partial ownership of raw material companies in China (subsidiaries/joint ventures). We believe this supply chain arrangement provides us with pricing advantages, reliable supply, market trend visibility and better sourcing lead-times for key raw materials central to manufacturing our substrates. In the event of industry-wide supply shortages we believe our vertically integrated supply chain strategy will be even more advantageous. Our raw material companies produce materials, including raw gallium (4N Ga), high purity gallium (6N and 7N Ga), starting material for InP, arsenic, germanium, germanium dioxide, pyrolytic boron nitride (pBN) crucibles and boron oxide (B₂O₃). We have board representation in all of these raw material companies. We consolidate the companies in which we have either a controlling financial interest, or majority financial interest combined with the ability to exercise substantive control over the operations, or financial decisions, of such companies. We use the equity method to account for companies in which we have noncontrolling financial interest and have the ability to exercise significant influence, but not control, over such companies. We purchase portions of the materials produced by these companies for our own use and they sell the remainder of their production to third parties.

The Beijing city government is moving its offices into the district where our original manufacturing facility is currently located and is in the process of moving thousands of government employees into this district. The government has constructed showcase tower buildings and overseen the establishment of new apartment complexes, retail stores and restaurants. A large park, named Green Heart City Park, was built across the street from our facility and Universal Studios has developed an amusement park within a few miles of our facility. To create room and upgrade the district, the city instructed virtually all existing manufacturing companies, including AXT, to relocate all or some of their manufacturing lines. We were instructed to relocate our gallium arsenide manufacturing lines. For reasons of manufacturing efficiency, we elected to also move part of our germanium manufacturing line. Our indium phosphide manufacturing line, as well as various administrative and sales functions, will remain primarily at our original site.

Begun in 2017, the relocation of our gallium arsenide production lines is now completed. Our PRC subsidiary, Baoding Tongmei Xtal Technology Co., Ltd. ("Baoding Tongmei"), entered into volume production in 2020. To mitigate our risks and maintain our production schedule, we moved our gallium arsenide equipment in stages. By December 31, 2019, we had ceased all crystal growth for gallium arsenide in our original manufacturing facility in Beijing and transferred 100% of our ingot production to the new manufacturing facility of our PRC subsidiary, ChaoYang Tongmei Xtal Technology Co., Ltd., ("ChaoYang Tongmei"), in Kazuo, a city approximately 250 miles from Beijing. We transferred our wafer processing equipment for gallium arsenide to Baoding Tongmei's new manufacturing facility in Dingxing, a city approximately 75 miles from Beijing. Most of our larger, more sophisticated customers have qualified gallium arsenide wafers from the new sites. A few customers, as well as prospective customers, are still in the qualification process. These new facilities enabled us to expand capacity and upgrade some of the equipment. In 2021 and 2022, we added additional equipment, including certain more advanced equipment. We have also invested in additional buildings to complement the initial construction and add capacity as needed. Our PRC subsidiaries also acquired sufficient land to enable them to add facilities, if needed in the future. We believe our ability to add capacity gives us a competitive advantage. In addition, a new level of technological sophistication in our manufacturing capabilities will enable us to support the major trends that we believe are likely to drive demand for our products in the years ahead.

Customer qualifications and expanding capacity as needed require us to continue to diligently address the many details that arise at each of our sites. A failure to properly accomplish this could result in disruption to our production and have a material adverse impact on our revenue, our results of operations and our financial condition. If we fail to meet the product qualification and volume requirements of a customer, we may lose sales to that customer. Our reputation may also be damaged. Any loss of sales could have a material adverse effect on our revenue, our results of operations and our financial condition.

On November 16, 2020, we announced a strategic initiative to access China's capital markets by beginning a process to list shares of Tongmei in an initial public offering (the "IPO") on the STAR Market, an exchange intended to support innovative companies in China. We formed and founded Tongmei in 1998 and believe Tongmei has grown into a company that will be an attractive offering on the STAR Market. To qualify for a STAR Market listing, the first major step

in the process was to engage private equity firms in China ("Investors") to invest funds in Tongmei. By December 31, 2020, Investors, which consist of 10 private equity funds, had entered into two sets of definitive transaction documents, each consisting of a capital increase agreement along with certain supplemental agreements in substantially the same form (collectively, the "Capital Investment Agreements"), with Tongmei for a total investment of approximately \$48.1 million. (The currency used in the investment transactions was the Chinese renminbi, which has been converted to approximate U.S. dollars for this Quarterly Report on Form 10-Q.) The remaining investment of approximately \$1.5 million of new capital was funded in January 2021. Under China regulations, these investments must be formally approved by the appropriate government agency and are not deemed to be dilutive until such approval is granted. The government approved the approximately \$49 million investment in its entirety on January 25, 2021. In exchange for an investment of approximately \$49 million, the Investors received a 7.28% redeemable noncontrolling interest in Tongmei.

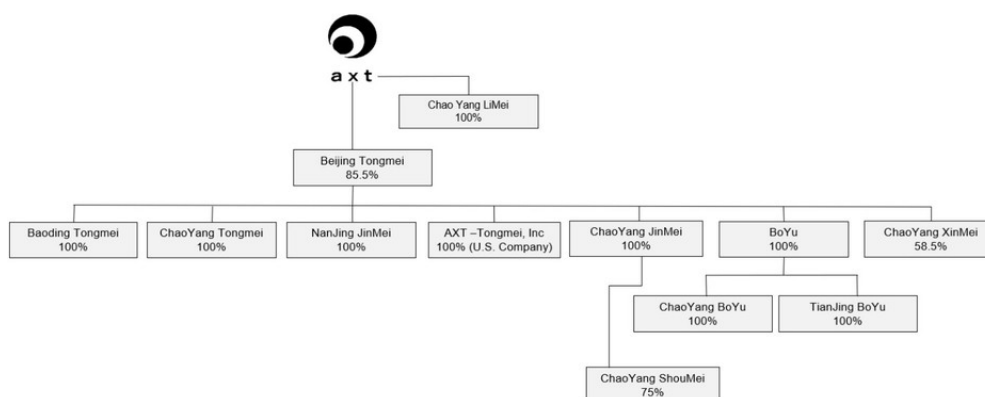
Pursuant to the Capital Investment Agreements with the Investors, each Investor has the right to require AXT to redeem any or all Tongmei shares held by such Investor at the original purchase price paid by such Investor, without interest, in the event the IPO fails to pass the audit of the Shanghai Stock Exchange, is not approved by the Chinese Securities Regulatory Commission ("CSRC") or Tongmei cancels the IPO application. The aggregate redemption amount is approximately \$49 million, subject to the foreign exchange rate variable at time of redemption.

Tongmei submitted its IPO application to the Shanghai Stock Exchange in December 2021 and it was formally accepted for review on January 10, 2022. The Shanghai Stock Exchange approved the IPO application on July 12, 2022. On August 1, 2022, the CSRC accepted for review Tongmei's IPO application. The STAR Market IPO remains subject to review and approval by the CSRC and other authorities. The process of going public on the STAR Market includes several periods of review and, therefore, is a lengthy process. Subject to review and approval by the CSRC and other authorities, Tongmei hopes to accomplish this goal in the coming months. The listing of Tongmei on the STAR Market will not change the status of AXT as a U.S. public company.

An early step in the STAR Market IPO process involved certain entity reorganizations and alignment of assets under Tongmei. In this regard our two consolidated raw material companies, Nanjing JinMei Gallium Co., Ltd. ("JinMei") and Beijing BoYu Semiconductor Vessel Craftwork Technology Co., Ltd. ("BoYu") and its subsidiaries were assigned to Tongmei in December 2020. As of June 30, 2021, AXT-Tongmei, Inc., a wholly owned subsidiary of AXT, was assigned to Tongmei. The assignment to Tongmei of JinMei, BoYu and its subsidiaries, and AXT-Tongmei, Inc. increased the number of customers and employees attributable to Tongmei as well as increased Tongmei's consolidated revenue.

We are neither a PRC operating company nor do we conduct our operations in China through the use of variable interest entities ("VIEs"). Recent statements and regulatory actions by China's government on the use of VIEs and data security or anti-monopoly concerns have not impacted our ability to conduct our business or continue to list our common stock on the Nasdaq Global Select Market.

The following organization chart depicts the consolidated structure as of March 31, 2023;



The businesses of our PRC subsidiaries and PRC joint ventures are subject to complex and rapidly evolving laws and regulations in the PRC, which can change quickly with little advance notice. The PRC government is a single party form of government with virtually unlimited authority and power to intervene in or influence commercial operations in China. In the past, we have experienced such intervention or influence by the PRC government and a change in the rules and regulations in China when we were instructed by the Beijing municipal government to relocate our manufacturing facility in Beijing and expect that such intervention or influence or change in the rules and regulations in China could occur in the future.

In the ordinary course of business, our PRC subsidiaries and PRC joint ventures require permits and licenses to operate in the PRC. Such permits and licenses include permits to use hazardous materials in manufacturing operations. From time to time, the PRC government issues new regulations, which may require additional actions on the part of our PRC subsidiaries and PRC joint ventures to comply. For example, on February 27, 2015, the China State Administration of Work Safety updated its list of hazardous substances. The previous list, which was published in 2002, did not restrict the materials that we use in our wafers. The new list added gallium arsenide. As a result of the newly published list, we were required to seek additional permits. In the ordinary course of business, our PRC subsidiaries and PRC joint ventures apply for permits as required. Any such intervention or influence or change in the rules and regulations in China could result in a material change in our PRC operations and/or the value of our common stock or cause the value of such securities to significantly decline or be worthless.

In September 2018, the Trump Administration announced a list of thousands of categories of goods that became subject to tariffs when imported into the United States. This pronouncement imposed tariffs on the wafer substrates we imported into the United States. The initial tariff rate was 10% and subsequently was increased to 25%. Approximately 14% of our revenue derives from importing our wafers into the United States and we expect the volume to increase. For the three months ended March 31, 2023, we paid approximately \$447,000 in tariffs. In 2022, we paid approximately \$3.3 million in tariffs. The future impact of tariffs and trade wars is uncertain.

We have created a vertically integrated supply chain and transfer cash through our corporate structure in three ways. First, we capitalize our investments in our PRC subsidiaries. We license to our PRC subsidiaries intellectual property and receive from our PRC subsidiaries royalty payments. Second, we use transfer pricing arrangements to buy from our PRC subsidiaries and PRC joint ventures wafers and raw materials. We also sell to our PRC subsidiaries capital equipment that we purchase at the request of our PRC subsidiaries and for which we are reimbursed by the applicable PRC subsidiary. We review the terms of the transfer pricing arrangements annually with our independent registered public accounting firm. Third, our PRC subsidiaries and PRC joint ventures have paid dividends to entities within the Company's corporate structure. For the three months ended March 31, 2023, the aggregate dividends paid to the Company, directly or to an intermediate entity within our corporate structure, by our PRC subsidiaries and PRC raw

material joint ventures were \$0. For the year ended December 31, 2022, the aggregate dividends paid to the Company, directly or to an intermediate entity within our corporate structure, by our PRC subsidiaries and PRC raw material joint ventures were approximately \$2.9 million. For the year ended December 31, 2022, the aggregate dividends paid to minority shareholders by our PRC subsidiaries and PRC raw material joint ventures were approximately \$0. All of these distributions were paid to our PRC subsidiaries and the minority shareholders. For the three months ended March 31, 2023 and the year ended December 31, 2022, no transfers, dividends, or distributions were made between the Company and its PRC subsidiaries, or to investors, except for the settlement of amounts owed under our transfer pricing arrangements in the ordinary course of business. We have no current intentions to distribute to our investors earnings under our corporate structure. We settle amounts owed under our transfer pricing arrangements in the ordinary course of business.

The cash generated from one PRC subsidiary is not used to fund another PRC subsidiary's operations. None of our PRC subsidiaries has ever faced difficulties or limitations on its ability to transfer cash between our subsidiaries. We have cash management policies that dictate the amount of such funding.

We are subject to a number of unique legal and operational risks associated with our corporate structure, any of which could result in a material change in our operations and/or the value of our common stock or cause the value of such securities to significantly decline or be worthless. Please carefully read the information beginning on page 53 of this Quarterly Report on Form 10-Q and included in the section entitled "Risk Factors" in Item 1A below. In particular, the following risk factors address issues associated with our corporate structure:

- Although we are a Delaware corporation and are neither a PRC operating company nor do we conduct our operations in China through the use of VIEs, in the event we inadvertently concluded that we do not require any permissions or approvals from the CSRC or other PRC central government authorities to complete a public offering of securities in the U.S. or applicable laws, regulations, or interpretations change, we may be required to obtain such permissions or approvals to complete such a public offering of securities.
- The PRC central government may intervene in or influence our PRC operations at any time and the rules and regulations in China can change quickly with little advance notice.
- The PRC central government may also exert more control over offerings conducted overseas and/or foreign investment in China-based issuers, which could result in a material change in our operations and/or the value of our common stock.
- Changes in China's political, social, regulatory or economic environments may affect our financial performance.
- Joint venture raw material companies in China bring certain risks.
- Risks exist in utilizing our new gallium arsenide manufacturing sites efficiently.
- The Chinese central government is increasingly aware of air pollution and other forms of environmental pollution and their reform efforts can impact our manufacturing, including intermittent mandatory shutdowns.
- Shutdowns or underutilizing our manufacturing facilities may result in declines in our gross margins.
- Enhanced trade tariffs, import restrictions, export restrictions, Chinese regulations or other trade barriers may materially harm our business.
- If China places restrictions on freight and transportation routes and on ports of entry and departure this could result in shipping delays or increased costs for shipping.
- Our international operations are exposed to potential adverse tax consequence in China.
- We derive a significant portion of our revenue from international sales, and our ability to sustain and increase our international sales involves significant risks.
- The terms of the private equity raised in China as a first step toward an IPO on the STAR Market grant each investor a right of redemption if Tongmei fails to achieve its IPO.
- We are subject to foreign exchange gains and losses that may materially impact our statement of operations.
- Although the audit report is prepared by an independent registered public accounting firm that is currently inspected fully by the Public Company Accounting Oversight Board (the "PCAOB"), there is no guarantee

that future audit reports will be prepared by an independent registered public accounting firm that is completely inspected by the PCAOB.

Our independent registered public accounting firm is BPM LLP ("BPM"), which is registered with the PCAOB. The Holding Foreign Companies Accountable Act (the "HFCA Act") requires that the PCAOB determine whether it is unable to inspect or investigate completely registered public accounting firms located in a non-U.S. jurisdiction because of a position taken by one or more authorities in that jurisdiction. On December 16, 2021, the PCAOB issued a report on its determinations that the PCAOB is unable to inspect or investigate completely registered public accounting firms headquartered in the PRC and Hong Kong because of positions taken by PRC authorities in those jurisdictions. BPM is neither headquartered in the PRC or Hong Kong nor is it subject to the determinations announced by the PCAOB. Accordingly, the Company does not expect the HFCA Act, the Accelerating Holding Foreign Companies Accountable Act and the related regulations to affect the Company and does not expect to be identified by the Securities and Exchange Commission, or SEC, under the HFCA Act. On December 15, 2022, the PCAOB vacated its 2021 determinations that the positions taken by authorities in the PRC and Hong Kong prevented it from inspecting and investigating completely registered public accounting firms headquartered in those jurisdictions. See "Although the audit report is prepared by an independent registered public accounting firm that is currently inspected fully by the PCAOB, there is no guarantee that future audit reports will be prepared by an independent registered public accounting firm that is completely inspected by the PCAOB" under the section entitled "Risk Factors" in Item 1A below for further information on risks related to our foreign operations and dependence.

Critical Accounting Policies, Estimates and Change in Accounting Estimates

We prepare our condensed consolidated financial statements in accordance with accounting principles generally accepted in the United States of America ("U.S. GAAP"). Accordingly, we make estimates, assumptions and judgments that affect the amounts reported on our condensed consolidated financial statements. These estimates, assumptions and judgments about future events and their effects on our results cannot be determined with certainty, and are made based upon our historical experience and on other assumptions that are believed to be reasonable under the circumstances. These estimates may change as new events occur or additional information is obtained, and we may periodically be faced with uncertainties, the outcomes of which are not within our control and may not be known for a prolonged period of time.

We have identified the policies below as critical to our business operations and understanding of our financial condition and results of operations. Critical accounting policies are material to the presentation of our condensed consolidated financial statements and require us to make difficult, subjective or complex judgments that could have a material effect on our financial reports and results of operations. They may require us to make assumptions about matters that are highly uncertain at the time of the estimate. Different estimates that we could have used, or changes in the estimate that are reasonably likely to occur, may have a material impact on our financial condition or results of operations.

Revenue Recognition

We manufacture and sell high-performance compound semiconductor substrates including indium phosphide, gallium arsenide and germanium wafers, and our consolidated subsidiaries sell certain raw materials, including high purity gallium (6N and 7N Ga), pyrolytic boron nitride (pBN) crucibles and boron oxide (B₂O₃). After we ship our products, there are no remaining obligations or customer acceptance requirements that would preclude revenue recognition. Our products are typically sold pursuant to purchase orders placed by our customers, and our terms and conditions of sale do not require customer acceptance. We account for a contract with a customer when there is a legally enforceable contract, which could be the customer's purchase order, the rights of the parties are identified, the contract has commercial terms, and collectibility of the contract consideration is probable. The majority of our contracts have a single performance obligation to transfer products and are short term in nature, usually less than six months. Our revenue is measured based on the consideration specified in the contract with each customer in exchange for transferring products that are generally based upon a negotiated, formula, list or fixed price. Revenue is recognized when control of the promised goods is transferred to our customer, which is either upon shipment from our dock, receipt at the customer's

dock, or removal from consignment inventory at the customer's location, in an amount that reflects the consideration we expect to be entitled to receive in exchange for those goods.

Accounts Receivable and Allowance for Doubtful Accounts

Accounts receivable are recorded at the invoiced amount and are not interest bearing. We review at least quarterly, or when there are changes in credit risks, the likelihood of collection on our accounts receivable balances and provide an allowance for doubtful accounts receivable for any expected credit losses primarily based upon the age of these accounts. We evaluate receivables from U.S. customers with an emphasis on balances in excess of 90 days and for receivables from customers located outside the U.S. with an emphasis on balances in excess of 120 days and establish a reserve allowance on the receivable balances if needed. The reason for the difference in the evaluation of receivables between foreign and U.S. customers is that U.S. customers have historically made payments in a shorter period of time than foreign customers. Foreign business practices generally require us to allow customer payment terms that are longer than those accepted in the United States. We assess the probability of collection based on a number of factors, including the length of time a receivable balance has been outstanding, our past history with the customer and their credit-worthiness.

We exercise judgment when determining the adequacy of our reserves as we evaluate historical bad debt trends, general economic conditions in the United States and internationally, and changes in customer financial conditions. Uncollectible receivables are recorded as bad debt expense when a credit loss is expected through the establishment of an allowance, which would then be written off when all efforts to collect have been exhausted and recoveries are recognized when they are received. As of March 31, 2023 and December 31, 2022, our accounts receivable, net balance was \$21.3 million and \$29.3 million, respectively, which was net of an allowance for doubtful accounts of \$307,000 and \$307,000, respectively. If actual uncollectible accounts differ substantially from our estimates, revisions to the estimated allowance for doubtful accounts would be required, which could have a material impact on our financial results for the future periods.

Warranty Reserve

We maintain a product warranty based upon our claims experience during the prior twelve months and any pending claims and returns of which we are aware. Warranty costs are accrued at the time revenue is recognized. As of March 31, 2023 and December 31, 2022, accrued product warranties totaled \$915,000 and \$669,000, respectively. The increase in accrued product warranties is primarily attributable to increased claims for quality issues experienced by a customer. If actual warranty costs or pending new claims differ substantially from our estimates, revisions to the estimated warranty liability would be required, which could have a material impact on our financial condition and results of operations for future periods.

Inventory Valuation

Inventories are stated at the lower of cost (approximated by standard cost) or net realizable value. Cost is determined using the weighted-average cost method. Our inventory consists of raw materials as well as finished goods and work in process that include material, labor and manufacturing overhead costs. We routinely evaluate the levels of our inventory in light of current market conditions in order to identify excess and obsolete inventory, and we provide a valuation allowance for certain inventories based upon the age and quality of the product and the projections for sale of the completed products. As of March 31, 2023 and December 31, 2022, we had an inventory reserve of \$25.9 million and \$24.7 million, respectively, for excess and obsolete inventory and \$50,000 and \$47,000, respectively, for lower of cost or net realizable value reserves. If actual demand for our products were to be substantially lower than estimated, additional inventory adjustments for excess or obsolete inventory might be required, which could have a material impact on our business, financial condition and results of operations.

Impairment of Investments

We classify marketable investments in debt securities as available-for-sale debt securities in accordance with Accounting Standards Codification ("ASC") Topic 320, *Investments - Debt Securities*. All available-for-sale debt

securities with a quoted market value below cost (or adjusted cost) are reviewed in order to determine whether the decline is other-than-temporary. Factors considered in determining whether a loss is temporary include the magnitude of the decline in market value, the length of time the market value has been below cost (or adjusted cost), credit quality, and our ability and intent to hold the securities for a period of time sufficient to allow for any anticipated recovery in market value. We also review our debt investment portfolio at least quarterly, or when there are changes in credit risks or other potential valuation concerns to identify and evaluate whether an allowance for expected credit losses or impairment would be necessary.

We also invest in equity instruments of privately-held companies in China for business and strategic purposes. Investments in our unconsolidated joint venture companies are classified as other assets and accounted for under either the equity or cost method, depending on whether we have the ability to exercise significant influence over their operations or financial decisions. We monitor our investments for impairment and record reductions in carrying value when events or changes in circumstances indicate that the carrying value may not be recoverable. Determination of impairment is highly subjective and is based on a number of factors, including an assessment of the strength of each company's management, the length of time and extent to which the fair value has been less than our cost basis, the financial condition and near-term prospects of the company, fundamental changes to the business prospects of the company, share prices of subsequent offerings, and our intent and ability to hold the investment for a period of time sufficient to allow for any anticipated recovery in our carrying value. There were no impairment charges during the three months ended March 31, 2023 and 2022.

Fair Value of Investments

ASC 820, establishes three levels of inputs that may be used to measure fair value.

Level 1 instruments represent quoted prices in active markets. Therefore, determining fair value for Level 1 instruments does not require significant management judgment, and the estimation is not difficult.

Level 2 instruments include observable inputs other than Level 1 prices, such as quoted prices for identical instruments in markets with insufficient volume or infrequent transactions (less active markets), issuer bank statements, credit ratings, non-binding market consensus prices that can be corroborated with observable market data, model-derived valuations in which all significant inputs are observable or can be derived principally from or corroborated with observable market data for substantially the full term of the assets or liabilities, or quoted prices for similar assets or liabilities. These Level 2 instruments require more management judgment and subjectivity compared to Level 1 instruments, including:

- Determining which instruments are most comparable to the instrument being priced requires management to identify a sample of similar securities based on the coupon rates, maturity, issuer, credit rating, and instrument type, and subjectively select an individual security or multiple securities that are deemed most similar to the security being priced.
- Determining which model-derived valuations to use in determining fair value requires management judgment. When observable market prices for similar securities or similar securities are not available, we price our marketable debt instruments using non-binding market consensus prices that are corroborated with observable market data or pricing models, such as discounted cash flow models, with all significant inputs derived from or corroborated with observable market data.

Level 3 instruments include unobservable inputs to the valuation methodology that are significant to the measurement of fair value of assets or liabilities. The determination of fair value for Level 3 instruments requires the most management judgment and subjectivity.

We place short-term foreign currency hedges that are intended to offset the potential cash exposure related to fluctuations in the exchange rate between the United States dollar and Japanese yen. We measure the fair value of these

foreign currency hedges at each month end and quarter end using current exchange rates and in accordance with U.S. GAAP. At quarter end any foreign currency hedges not settled are netted in "Accrued liabilities" in the condensed consolidated balance sheets and classified as Level 3 assets and liabilities. As of March 31, 2023, the net change in fair value from the placement of the hedge to settlement at each month end during the quarter had a de minimis impact to the condensed consolidated results.

There have been no transfers between fair value measurement levels during the three months ended March 31, 2023 and 2022.

Impairment of Long-Lived Assets

We evaluate the recoverability of property, equipment and intangible assets in accordance with ASC Topic 360, *Property, Plant and Equipment*. When events and circumstances indicate that long-lived assets may be impaired, we compare the carrying value of the long-lived assets to the projection of future undiscounted cash flows attributable to these assets. In the event that the carrying value exceeds the future undiscounted cash flows, we record an impairment charge against income equal to the excess of the carrying value over the assets' fair value. Fair values are determined based on quoted market values, discounted cash flows or internal and external appraisals, as applicable. Assets held for sale are carried at the lower of carrying value or estimated net realizable value. We had no "Assets held for sale" or any impairment of long-lived assets in the condensed consolidated balance sheets as of March 31, 2023 and December 31, 2022.

Stock-based Compensation

We account for stock-based compensation in accordance with ASC Topic 718, *Stock-based Compensation*. Share-based awards granted include stock options and restricted stock awards. We utilize the Black-Scholes option pricing model to estimate the grant date fair value of stock options, which requires the input of highly subjective assumptions, including estimating stock price volatility and expected term. Historical volatility of our stock price was used while the expected term for our options was estimated based on historical option exercise behavior and post-vesting forfeitures of options, and the contractual term, the vesting period and the expected term of the outstanding options. Further, we apply an expected forfeiture rate in determining the amount of share-based compensation. We use historical forfeitures to estimate the rate of future forfeitures. Changes in these inputs and assumptions can materially affect the measure of estimated fair value of our stock compensation. The cost of restricted stock awards is determined using the fair value of our common stock on the date of grant.

The award of performance Restricted Stock covering Shares (the "Performance Award") will be subject to vesting requirements relating to both the recipient of the Performance Award (the "Participant") continuously remaining a Service Provider through specified dates and achievement of specified performance-based criteria ("Performance Criteria"). Any capitalized term not defined herein will have the meaning ascribed to such term in the 2015 Equity Incentive Plan. The Performance Criteria will be measured over the Company's fiscal year 2022 or 2023.

The financial Performance Criteria are metrics based upon prior year-end actual results as compared to the Company's current year-end actual results with respect to the 2022 Performance Awards or based upon the current year-end actual results with respect to the 2023 Performance Awards. All performance shares, if earned, are still subject to annual vesting over a four-year period except that no shares are vested on the first anniversary because the performance measurement is based on year-end results for the entire year.

We recognize the compensation costs net of an estimated forfeiture rate over the requisite service period of the options award, which is generally the vesting term of four years. Compensation expense for restricted stock awards is recognized over the vesting period, which is generally one, three or four years. Stock-based compensation expense is recorded in cost of revenue, research and development, and selling, general and administrative expenses.

Income Taxes

We account for income taxes in accordance with ASC Topic 740, *Income Taxes* ("ASC 740"), which requires that deferred tax assets and liabilities be recognized using enacted tax rates for the effect of temporary differences between the book and tax bases of recorded assets and liabilities. ASC 740 also requires that deferred tax assets be reduced by a valuation allowance if it is more likely than not that a portion of the deferred tax asset will not be realized.

We provide for income taxes based upon the geographic composition of worldwide earnings and tax regulations governing each region, particularly China. The calculation of tax liabilities involves significant judgment in estimating the impact of uncertainties in the application of complex tax laws, particularly in foreign countries such as China.

See Note 14—"Income Taxes" in the notes to condensed consolidated financial statements for additional information.

Impact of the COVID-19 Pandemic

In March 2020, the World Health Organization declared the outbreak of COVID-19 to be a pandemic, which continues to be an ongoing pandemic. In March 2020, the President of the United States declared the COVID-19 outbreak a national emergency. For much of the three months ended March 31, 2020, our manufacturing facilities in China were operating at reduced staffing levels to limit the risk of COVID-19 exposure for our employees. The Chinese government mandates have evolved, allowing us to return to full staffing levels at all three manufacturing locations in China. We are unable to accurately predict the full impact of the COVID-19 pandemic due to numerous uncertainties, including the severity of the disease, the duration of the outbreak, the potential resurgence of the outbreak as a result of variants in countries that had previously contained the outbreak, the availability of COVID-19 vaccines and the number of people who are vaccinated, the effect of the outbreak on transportation, such as reduced availability of air transport, port closures, and increased border controls or closures, the impact of the outbreak on our customers and additional actions that may be taken by government authorities to contain the outbreak, such as lockdowns in China that may require the temporary closure of one or more of our manufacturing facilities in China and travel restrictions between China and the U.S. that have disrupted our normal movement to and from China and impacted our efficiency. As a result of these factors, we believe that the COVID-19 pandemic has had and may continue to have a material adverse impact on our business, condensed consolidated results of operations and financial condition until the COVID-19 pandemic subsides and related public health measures are reduced or eliminated.

Results of Operations**Revenue**

	Three Months Ended			
	March 31,		Increase (Decrease)	% Change
	2023	2022		
Product Type:	(\$ in thousands)			
Substrates	\$ 13,489	\$ 31,745	\$ (18,256)	(57.5)%
Raw materials and other	5,916	7,908	(1,992)	(25.2)%
Total revenue	\$ 19,405	\$ 39,653	\$ (20,248)	(51.1)%

Revenue decreased \$20.2 million, or 51.1%, to \$19.4 million for the three months ended March 31, 2023 from \$39.7 million for the three months ended March 31, 2022. The substrate revenue decrease for the three months ended March 31, 2023 as compared to the same period in 2022 was primarily the result of lower demand for InP wafer substrates due to softening in data center, consumer and telecommunications and GaAs wafer substrates reflecting the overall slow-down across a number of applications particularly in China. Raw materials sales decreased \$2.0 million, or 25.2%, to \$5.9 million for the three months ended March 31, 2023 as compared to the same period in 2022. The decrease in raw materials revenue for the three months ended March 31, 2023 as compared to the same period in 2022 was primarily the result of a decrease in sales of pBN crucibles and decreased sales of refined gallium resulting from weaker market demand.

Revenue by Geographic Region

	March 31,		Increase	
	2023	2022	(Decrease)	% Change
	(\$ in thousands)			
China	\$ 8,102	\$ 17,480	\$ (9,378)	(53.6)%
% of total revenue	42 %	44 %		
Taiwan	2,471	6,859	(4,388)	(64.0)%
% of total revenue	13 %	17 %		
Japan	1,535	2,807	(1,272)	(45.3)%
% of total revenue	8 %	7 %		
Asia Pacific (excluding China, Taiwan and Japan)	1,091	1,756	(665)	(37.9)%
% of total revenue	6 %	5 %		
Europe (primarily Germany)	3,570	6,394	(2,824)	(44.2)%
% of total revenue	18 %	16 %		
North America (primarily the United States)	2,636	4,357	(1,721)	(39.5)%
% of total revenue	13 %	11 %		
Total revenue	\$ 19,405	\$ 39,653	\$ (20,248)	(51.1)%

Revenue in China decreased \$9.4 million for the three months ended March 31, 2023, primarily due to lower demand for our GaAs, InP and Ge wafer substrates and refined gallium sold by one of our consolidated subsidiaries. Revenue in Taiwan decreased \$4.4 million, primarily due to lower demand for our InP and GaAs wafer substrates. Revenue in Japan decreased \$1.3 million primarily due to lower demand for our InP and GaAs wafer substrates and pBN crucibles sold by one of our consolidated subsidiaries. Revenue in Asia Pacific decreased \$0.7 million, primarily due to lower demand for our GaAs and pBN crucibles sold by one of our consolidated subsidiaries. Revenue in Europe decreased \$2.8 million, primarily due to lower demand for our GaAs, Ge and InP wafer substrates and pBN crucibles sold by one of our consolidated subsidiaries. Revenue in North America decreased \$1.7 million, primarily due to lower demand for our InP and GaAs wafer substrates and pBN crucibles sold by one of our consolidated subsidiaries.

Gross Profit

	Three Months Ended March 31,		Increase	
	2023	2022	(Decrease)	% Change
	(\$ in thousands)			
Gross profit	\$ 5,110	\$ 13,308	\$ (8,198)	(61.6)%
Gross Profit %	26.3 %	33.6 %		

Gross profit decreased \$8.2 million, or 61.6%, to \$5.1 million for the three months ended March 31, 2023 from \$13.3 million for the three months ended March 31, 2022. The decrease in gross profit is the result of lower revenue across all product lines. Gross margin as a percentage of revenue decreased due to under absorbed factory overhead, partially offset by cost savings as a result of recycling InP materials.

Selling, General and Administrative Expenses

	Three Months Ended March 31,		Increase	
	2023	2022	(Decrease)	% Change
	(\$ in thousands)			
Selling, general and administrative expenses	\$ 5,952	\$ 6,450	\$ (498)	(7.7)%
% of total revenue	30.7 %	16.3 %		

Selling, general and administrative expenses decreased \$0.5 million, or 7.7%, to \$6.0 million for the three months ended March 31, 2023 from \$6.5 million for the three months ended March 31, 2022. The lower selling, general and administrative expenses were primarily from a decrease in personnel-related expenses and outside commissions, partially offset by an increase in professional services.

Research and Development

	Three Months Ended March 31,		Increase (Decrease)	% Change
	2023	2022		
	(\$ in thousands)			
Research and development	\$ 3,595	\$ 3,159	\$ 436	13.8 %
% of total revenue	18.5 %	8.0 %		

Research and development expenses increased \$0.4 million, or 13.8%, to \$3.6 million for the three months ended March 31, 2023 from \$3.2 million for the three months ended March 31, 2022. The increase in research and development expenses for the three months ended March 31, 2023 was primarily due to development expenses for 8-inch GaAs and 6-inch InP wafer substrates and development of new features for certain of our GaAs and InP wafer substrates.

Interest Expense, Net

	Three Months Ended March 31,		Increase (Decrease)	% Change
	2023	2022		
	(\$ in thousands)			
Interest expense, net	\$ 397	\$ 183	\$ 214	116.9 %
% of total revenue	2.0 %	0.5 %		

Interest expense, net increased \$214,000 to \$397,000 for the three months ended March 31, 2023 from \$183,000 for the three months ended March 31, 2022. Interest expense, net increased primarily due to increased debt during the three months ended March 31, 2023 as compared to the three months ended March 31, 2022.

Equity in Income of Unconsolidated Joint Ventures

	Three Months Ended March 31,		Equity in Income	
	2023	2022	Change	% Change
	(\$ in thousands)			
Equity in income of unconsolidated joint ventures	\$ 1,034	\$ 1,125	\$ (91)	(8.1)%
% of total revenue	5.3 %	2.8 %		

The equity in income of unconsolidated joint venture companies was income of \$1.0 million for the three months ended March 31, 2023 as compared to income of \$1.1 million for the three months ended March 31, 2022. The decrease in income of \$91,000 is primarily due to lower sales volume at two raw gallium companies.

Other Income (expense), Net

	Three Months Ended March 31,		Other Income (Expense)	
	2023	2022	Change	% Change
	(\$ in thousands)			
Other income (expense), net	\$ 282	\$ (9)	\$ 291	3,233.3 %
% of total revenue	1.5 %	(0.0)%		

Other income (expense), net increased \$291,000 to an income of \$282,000 for the three months ended March 31, 2023 from an expense of \$9,000 for the three months ended March 31, 2022. Other income (expense), net

increased primarily due to compensation received from the China government by one of our consolidated subsidiaries for establishing its facilities in Kazuo.

Provision for Income Taxes

	Three Months Ended March 31,			
	2023	2022	Increase (Decrease)	% Change
	(\$ in thousands)			
Provision for income taxes	\$ 148	\$ 660	\$ (512)	(77.6)%
% of total revenue	0.8 %	1.7 %		

Provision for income taxes decreased \$512,000, or 77.6%, to \$148,000 for the three months ended March 31, 2023 as compared to \$660,000 for the three months ended March 31, 2022. Income taxes and certain state taxes, have been provided for our U.S. operations as most of the income in the U.S. had been fully offset by utilization of federal and state net operating loss carryforwards except for the U.S. subsidiary, AXT-Tongmei. Additionally, there is uncertainty of generating future profit in the U.S., which has resulted in our deferred tax assets being fully reserved. Our estimated tax rate can vary greatly from year to year because of the change or benefit in the mix of taxable income between our U.S. and China-based operations.

Under the 2017 Tax Cuts and Jobs Act (TCJA), research and experimental ("R&E") expenditures incurred or paid for tax years beginning after December 31, 2021 will no longer be immediately deductible for tax purposes. Instead, businesses are now required to capitalize and amortize R&E expenditures over a period of five years for research conducted within the U.S. or 15 years for research conducted in a foreign jurisdiction. We capitalize the R&E expense for our Delaware corporation and amortize it over five years. We also capitalize the R&E expense in our China subsidiaries and amortize it over 15 years.

On August 16, 2022, President Biden signed the Inflation Reduction Act ("the Inflation Reduction Act") into law finalizing a legislation intended to address inflation by paying down the national debt, lower consumer energy costs, providing incentives for the production of clean energy, and reducing healthcare costs. The Inflation Reduction Act imposes 1% exercise tax on stock buy backs and 15% minimum tax on corporations with over \$1 billion in profit. The Inflation Reduction Act has no impact on the Company, since the Company has no plan to buy back additional shares of its common stock and the Company's profit is not over \$1 billion.

Net Income (loss) Attributable to Noncontrolling Interests and Redeemable Noncontrolling Interests

	Three Months Ended		Net (income) loss attributable to	
	March 31,		noncontrolling interests and	
	2023	2022	Change	% Change
	(\$ in thousands)			
Net (income) loss attributable to noncontrolling interests and redeemable noncontrolling interests	\$ 318	\$ (807)	\$ 1,125	139.4 %
% of total revenue	1.6 %	(2.0)%		

Net income (loss) attributable to noncontrolling interests and redeemable noncontrolling interests decreased \$1.1 million or 139.4% to a loss of \$318,000 for the three months ended March 31, 2023, from income of \$807,000 for the three months ended March 31, 2022, primarily due to lower profitability from our consolidated joint venture companies in China as sales decreased due to a reduction in raw materials sales.

Liquidity and Capital Resources

We consider cash and cash equivalents and short-term investments as liquid and available for use within one year in our current operations. Short-term investments are comprised of U.S. government securities, certificates of deposit and investment-grade corporate notes and bonds.

As of March 31, 2023, our principal source of liquidity was \$53.6 million, which consisted of cash, restricted cash and cash equivalents of \$44.9 million and investments of \$8.7 million. In the three months ended March 31, 2023, cash, restricted cash and cash equivalents increased by \$3.5 million and investments decreased by \$2.8 million. The increase in cash, restricted cash and cash equivalents of \$3.5 million in the three months ended March 31, 2023 was primarily due to net cash provided by financing activities of \$5.8 million and the effect of exchange rate changes of \$19,000, partially offset by net cash used in operating activities of \$1.5 million and net cash used in investing activities of \$0.7 million. As of March 31, 2023, we and our consolidated joint ventures in China held approximately \$40.4 million in cash and investments in foreign bank accounts.

As of March 31, 2022, our principal source of liquidity was \$44.3 million, which consisted of cash and cash equivalents of \$29.5 million and investments of \$14.8 million. In the three months ended March 31, 2022, cash and cash equivalents decreased by \$7.3 million and investments decreased by \$0.2 million. The decrease in cash and cash equivalents of \$7.3 million in the three months ended March 31, 2022 was primarily due to net cash used in operating activities of \$8.9 million, and net cash used in investing activities of \$6.3 million, partially offset by net cash provided by financing activities of \$7.9 million and the effect of exchange rate changes of \$12,000. As of March 31, 2022, we and our consolidated joint ventures in China held approximately \$18.8 million in cash and investments in foreign bank accounts.

Net cash used in operating activities of \$1.5 million for the three months ended March 31, 2023 was primarily comprised of a net loss before income attributable to noncontrolling interest and redeemable noncontrolling interests of \$3.7 million, income from equity method investments of \$1.0 million, partially offset by the adjustment for non-cash items of depreciation and amortization of \$2.1 million, stock-based compensation of \$0.9 million and a net change of \$0.1 million in operating assets and liabilities.

Net cash used in operating activities of \$8.9 million for the three months ended March 31, 2022 was primarily comprised of a net change of \$14.9 million in operating assets and liabilities and income from equity method investments of \$1.1 million, partially offset by a net income before income attributable to non-controlling interest and redeemable noncontrolling interests of \$4.0 million, the adjustment for non-cash items of depreciation and amortization of \$2.0 million and stock-based compensation of \$1.1 million.

Net cash used in investing activities of \$0.7 million for the three months ended March 31, 2023 was primarily from the purchase of property, plant and equipment of \$3.6 million, partially offset by proceeds from sales and maturities of available-for-sale debt securities of \$2.9 million.

Net cash used in investing activities of \$6.3 million for the three months ended March 31, 2022 was from the purchase of property, plant and equipment of \$6.3 million.

Net cash provided by financing activities was \$5.8 million for the three months ended March 31, 2023, which consisted of proceeds from short-term loans of \$18.4 million, capital increase in subsidiary shares from noncontrolling interest of \$0.2 million and common stock option exercised of \$8,000, partially offset by repayment of short-term loan of \$12.8 million.

Net cash provided by financing activities was \$7.9 million for the three months ended March 31, 2022, which consisted of proceeds from short-term loan of \$10.7 million, partially offset by repayment of short-term loan of \$2.8 million.

On October 27, 2014, our Board of Directors approved a stock repurchase program pursuant to which we may repurchase up to \$5.0 million of our outstanding common stock. These repurchases could be made from time to time in the open market and could be funded from our existing cash balances and cash generated from operations. During 2015, we repurchased approximately 908,000 shares at an average price of \$2.52 per share for a total purchase price of approximately \$2.3 million under the stock repurchase program. Since 2015, no shares were repurchased under this program. During the three months ended March 31, 2023, we did not repurchase any shares under the approved stock

repurchase program. As of March 31, 2023, approximately \$2.7 million remained available for future repurchases under this program. Currently, we do not plan to repurchase additional shares.

Dividends accrue on our outstanding Series A preferred stock, and are payable as and when declared by our Board of Directors. We have never declared or paid any dividends on the Series A preferred stock. By the terms of the Series A preferred stock, so long as any shares of Series A preferred stock are outstanding, neither the Company nor any subsidiary of the Company shall redeem, repurchase or otherwise acquire any shares of common stock, unless all accrued dividends on the Series A preferred stock have been paid. During 2013 and 2015, we repurchased shares of our outstanding common stock. As of December 31, 2015, the Series A preferred stock had cumulative dividends of \$2.9 million and we include such cumulative dividends in "Accrued liabilities" in our condensed consolidated balance sheets. At the time we pay this accrued liability, our cash and cash equivalents will be reduced. We account for the cumulative year to date dividends on the Series A preferred stock when calculating our earnings per share.

Occasionally, one of our PRC subsidiaries or PRC raw material joint ventures declares and pays a dividend. These dividends generally occur when the PRC joint venture declares a dividend for all of its shareholders. Dividends paid to the Company are subject to a 10% PRC withholding tax. The Company is required to obtain approval from the State Administration of Foreign Exchange ("SAFE") to transfer funds in or out of the PRC. SAFE requires a valid agreement to approve the transfers, which are processed through a bank. Other than PRC foreign exchange restrictions, the Company is not subject to any PRC restrictions and limitations on its ability to distribute earnings from its businesses, including its PRC subsidiaries and PRC joint ventures, to the Company and its investors as well as the ability to settle amounts owed by the Company to its PRC subsidiaries and PRC joint ventures. If SAFE approval is denied the dividend payable to the Company would be owed but would not be paid.

For the three months ended March 31, 2023 and 2022, the aggregate dividends paid to us, directly or to an intermediate entity within our corporate structure, by our PRC subsidiaries and PRC raw material joint ventures were \$0 and \$0, respectively. For the three months ended March 31, 2023 and 2022, the aggregate dividends paid to minority shareholders by our PRC subsidiaries and PRC raw material joint ventures were approximately \$0 and \$0, respectively. For the three months ended March 31, 2023, no transfers, dividends, or distributions have been made to date between the Company and its PRC subsidiaries, or to investors, except for the settlement of amounts owed under our transfer pricing arrangements in the ordinary course of business.

We have no current intentions to distribute to our investors earnings under our corporate structure. We settle amounts owed under our transfer pricing arrangements in the ordinary course of business.

The cash generated from one PRC subsidiary is not used to fund another PRC subsidiary's operations. None of our PRC subsidiaries has ever faced difficulties or limitations on its ability to transfer cash between our subsidiaries. AXT has cash management policies that dictate the amount of such funding.

As one of the first steps in the process of listing Tongmei on the STAR Market and going public, we sold approximately 7.28% of Tongmei to private equity investors for approximately \$49 million in the aggregate. Pursuant to the Capital Investment Agreements with the Investors, each Investor has the right to require AXT to redeem any or all Tongmei shares held by such Investor at the original purchase price paid by such Investor, without interest, in the event the IPO fails to pass the audit of the Shanghai Stock Exchange, is not approved by the CSRC or Tongmei cancels the IPO application. The aggregate redemption amount is approximately \$49 million.

Tongmei submitted its IPO application to the Shanghai Stock Exchange, and it was formally accepted for review on January 10, 2022. The Shanghai Stock Exchange approved the IPO application on July 12, 2022. On August 1, 2022, the CSRC accepted for review Tongmei's IPO application. The STAR Market IPO remains subject to review and approval by the CSRC and other authorities. The process of going public on the STAR Market includes several periods of review and, therefore, is a lengthy process. Subject to review and approval by the CSRC and other authorities, Tongmei expects to accomplish this goal in the coming months. The listing of Tongmei on the STAR Market will not change the status of AXT as a U.S. public company.

Our bank loans and credit facilities typically have a term of 12 months or less and are included in "Bank loan" in our condensed consolidated balance sheets. The following table represents bank loans as of March 31, 2023 and December 31, 2022 (in thousands, except interest rate data):

Subsidiary	Bank	Loan		Interest	Start Date	Due Date	December 31,	March 31,
		Detail	Rate				2022	2023
Tongmei	Bank of China (1)	\$ 2,108	2.7 %	%	September-22	March-23	\$ 2,175	\$ -
		3,935	4.6 %	%	January-22	January-23	4,059	-
		1,405	4.2 %	%	April-22	April-23	1,450	1,455
	Bank of China (5)	1,848	3.5 %	%	January-23	January-24	-	1,848
		2,184	2.8 %	%	March-23	March-24	-	2,184
		2,911	3.5 %	%	January-23	January-24	-	2,911
	Bank of Communications (2)	1,405	3.3 %	%	January-22	January-23	1,450	-
		1,405	3.3 %	%	January-22	January-23	1,450	-
	Bank of Communications (5)	1,450	3.3 %	%	December-22	December-23	1,450	1,455
		1,455	3.3 %	%	January-23	January-24	-	1,455
	China Merchants Bank (5)	4,367	3.7 %	%	January-23	January-24	-	4,367
		3,192	4.2 %	%	May-22	May-23	3,292	3,306
	Bank of Beijing (4)	2,290	4.2 %	%	January-23	January-24	-	2,290
		5,621	4.4 %	%	June-22	June-23	5,798	5,823
	Industrial Bank (5)	2,811	4.4 %	%	September-22	September-23	2,900	2,911
		1,405	4.8 %	%	June-22	June-23	1,450	1,455
	NingBo Bank (5)	1,405	4.8 %	%	August-22	August-23	1,450	1,455
		1,405	4.8 %	%	September-22	September-23	1,450	1,455
		1,406	4.5 %	%	November-22	November-23	1,450	1,455
		2,900	4.5 %	%	December-22	December-23	2,900	2,911
		1,382	4.5 %	%	January-23	January-24	-	1,382
		5,621	3.2 %	%	September-22	July-23	5,800	2,911
	NanJing Bank (5)	2,811	4.3 %	%	September-22	September-23	2,899	2,911
		1,265	4.3 %	%	November-22	November-23	1,305	1,311
BoYu	Industrial and Commercial Bank of China (6)	1,450	2.8 %	%	December-22	December-23	1,450	1,455
	Bank of China (5)	1,204	2.4 %	%	January-23	January-24	-	1,204
	NingBo Bank (5)	703	4.8 %	%	September-22	March-23	725	-
		1,406	3.6 %	%	November-22	May-23	1,450	1,455
		725	4.8 %	%	December-22	June-23	725	728
Loan Balance		\$ 728	3.6 %	%	March-23	September-23	\$ 47,078	\$ 52,821

Collateral for the above bank loans and line of credit

- (1) Baoding Tongmei's land use rights and all of its buildings located at its facility in Dingxing, China.
- (2) ChaoYang Tongmei's land use rights and all of its buildings located at its facility in Kazuo, China.
- (3) ChaoYang LiMei time deposit.
- (4) AXT time deposit.
- (5) Not collateralized.
- (6) BoYu's land use rights and its building located at its facility in Tianjin, China and BoYu's accounts receivable.

On July 27, 2021, we filed with the SEC a registration statement on Form S-3, pursuant to which we may offer up to \$60 million of common stock, preferred stock, debt securities, depository shares, warrants, subscription rights, purchase contracts and/or units in one or more offerings and in any combination. A prospectus supplement, which we will provide each time we offer securities, will describe the specific amounts, prices and terms of the securities we determine to offer. We currently expect to use the net proceeds from the sale of securities under the shelf registration statement for working capital, capital expenditures and other general corporate purposes. We may also use a portion of the net proceeds to acquire, license or invest in complementary products, technologies or businesses. On May 17, 2022, the SEC declared the registration statement effective.

We believe that we have adequate cash and investments to meet our operating needs and capital expenditures over the next twelve months. If our sales decrease, however, our ability to generate cash from operations will be adversely affected which could adversely affect our future liquidity, require us to use cash at a more rapid rate than expected, and require us to seek additional capital.

Cash from operations could be affected by various risks and uncertainties, including, but not limited to those set forth below under the section entitled "Risk Factors" in Item 1A below.

Contract to Purchase Goods and Services

Purchase orders or contracts for the purchase of certain goods and services are not considered to be part of our contractual obligations. We cannot determine the aggregate amount of such purchase orders that represent contractual obligations because purchase orders may represent authorizations to purchase rather than binding agreements. For the purposes of this disclosure, contractual obligations for purchase of goods or services are defined as agreements that are enforceable and legally binding and that specify all significant terms, including fixed or minimum quantities to be purchased; fixed, minimum, or variable price provisions; and the approximate timing of the transaction. Our purchase orders are based on our current needs and are fulfilled by our vendors within short time horizons. We also enter into contracts for outsourced services; however, the obligations under these contracts were not significant and the contracts generally contain clauses allowing for cancellation without significant penalty. Contractual obligations that are contingent upon the achievement of certain milestones would also not be included.

Land Purchase and Investment Agreement

We have established a wafer processing production line in Dingxing, China. In addition to a land rights and building purchase agreement that we entered into with a private real estate development company to acquire our new manufacturing facility, we also entered into a cooperation agreement with the Dingxing local government. In addition to pledging its full support and cooperation, the Dingxing local government will issue certain tax credits to us as we achieve certain milestones. We, in turn, agreed to hire local workers over time, pay taxes when due and eventually demonstrate a total investment of approximately \$90 million in value, assets and capital. The investment will include cash paid for the land and buildings, cash on deposit in our name at local banks, the gross value of new and used equipment (including future equipment that might be used for indium phosphide and germanium substrates production), the deemed value for our customer list or the end user of our substrates (for example, the end users of the 3-D sensing VCSELs), a deemed value for employment of local citizens, a deemed value for our proprietary process technology, other intellectual property, other intangibles and additional items of value. There is no timeline or deadline by which this must be accomplished, rather it is a good faith covenant entered into between AXT and the Dingxing local government. Further, there is no specific penalty contemplated if either party breaches the agreement, however the agreement does state that each party has a right to seek from the other party compensation for losses. Under certain conditions, the Dingxing local government may purchase the land and building at the appraised value. We believe that such cooperation agreements are normal, customary and usual in China and that the future valuation is flexible. We have a similar agreement with the city of Kazuo, China, although on a smaller scale. The total investment targeted by AXT in Kazuo is approximately \$15 million in value, assets and capital.

Off-Balance Sheet Arrangements

As of March 31, 2023, we did not have any off-balance sheet financing arrangements and have never established any special purpose entities as defined under SEC Regulation S-K Item 303(a)(4)(ii).

ITEM 3. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Foreign Currency Risk

A significant portion of our business is conducted in currencies other than the U.S. dollar. Foreign exchange losses have had a material adverse effect on our operating results and cash flows in the past and could have a material adverse effect on our operating results and cash flows in the future. If we do not effectively manage the risks associated with this currency risk, our revenue, cash flows and financial condition could be adversely affected. Although during 2022, we recorded a foreign exchange gain of \$1.6 million, during 2021 and 2020 we recorded net foreign exchange loss of \$434,000 and \$411,000, respectively, included as part of other income, net in our condensed consolidated statements of operations. We incur foreign currency transaction exchange gains and losses due to operations in general. In the future we may experience foreign exchange losses on our non-functional currency denominated receivables and payables to the extent that we have not mitigated our exposure. Foreign exchange losses could have a materially adverse effect on our operating results and cash flows.

Our product sales to Japanese customers are typically invoiced in Japanese yen. As such, we have foreign exchange exposure on our accounts receivable and on any Japanese yen denominated cash deposits. To partially protect us against fluctuations in foreign currency resulting from accounts receivable in Japanese yen, starting in 2015, we instituted a foreign currency hedging program. We place short term hedges that are intended to offset the potential cash exposure related to fluctuations in the exchange rate between the United States dollar and Japanese yen. We measure the fair value of these hedges at each month end and quarter end using current exchange rates and in accordance with U.S. GAAP. At quarter end and year end any foreign currency hedges not settled are netted on the condensed consolidated balance sheet and consolidated balance sheet, respectively, and classified as Level 3 assets and liabilities. As of March 31, 2023 and December 31, 2022, the net change in fair value from the placement of the hedge to settlement at each month end during the quarter had a de minimis impact to the condensed consolidated results.

The functional currency for our foreign operations is the renminbi, the local currency of China, and in the future we may establish short term hedges covering renminbi. Most of our operations are conducted in China and most of our costs are incurred in Chinese renminbi, which subjects us to fluctuations in the exchange rates between the U.S. dollar and the Chinese renminbi. We incur transaction gains or losses resulting from consolidation of expenses incurred in local currencies for our Chinese subsidiaries, as well as in translation of the assets and liabilities at each balance sheet date. Our financial results could be adversely affected by factors such as changes in foreign currency exchange rates or weak economic conditions in foreign markets, including the revaluation by China of the renminbi, and any future adjustments that China may make to its currency such as any move it might make to a managed float system with opportunistic interventions. We may also experience foreign exchange losses on our non-functional currency denominated receivables and payables.

We currently are using a hedging program to minimize the effects of currency fluctuations relating to the Japanese yen. While we may apply this program to other currencies, such as the Chinese renminbi, our hedging position is partial and may not exist at all in the future. It may not succeed in minimizing our foreign currency fluctuation risks. Our primary objective in holding these instruments is to reduce the volatility of earnings and cash flows associated with changes in foreign currency. The program is not designated for trading or speculative purposes. The company may choose not to hedge certain foreign exchange exposures for a variety of reasons, including but not limited to accounting considerations and the prohibitive economic cost of hedging particular exposures. However, even with our hedging program, we still experience losses on foreign exchange from time to time.

Interest Rate Risk

Cash, cash equivalents and restricted cash earning interest and certain variable rate debt instruments are subject to interest rate fluctuations. The following table sets forth the probable impact of a 10% change in interest rates (in thousands):

Instrument	Balance as of March 31, 2023	Current Interest Rate	Projected Annual Interest Income	Proforma 10% Interest Rate Decline Income	Proforma 10% Interest Rate Increase Income
Cash, cash equivalents and restricted cash	\$ 44,893	0.42 %	\$ 189	\$ 170	\$ 208
Investments in marketable debt securities	8,658	1.35 %	117	105	129
			<u>\$ 306</u>	<u>\$ 275</u>	<u>\$ 337</u>

The primary objective of our investment activities is to preserve principal while maximizing income without significantly increasing risk. Financial instruments that potentially subject us to concentration of credit risk consist primarily of cash and cash equivalents, short-term investments, and accounts receivable. We invest primarily in money market accounts, certificates of deposits, corporate bonds and notes, and government securities. We are exposed to credit risks in the event of default by the issuers to the extent of the amount recorded on the condensed consolidated balance sheets. These securities are generally classified as available-for-sale and consequently are recorded on the balance sheet at fair value with unrealized gains or losses reported as a separate component of accumulated other comprehensive income (loss), net of estimated tax, further reduced by a valuation allowance for expected credit losses, if any. Our cash,

cash equivalents and short-term investments and long-term investments are in high-quality instruments placed with major banks and financial institutions and commercial paper. We have no investments in auction rate securities.

Credit Risk

We perform ongoing credit evaluations of our customers' financial condition, and limit the amount of credit extended when deemed necessary, but generally do not require collateral. The credit risk in our accounts receivable is mitigated by our credit evaluation process and the broad dispersion of sales transactions. No customers accounted for 10% of our accounts receivable balance as of March 31, 2023 and two customers accounted for more than 10% of our accounts receivable as of December 31, 2022.

Impairment of Equity Investment Risk

As part of our supply chain strategy, we maintain minority investments in privately-held raw material companies located in China either invested directly by us or by one of our supply chain companies in China. These minority investments are reviewed for other than temporary declines in value on a quarterly basis. These investments are classified as other assets in the condensed consolidated balance sheets and accounted for under either the equity or cost method, depending on whether we have the ability to exercise significant influence over their operations or financial decisions. We monitor our investments for impairment and record reductions in carrying value when events or changes in circumstances indicate that the carrying value may not be recoverable. Reasons for other than temporary declines in value include whether the related company would have insufficient cash flow to operate for the next twelve months, significant changes in the operating performance and changes in market conditions. As of March 31, 2023 and December 31, 2022, we did not maintain any direct investments under the cost method. Our minority investments under the equity method as of March 31, 2023 and December 31, 2022 totaled \$16.5 million and \$14.6 million, respectively.

ITEM 4. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our Chief Executive Officer and our Chief Financial Officer, evaluated the effectiveness of the design and operation of our disclosure controls and procedures as of the end of the period covered by this Quarterly Report on Form 10-Q. Based upon this evaluation, our Chief Executive Officer and Chief Financial Officer have concluded that our disclosure controls and procedures as defined under Securities Exchange Act Rules 13a-15(e) and 15d-15(e) were effective at the reasonable assurance level to ensure that information required to be disclosed in our Securities Exchange Act reports is recorded, processed, summarized and reported within the time periods specified by the Securities and Exchange Commission and is accumulated and communicated to management, including our Chief Executive Officer and our Chief Financial Officer, as appropriate to allow timely decisions regarding required disclosure.

Our disclosure controls and procedures include components of our internal control over financial reporting. Management's assessment of the effectiveness of our internal control over financial reporting is expressed at the level of reasonable assurance because a control system, no matter how well designed and operated, can provide only reasonable assurance that the control system's objectives will be met.

Changes in Internal Control Over Financial Reporting

There were no changes in our internal control over financial reporting identified in management's evaluation pursuant to Rules 13a or 15(d) of the Exchange Act that occurred during the three months ended March 31, 2023 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

PART II. OTHER INFORMATION

Item 1. Legal Proceedings

From time to time we may be involved in judicial or administrative proceedings concerning matters arising in the ordinary course of business. We do not expect that any of these matters, individually or in the aggregate, will have a material adverse effect on our business, financial condition, cash flows or results of operation.

Item 1A. Risk Factors

For ease of reference, we have divided these risks and uncertainties into the following general categories:

- I. Summary Risk Factors;
- II. Risks Related to Our Business and Operations;
- III. Risks Related to International Aspects of Our Business;
- IV. Risks Related to Our Financial Results and Capital Structure;
- V. Risks Related to Our Intellectual Property; and
- VI. Risks Related to Compliance, Environmental Regulations and Other Legal Matters.

I. Summary Risk Factors

- We are subject to a number of unique legal and operational risks associated with our corporate structure.
- The PRC central government may intervene in or influence our PRC operations at any time and the rules and regulations in China can change quickly with little advance notice.
- Although the audit report is prepared by an independent registered public accounting firm that is currently inspected fully by the PCAOB, there is no guarantee that future audit reports will be prepared by an independent registered public accounting firm that is completely inspected by the PCAOB.
- Our NASDAQ stock price is volatile and our stock price could decline. Unpredictable fluctuations in our operating results, changes and events in our end markets and global trends cause volatility in our stock price.
- COVID-19 or other contagious diseases may affect our business operations and financial performance. Lack of supply of vaccines and resistance by some to be vaccinated could prolong COVID-19.
- Global economic and political conditions, including trade tariffs and restrictions from China, may have a negative impact on our business and financial results.
- Changes in China's political, social, regulatory or economic environments may affect our financial performance.
- The Chinese central government is increasingly aware of air pollution and other forms of environmental pollution and their reform efforts can impact our manufacturing, including intermittent mandatory shutdowns. Shutdowns or underutilizing our manufacturing facilities may result in declines in our gross margins.
- Enhanced trade tariffs, import restrictions, export restrictions, Chinese regulations or other trade barriers may materially harm our business.
- If China places restrictions on freight and transportation routes and on ports of entry and departure this could result in shipping delays or increased costs for shipping.
- Our international operations are exposed to potential adverse tax consequence in China.
- Our gross margin has fluctuated historically and may decline or increase due to several factors. Factors such as product mix, unit volume, yields and other manufacturing efficiencies can cause our gross margin to decrease or increase from quarter to quarter.

- The proposed Tongmei IPO on the STAR Market in China could fail to be completed. This could result in investor disappointment and in failure to secure sufficient capital needed to take advantage of market opportunities for our products. Our stock price could decline.
- The terms of the private equity raised by Tongmei in China grant each investor a right of redemption if the IPO fails to pass the audit of the Shanghai Stock Exchange, is not approved by the CSRC or Tongmei cancels the IPO application. This could result in disgorging the cash that we raised from the Investors.
- Defects in our products could diminish demand for our products. Our ability to receive orders from tier one customers is contingent on producing wafer substrates of very high quality and deploying best practices in manufacturing. We may not always be able to meet these requirements and we could then lose revenue.
- Difficulties in accurately estimating market demand could result in over-investing in equipment and capacity expansion or losing market share if we do not invest sufficiently.
- Attracting and retaining tier one customers requires that we succeed in our research and development programs. Customers establish difficult to meet product specifications regarding defect densities, surface flatness diameter size and other specifications pushing the boundaries of material science. We may not achieve these specifications.
- We are subject to foreign exchange gains and losses that materially impact our condensed consolidated statements of operations. Because we are a global company we are exposed to changes and swings in foreign exchange, particularly when currencies experience periods of volatility.
- Joint venture raw material companies in China bring certain risks.
- Risks exist in utilizing our new gallium arsenide manufacturing sites efficiently.
- We derive a significant portion of our revenue from international sales, and our ability to sustain and increase our international sales involves significant risks.

II. Risks Related to Our Business and Operations

Silicon substrates (wafers) are significantly lower in cost compared to substrates made from specialty materials, such as those that we produce, and new silicon-based technologies could enable silicon-based substrates to replace specialty material-based substrates for certain applications.

Historically silicon wafers or substrates are less expensive than specialty material substrates, such as those that we produce. Electronic circuit designers will generally consider silicon first and only turn to alternative materials if silicon cannot provide the required functionality in terms of power consumption, speed, wave lengths or other specifications. Beginning in 2011, certain applications that had previously used GaAs substrates, specifically the RF chip in mobile phones, adopted a new silicon-based technology called silicon on insulator, or SOI. SOI technology uses a silicon-insulator-silicon layered substrate in place of conventional silicon substrates in semiconductor manufacturing. SOI substrates cost less than GaAs substrates and, although their performance is not as robust as GaAs substrates in terms of power consumption, heat generation and speed, they became acceptable in mobile phones and other applications that were previously dominated by GaAs substrates. The adoption of SOI resulted in decreased GaAs wafer demand, and decreased revenue. If SOI or new silicon-based technologies gain more widespread market acceptance, or are used in more applications, our sales of specialty material-based substrates could be reduced and our business and operating results could be significantly and adversely affected.

COVID-19 or other contagious diseases may affect our business operations and financial performance.

The spread of COVID-19 has impacted our operations and financial performance. This outbreak has triggered references to the SARS outbreak, which occurred in 2003 and affected our business operations. Any severe occurrence of an outbreak of a contagious disease such as COVID-19, SARS, Avian Flu or Ebola may cause us or the government to temporarily close our manufacturing operations in China. In January 2020, virtually all companies in China were ordered to remain closed after the traditional Lunar New Year holiday ended, including our subsidiaries in China. In late March 2022, as a result of an outbreak of COVID-19, Shanghai was locked down and certain manufacturing facilities were required to close. In the second quarter of 2022, rising COVID-19 infections in Beijing resulted in concerns of a city-wide lockdown which could have required our manufacturing facilities in Beijing to close temporarily. Although some apartment complexes were locked down, there was no city-wide lockdown. In December 2022, the PRC government

ended its zero-COVID policy. If there is a renewed surge of the COVID-19 pandemic in cities in which our PRC subsidiaries and PRC joint ventures are located, the Chinese government may require these companies to close again. If one or more of our key suppliers is required to close for an extended period, we might not have enough raw material inventories to continue manufacturing operations. In addition, travel restrictions between China and the U.S. have disrupted our normal movement to and from China and this has impacted our efficiency. If COVID-19 vaccines are not widely available or people choose not to be vaccinated, our business operations may be affected negatively. The outbreak has affected transportation and reduced the availability of air transport, caused port closures, and increased border controls and closures. If our manufacturing operations were closed for a significant period or we experience difficulty in shipping our products, we could lose revenue and market share, which would depress our financial performance and could be difficult to recapture. If one of our key customers is required to close for an extended period, this may delay the placement of new orders. As a result, our revenue would decline. Further, customers might default on their obligations to us. In the first quarter of 2020 we observed an increase in our accounts receivable and believe this was the result of businesses slowing down and a general cautiousness due to the COVID-19 pandemic. Such events would negatively impact our financial performance.

Our gross margin has fluctuated historically and may decline due to several factors.

Our gross margin has fluctuated from period to period as a result of increases or decreases in total revenue, unit volume, shifts in product mix, shifts in the cost of raw materials, costs related to the relocation of our gallium arsenide and germanium production lines, including costs related to hiring additional manufacturing employees at our new locations, tariffs imposed by the U.S. government, the introduction of new products, decreases in average selling prices for products, utilization of our manufacturing capacity, fluctuations in manufacturing yields and our ability to reduce product costs. These factors and other variables change from period to period and these fluctuations are expected to continue in the future. For example, in the second quarter of 2019 our gross margin was 34.3% but it dropped to 21.0% in the fourth quarter of 2019 as a result of several of these factors.

Our raw material companies experience selling price volatility and purchase price volatility in acquiring base materials. We consolidate the results of two of these raw material companies, and any reduction in their gross margins could have a significant, adverse impact on our overall gross margins. One or more of our companies has in the past sold, and may in the future sell, raw materials at significantly reduced prices in order to gain volume sales or sales to new customers. In addition, at some points in the last three years, the market price of gallium dropped below our per unit inventory cost and we incurred an inventory write down under the lower of cost or net realizable value accounting rules.

Shutdowns or underutilizing our manufacturing facilities may result in declines in our gross margins.

An important factor in our success is the extent to which we are able to utilize the available capacity in our manufacturing facilities. A number of factors and circumstances may reduce utilization rates, including periods of industry overcapacity, low levels of customer orders, operating inefficiencies, mechanical failures and disruption of operations due to expansion, power interruptions, fire, flood, other natural disasters or calamities or government-ordered mandatory factory shutdowns, including as a result of the COVID-19 pandemic. Severe air pollution in Beijing can trigger mandatory factory shutdowns. For example, in the first quarter of 2018, over 300 manufacturing companies, including AXT, were intermittently shut down by the local government for a total of ten days from February 27 to March 31, due to severe air pollution. In late March 2022, as a result of an outbreak of COVID-19, Shanghai was locked down and certain manufacturing facilities were required to close. In the second quarter of 2022, rising COVID-19 infections in Beijing resulted in concerns of a city-wide lockdown, which could have required our manufacturing facilities in Beijing to close temporarily. Although some apartment complexes were locked down there was no city-wide lockdown. In December 2022, the PRC government ended its zero-COVID policy. Further, we have increased capacity by adding two new sites and this could reduce our utilization rate and increase our depreciation charges. Because many portions of our manufacturing costs are relatively fixed, high utilization rates are critical to our gross margins and operating results. If we fail to achieve acceptable manufacturing volumes or experience product shipment delays, our results of operations will be negatively affected. During periods of decreased demand, we have underutilized our manufacturing lines. If we are unable to improve utilization levels at our facilities during periods of decreased demand and correctly manage capacity, the fixed expense levels will have an adverse effect on our business, financial condition and results of

operations. For example, in the three months ended March 31, 2023, our revenue dropped to \$19.4 million and our gross margin was only 26.3%.

If we are unable to utilize the available capacity in our manufacturing facilities, we may need to implement a restructuring plan, which could have a material adverse effect on our revenue, our results of operations and our financial condition. For example, in 2013, we concluded that incoming orders were insufficient and that we were significantly underutilizing our factory capacity. As a result, in February 2014, we announced a restructuring plan with respect to our China company, Tongmei, in order to better align manufacturing capacity with demand. Under the restructuring plan, we recorded a charge of approximately \$907,000 in the first quarter of 2014.

If we receive fewer customer orders than forecasted or if our customers delay or cancel orders, we may not be able to reduce our manufacturing costs in the short-term and our gross margins would be negatively affected. In addition, lead times required by our customers are shrinking, which reduces our ability to forecast orders and properly balance our capacity utilization.

If we have low product yields, the shipment of our products may be delayed and our product cost and operating results may be adversely impacted.

A critical factor in our product cost is yield. Our products are manufactured using complex crystal growth and wafer processing technologies, and the number of usable wafer substrates we produce can fluctuate as a result of many factors, including:

- poor control of furnace temperature and pressure;
- impurities in the materials used;
- contamination of the manufacturing environment;
- quality control and inconsistency in quality levels;
- lack of automation and inconsistent processing requiring manual manufacturing steps;
- substrate breakage during the manufacturing process; and
- equipment failure, power outages or variations in the manufacturing process.

An example where yield is of special concern is for our six-inch semi-conducting gallium arsenide substrates, which can be used for manufacturing industrial lasers and LED lighting. These applications require very low defect densities, also called EPD, and our yields will be lower than the yields achieved for the same substrate when it will be used in other applications. If we are unable to achieve the targeted quantity of low defect density substrates, then our manufacturing costs would increase and our gross margins would be negatively impacted.

In addition, we may modify our process to meet a customer specification, but this can impact our yields. If our yields decrease, our revenue could decline if we are unable to produce products to our customers' requirements. At the same time, our manufacturing costs could remain fixed, or could increase. Lower yields negatively impact our gross margin. We have experienced product shipment delays and difficulties in achieving acceptable yields on both new and older products, and such delays and poor yields have adversely affected our operating results. We may experience similar problems in the future and we cannot predict when they may occur, their duration or severity.

If our manufacturing processes result in defects in our products making them unfit for use by our customers, our products would be rejected, resulting in compensation costs paid to our customers, and possible disqualification. This could lead to revenue loss and market share loss.

Risks exist in utilizing our new gallium arsenide manufacturing sites efficiently.

The Beijing city government is moving its offices to the Tongzhou district where our original manufacturing facility is currently located. The city government is in the process of moving thousands of government employees into this area. To create room and upgrade the district, the city instructed virtually all existing manufacturing companies, including AXT, to relocate all or some of their manufacturing lines. We were instructed to move our gallium arsenide manufacturing line out of the area.

Although the relocation is completed and we are in volume production at the new sites, unforeseen manufacturing issues at the new sites could still occur. Problems could occur as we add capacity or comply with strict guidelines as customers perform their qualifications. All of this will require us to continue to diligently address the many details that arise at each of our new sites. A failure to properly accomplish this could result in disruption to our production and have a material adverse impact on our revenue, our results of operations and our financial condition. If we fail to meet the product qualification and volume requirements of a customer, we may lose sales to that customer. Our reputation may also be damaged. Any loss of sales could have a material adverse effect on our revenue, our results of operations and our financial condition.

Some of our key employees are relocating to our new manufacturing sites. Travel restrictions within China resulting from COVID-19 have impacted their relocation and hindered commuting. Certain employees may choose not to relocate. If we are unable to continue to employ those key employees in our original manufacturing facility, we may be required to terminate those employees and could incur severance costs. If the Chinese government does not assist us in this matter it could materially and adversely impact our results of operations and our financial condition. Further, a loss of key employees or our inability to hire qualified employees could disrupt our production, which could materially and adversely impact our results of operations and our financial condition.

The Chinese government has in the past imposed temporary restrictions on manufacturing facilities, such as the restrictions imposed on polluting factories for the 2008 Olympics and the 2014 Asian Pacific Economic Cooperation event. These restrictions included a shutdown of the transportation of materials and power plants to reduce air pollution. To reduce air pollution in Beijing, the Chinese government has sometimes limited the construction of new, or expansion of existing, facilities by manufacturing companies in the Beijing area or required mandatory factory shutdowns. For example, in the first quarter of 2018, over 300 manufacturing companies, including AXT, were intermittently shut down by the local government for a total of ten days from February 27 to March 31 due to severe air pollution. In late March 2022, as a result of an outbreak of COVID-19, Shanghai was locked down and certain manufacturing facilities were required to close. In the second quarter of 2022, rising COVID-19 infections in Beijing resulted in concerns of a city-wide lockdown which could have required our manufacturing facilities in Beijing to close temporarily. Although some apartment complexes were locked down, there was no city-wide lockdown. In December 2022, the PRC government ended its zero-COVID policy. If the government applies similar restrictions to us or requires mandatory factory shutdowns in the future, then such restrictions or shutdowns could have an adverse impact on our results of operations and our financial condition. Our ability to supply current or new orders could be significantly impacted. Customers could then be required to purchase products from our competitors, causing our competitors to take market share from us.

In addition, from time to time, the Chinese government issues new regulations, which may require additional actions on our part to comply. On February 27, 2015, the China State Administration of Work Safety updated its list of hazardous substances. The previous list, which was published in 2002, did not restrict the materials that we use in our wafers. The new list added gallium arsenide. As a result of the newly published list, we were required to seek additional permits.

Additional customers may require that they re-qualify our gallium arsenide wafer substrates or our new sites as a result of relocating our gallium arsenide manufacturing lines.

Although some of our largest customers have qualified our new sites there may still be some who will decide to go through the qualification process. If we fail to meet the product qualification requirements of a customer, we may lose sales to that customer. Our reputation may also be damaged. Any loss of sales could have a material adverse effect on our revenue, our results of operations and our financial condition.

Global economic and political conditions, including trade tariffs and restrictions, may have a negative impact on our business and financial results.

In September 2018, the Trump Administration announced a list of thousands of categories of goods that became subject to tariffs when imported into the United States from China. This pronouncement imposed tariffs on wafer substrates we imported into the United States. The initial tariff rate was 10% and subsequently was increased to 25%. Approximately 12% of our revenue derives from importing our wafers into the United States. In the first quarter of 2023 we paid approximately \$447,000 in tariffs. In the years ended December 31, 2022, 2021 and 2020 we paid approximately \$3.3 million, \$1.3 million and \$1.3 million, respectively, in tariffs. The future impact of tariffs and trade wars is uncertain.

The economic and political conditions between China and the United States, in our view, create an unstable business environment. The United States has restricted access by certain Chinese technology companies to items produced domestically and abroad from U.S. technology and software, which may impact our ability to grow our revenue. Trade restrictions against China have resulted in a greater determination within China to be self-sufficient and produce more goods domestically. Government agencies in China may be encouraging and supporting the founding of new companies, the addition of new products in existing companies and more vertical integration within companies. These factors could negatively impact our sales in China.

Our operations and financial results depend on worldwide economic and political conditions and their impact on levels of business spending, which has deteriorated significantly in many countries and regions. Uncertainties in the political, financial and credit markets and U.S. financial system may cause our customers to postpone deliveries. The COVID-19 virus is an additional cause of uncertainty. Additionally, U.S. bank failures in 2023 may affect our customers. Delays in the placement of new orders and extended uncertainties may reduce future sales of our products and services. The revenue growth and profitability of our business depends on the overall demand for our substrates. Because the end users of our products are primarily large companies whose businesses fluctuate with general economic and business conditions, a softening of demand for products that use our substrates, caused by a weakening economy, may result in decreased revenue. Customers may find themselves facing excess inventory from earlier purchases, and may defer or reconsider purchasing products due to the downturn in their business and in the general economy. For example, global business conditions deteriorated in the second half of 2022. In the second quarter of 2022, our revenue totaled \$39.5 million. In the fourth quarter of 2022, our revenue declined to \$26.8 million and in the first quarter of 2023, our revenue further declined to \$19.4 million. If market conditions deteriorate, we may experience increased collection times and greater write-offs, either of which could have a material adverse effect on our profitability and our cash flow.

Future tightening of credit markets and concerns regarding the availability of credit may make it more difficult for our customers to raise capital, whether debt or equity, to finance their purchases of capital equipment or of the products we sell. Delays in our customers' ability to obtain such financing, or the unavailability of such financing, would adversely affect our product sales and revenues and, therefore, harm our business and operating results. We cannot predict the timing, duration of or effect on our business of any future economic downturn or the timing or strength of any subsequent recovery.

If any of our facilities are damaged by occurrences such as fire, explosion, power outage or natural disaster, we might not be able to manufacture our products.

The ongoing operation of our manufacturing and production facilities is critical to our ability to meet demand for our products. If we are not able to use all or a significant portion of our facilities for prolonged periods for any reason, we would not be able to manufacture products for our customers. For example, a fire or explosion caused by our

use of combustible chemicals, high furnace temperatures or, in the case of InP, high pressure during our manufacturing processes could render some of our facilities inoperable for an indefinite period of time. Actions outside of our control, such as earthquakes or other natural disasters, could also damage our facilities, rendering them inoperable. If we are unable to operate our facilities and manufacture our products, we would lose customers and revenue and our business would be harmed.

On the evening of March 15, 2017, an electrical short-circuit fire occurred at our Beijing manufacturing facility. The electrical power supply supporting 2-inch, 3-inch and 4-inch gallium arsenide and germanium crystal growth was damaged and production in that area was stopped. In addition, a wastewater pipe was damaged resulting in a halt to wafer processing for four days until the pipe could be repaired. We were able to rotate key furnace hardware and use some of the 6-inch capacity for smaller diameter crystal growth production to mitigate the impact of the fire and resume production. If we are unable to recover from a fire or natural disaster, our business and operating results could be materially and adversely affected.

Demand for our products may decrease if demand for the end-user applications decrease or if manufacturers downstream in our supply chain experience difficulty manufacturing, marketing or selling their products.

Our products are used to produce components for electronic and opto-electronic products. Accordingly, demand for our products is subject to the demand for end-user applications, including certain consumer applications, which utilize our products, as well as factors affecting the ability of the manufacturers downstream in our supply chain to introduce and market their products successfully, including:

- worldwide economic and political conditions and their impact on levels of business spending;
- the competition such manufacturers face in their particular industries;
- end of life obsolescence of products containing devices built on our wafers;
- the technical, manufacturing, sales, marketing and management capabilities of such manufacturers;
- the financial and other resources of such manufacturers; and
- the inability of such manufacturers to sell their products if they infringe third-party intellectual property rights.

If demand for the end-user applications for which our products are used decreases, or if manufacturers downstream in our supply chain are unable to develop, market and sell their products, demand for our products will decrease. For example, during 2019 widespread political and economic instability and trade war concerns resulted in a general slowdown and our revenue decreased significantly. Additionally, in the second half of 2016, manufacturers producing and selling passive optical network devices known as EPONs and GPONs experienced a slowdown in demand resulting in surplus inventory on hand. The slowdown persisted until late in 2017. This resulted in a slowdown of sales of our InP substrates used in the PON market. More recently, global business conditions deteriorated in the second half of 2022. In the second quarter of 2022, our revenue totaled \$39.5 million. In the fourth quarter of 2022 our revenue declined to \$26.8 million and in the first quarter of 2023, our revenue further declined to \$19.4 million. We expect similar cycles of strong demand followed by lower demand will occur for various InP, GaAs or Ge substrates in the future.

Our revenue, gross margins and profitability can be hurt if the average sales price of the various raw materials in our partially owned companies decreases.

Although the companies in our vertically integrated supply chain have historically made a positive contribution to our financial performance, when the average selling prices for the raw materials produced decline, this results in a negative impact on our revenue, gross margin and profitability. For example, the average selling prices for 4N gallium

and for germanium were driven down by oversupply in the past, and negatively impacted our financial results. In 2022 and 2021, the companies accounted for under the equity method of accounting contributed a gain of \$6.0 million and \$4.4 million, respectively, to our condensed consolidated financial statements. However, in 2019, the companies accounted for under the equity method of accounting contributed a loss of \$1.9 million to our condensed consolidated financial statements. Further, in several quarters over the past three years, one of our consolidated subsidiaries incurred a lower of cost or net realizable value inventory write down, which negatively impacted our consolidated gross margin. In the first quarter of 2019, we incurred an impairment charge of \$1.1 million for a germanium materials company in China in which we had a 25% ownership interest, writing down our investment to zero value. If the pricing environment remains stressed by oversupply and our raw material companies cannot reduce their production costs, then the reduced average selling prices of the raw materials will have a continuing adverse impact on our revenue, gross margins and net profit.

Problems incurred in our raw material companies or our investment partners could result in a material adverse impact on our financial condition or results of operations.

We have invested in raw material companies in China that produce materials, including 99.99% pure gallium (4N Ga), high purity gallium (6N and 7N Ga), arsenic, germanium, germanium dioxide, pyrolytic boron nitride (pBN) crucibles and boron oxide (B₂O₃). We purchase a portion of the materials produced by these companies for our use and they sell the remainder of their production to third parties. We consolidate the companies in which we have a majority or controlling financial interest and employ equity accounting for the companies in which we have a smaller ownership interest. Several of these companies occupy space within larger facilities owned and/or operated by one of the other investment partners. Several of these partners are engaged in other manufacturing activities at or near the same facility. In some facilities, we share access to certain functions, including water, hazardous waste treatment or air quality treatment. If a partner in any of these ventures experiences problems with its operations, or deliberately withholds or disrupts services, disruptions in the operations of our companies could occur, having a material adverse effect on the financial condition and results of operation in these companies, and correspondingly on our financial condition or results of operations. For example, since gallium is a by-product of aluminum, our raw gallium company in China, which is housed in and receives services from an affiliated aluminum plant, could generate lower production and shipments of gallium as a result of reduced services provided by the aluminum plant. Accordingly, in order to meet customer supply obligations, our supply chain may have to source materials from another independent third-party supplier, resulting in higher costs and reduced gross margin.

The China central government has become increasingly concerned about environmental hazards. Air pollution has been a problem in Beijing and other parts of China. In days of severe air pollution, the government has ordered manufacturing companies to stop all production. The central government is also tightening control over hazardous chemicals and other hazardous elements such as arsenic, which is produced by two of our raw material companies. Further, the central government encourages employees to report to the appropriate regulatory agencies possible safety or environmental violations, but there may not be actual violations. Regular use in the normal course of business of hazardous chemicals or hazardous elements or a company's failure to meet the ever-tightening standards for control of hazardous chemicals or hazardous elements could result in orders to shut down permanently, fines or other severe measures. Any such orders directed at one of our raw material companies could result in impairment charges if the company is forced to close its business, cease operations or incurs fines or operating losses, which would have a material adverse effect on our financial results. In the first quarter of 2019, we incurred an impairment charge of \$1.1 million for a germanium materials company in China in which we had a 25% ownership interest, writing down our investment to zero value.

Further, some of our raw material companies share facilities with our raw material investment partners. If either company is deemed to have violated applicable laws, rules or regulations governing the use, storage, discharge or disposal of hazardous chemicals, their operations could be adversely affected and we could be subject to substantial liability for clean-up efforts, personal injury, fines or suspension or termination of operations. Employees working for these companies could bring litigation against us even though we are not directly controlling those operations. While we would expect to defend ourselves vigorously in any litigation that is brought against us, litigation is inherently uncertain and it is possible that our business, financial condition, results of operations or cash flows could be affected. Even if we are not deemed responsible for the actions of the raw material companies or investment partners, litigation could be

costly, time consuming to defend and divert management attention; in addition, if we are deemed to be the most financially viable of the partners, plaintiffs may decide to pursue us for damages.

Intense competition in the markets for our products could prevent us from increasing revenue and achieving profitability.

The markets for our products are intensely competitive. We face competition for our wafer substrate products from other manufacturers of substrates, such as Sumitomo, JX, Freiburger, Umicore, and CCTC, and from companies, such as Qorvo and Skyworks, that are actively considering alternative materials to GaAs and marketing semiconductor devices using these alternative materials. We believe that at least two of our major competitors are shipping high volumes of GaAs substrates manufactured using a process similar to our VGF process technology. Other competitors may develop and begin using similar technology. Sumitomo and JX also compete with us in the InP market. If we are unable to compete effectively, our revenue may decrease and we may not maintain profitability. We face many competitors that have a number of significant advantages over us, including:

- greater name recognition and market share in the business;
- more manufacturing experience;
- extensive intellectual property; and
- significantly greater financial, technical and marketing resources.

Our competitors could develop new or enhanced products that are more effective than our products.

The level and intensity of competition has increased over the past years and we expect competition to continue to increase in the future. Competitive pressures have resulted in reductions in the prices of our products, and continued or increased competition could reduce our market share, require us to further reduce the prices of our products, affect our ability to recover costs and result in reduced gross margins and profitability.

In addition, new competitors have and may continue to emerge, such as a crystal growing company established by a former employee in China that is supplying semi-conducting GaAs wafers to the LED market. Competition from sources such as this could increase, particularly if these competitors are able to obtain large capital investments. Further, recent trade tensions between China and the United States have resulted in a greater determination within China to be self-sufficient and produce more goods domestically. This could result in the formation of new competitors that would compete against our company and adversely affect our financial results.

Cyber-attacks, system security risks and data protection issues could disrupt our internal operations and cause a reduction in revenue, increase in expenses, negatively impact our results of operation or result in other adverse consequences.

Like most technology companies, we could be targeted in cyber-attacks. We face a risk that experienced computer programmers and hackers may be able to penetrate our network security and misappropriate or compromise our confidential and proprietary information, potentially without being detected. Computer programmers and hackers also may be able to develop and deploy viruses, worms, and other malicious software programs that attack our information technology infrastructure and demand a ransom payment. The costs to us to eliminate or alleviate cyber or other security problems, bugs, viruses, worms, malicious software programs and security vulnerabilities could be significant, and our efforts to address these problems may not be successful and could result in interruptions and delays that may impede our sales, manufacturing, distribution, accounting or other critical functions.

Breaches of our security measures could create system disruptions or cause shutdowns or result in the accidental loss, inadvertent disclosure or unapproved dissemination of proprietary information or sensitive or confidential data about us. Cyber-attacks could use fraud, trickery or other forms of deception. A cyber-attack could expose us to a risk of loss or misuse of information, result in litigation and potential liability, damage our reputation or otherwise harm our

business. In addition, the cost and operational consequences of implementing further data protection measures could be significant.

Portions of our information technology infrastructure might also experience interruptions, delays or cessations of service or produce errors in connection with systems integration or migration work that takes place from time to time, which may have a material impact on our business. We may not be successful in implementing new systems and transitioning data, which could cause business disruptions and be more expensive, time consuming, disruptive and resource-intensive than originally anticipated. Such disruptions could adversely impact our ability to fulfill orders and interrupt other processes. Delayed sales, lower margins or lost customers could adversely affect our financial results and reputation.

The average selling prices of our substrates may decline over relatively short periods, which may reduce our revenue and gross margins.

Since the market for our products is characterized by declining average selling prices resulting from various factors, such as increased competition, overcapacity, the introduction of new products and decreased sales of products incorporating our products, the average selling prices for our products may decline over relatively short time periods. We have in the past experienced, and in the future may experience, substantial period-to-period fluctuations in operating results due to declining average selling prices. In certain years, we have experienced an average selling price decline of our substrate selling prices of approximately 5% to 10%, depending on the substrate product. It is possible that the pace of the decline of average selling prices could accelerate beyond these levels for certain products in a commoditizing market. We anticipate that average selling prices may decrease in the future in response to the unstable demand environment, price reductions by competitors, or by other factors, including pricing pressures from significant customers. When our average selling prices decline, our revenue and gross profit decline, unless we are able to sell more products or reduce the cost to manufacture our products. We generally attempt to combat an average selling price decline by improving yields and manufacturing efficiencies and working to reduce the costs of our raw materials and of manufacturing our products. We also need to sell our current products in increasing volumes to offset any decline in their average selling prices, and introduce new products, which we may not be able to do, or do on a timely basis.

In order to remain competitive, we must continually improve our processes, work to reduce the cost of manufacturing our products and improve our yields and manufacturing efficiencies. Our efforts may not allow us to keep pace with competitive pricing pressures which could adversely affect our margins. There is no assurance that any changes effected by us will result in sufficient cost reductions to allow us to reduce the price of our products to remain competitive or improve our gross margins.

Defects in our products could diminish demand for our products.

Our wafer products are complex and may contain defects, including defects resulting from impurities inherent in our raw materials or inconsistencies in our manufacturing processes. We have experienced quality control problems with some of our products, which caused customers to return products to us, reduce orders for our products, or both. If we experience quality control problems, or experience other manufacturing problems, customers may return product for credit, cancel or reduce orders or purchase products from our competitors. We may be unable to maintain or increase sales to our customers and sales of our products could decline. Defects in our products could cause us to incur higher manufacturing costs and suffer product returns and additional service expenses, all of which could adversely impact our operating results. If new products developed by us contain defects when released, our customers may be dissatisfied and we may suffer negative publicity or customer claims against us, lose sales or experience delays in market acceptance of our new products.

Our substrate products have a long qualification cycle that makes it difficult to forecast revenue from new customers or for new products sold to existing customers.

New customers typically place orders with us for our substrate products three months to a year or more after our initial contact with them. The sale of our products is subject to our customers' lengthy internal evaluation and approval processes. During this time, we may incur substantial expenses and expend selling, marketing and management efforts

while the customers evaluate our products. These expenditures may not result in sales of our products. If we do not achieve anticipated sales in a period as expected, we may experience an unplanned shortfall in our revenue. As a result, our operating results would be adversely affected. In addition, if we fail to meet the product qualification requirements of the customer, we may not have another opportunity to sell that product to that customer for many months or even years. In the current competitive climate, the average qualification and sales cycle for our products has lengthened even further and is expected to continue to make it difficult for us to forecast our future sales accurately. We anticipate that sales of any future substrate products will also have lengthy qualification periods and will, therefore, be subject to risks substantially similar to those inherent in the lengthy sales cycles of our current substrate products.

The loss of one or more of our key substrate customers would significantly hurt our operating results.

From time to time, sales to one or more of our customers individually represent more than 10% of our revenue and if we were to lose a major customer the loss would negatively impact our revenue. Our customers are not obligated to purchase a specified quantity of our products or to provide us with binding forecasts of product purchases. In addition, our customers may reduce, delay or cancel orders. In the past, we have experienced a slowdown in bookings, significant push-outs and cancellation of orders from customers. If we lose a major customer or if a customer cancels, reduces or delays orders, our revenue would decline. In addition, customers that have accounted for significant revenue in the past may not continue to generate revenue for us in any future period. Any loss of customers or any delay in scheduled shipments of our products could cause revenue to fall below our expectations and the expectations of market analysts or investors, causing our stock price to decline.

The cyclical nature of the semiconductor industry may limit our ability to maintain or increase net sales and operating results during industry downturns.

The semiconductor industry is highly cyclical and periodically experiences significant economic downturns characterized by diminished product demand, resulting in production overcapacity and excess inventory in the markets we serve. A downturn can result in lower unit volumes and rapid erosion of average selling prices. The semiconductor industry has experienced significant downturns, often in connection with, or in anticipation of, maturing product cycles of both semiconductor companies' and their customers' products or a decline in general economic conditions. This may adversely affect our results of operations and the value of our business.

Our continuing business depends in significant part upon manufacturers of electronic and opto-electronic compound semiconductor devices, as well as the current and anticipated market demand for these devices and products using these devices. As a supplier to the semiconductor industry, we are subject to the business cycles that characterize the industry. The timing, length and volatility of these cycles are difficult to predict. The compound semiconductor industry has historically been cyclical due to sudden changes in demand, the amount of manufacturing capacity and changes in the technology employed in compound semiconductors. The rate of changes in demand, including end demand, is high, and the effect of these changes upon us occurs quickly, exacerbating the volatility of these cycles. These changes have affected the timing and amounts of customers' purchases and investments in new technology. These industry cycles create pressure on our revenue, gross margin and net income.

Our industry has in the past experienced periods of oversupply and that has resulted in significantly reduced prices for compound semiconductor devices and components, including our products, both as a result of general economic changes and overcapacity. Oversupply causes greater price competition and can cause our revenue, gross margins and net income to decline. During periods of weak demand, customers typically reduce purchases, delay delivery of products and/or cancel orders for our products. Order cancellations, reductions in order size or delays in orders could occur and would materially adversely affect our business and results of operations. Actions to reduce our costs may be insufficient to align our structure with prevailing business conditions. We may be required to undertake additional cost-cutting measures, and may be unable to invest in marketing, research and development and engineering at the levels we believe are necessary to maintain our competitive position. Our failure to make these investments could seriously harm our business.

A significant portion of our operating expense and manufacturing costs are relatively fixed. If revenue for a particular quarter is lower than we expect, we likely will be unable to proportionately reduce our operating expenses or fixed manufacturing costs for that quarter, which would harm our operating results.

If we do not successfully develop new product features and improvements and new products that respond to customer requirements, our ability to generate revenue, obtain new customers, and retain existing customers may suffer.

Our success depends on our ability to offer new product features, improved performance characteristics and new products, such as larger diameter substrates, low defect density substrates, thicker or thinner substrates, substrates with extreme surface flatness specifications, substrates that are manufactured with a doped crystal growth process or substrates that incorporate leading technology and other technological advances. This is an ongoing iterative research and development process performed by our China team in collaboration with our manufacturing managers. New products must meet customer needs and compete effectively on quality, price and performance. The markets for our products are characterized by rapid technological change, changing customer needs and evolving industry standards. If our competitors introduce products employing new technologies or performance characteristics, our existing products could become obsolete and unmarketable. Over time, we have seen our competitors selling more substrates manufactured using a crystal growth technology similar to ours, which has eroded our technological differentiation.

The development of new product features, improved performance characteristics and new products can be a highly complex process, and we may experience delays in developing and introducing them. Any significant delay could cause us to fail to timely introduce and gain market acceptance of new products. Further, the costs involved in researching, developing and engineering new products could be greater than anticipated. If we fail to offer new products or product enhancements or fail to achieve higher quality products, we may not generate sufficient revenue to offset our development costs and other expenses or meet our customers' requirements.

We have made and may continue to make strategic investments in raw materials suppliers, which may not be successful and may result in the loss of all or part of our investment.

We have made direct investments or investments through our subsidiaries in raw material suppliers in China, which provide us with opportunities to gain supplies of key raw materials that are important to our substrate business. These affiliates each have a market beyond that provided by us. We do not have significant influence over every one of these companies and in some we have made only a strategic, minority investment. We may not be successful in achieving the financial, technological or commercial advantage upon which any given investment is premised, and we could end up losing all or part of our investment which would have a negative impact on our results of operations. In the first quarter of 2017, we incurred an impairment charge of \$313,000 against one of our partially owned suppliers, writing down our investment to zero value. In the first quarter of 2019, we incurred an impairment charge of \$1.1 million for a germanium materials company in China in which we had a 25% ownership interest, writing down our investment to zero value. A significant decline in the selling prices of raw materials began in 2015 and weakened some of these companies and their losses negatively impacted our financial results for several years. Further, the increasing concern and restrictions in China of hazardous chemicals and other hazardous elements could result in orders to shut down permanently, fines or other severe measures. Any such orders directed at one of our joint venture companies could result in impairment charges if the company is forced to close its business, cease operations or incurs fines, or operating losses, which would have a material adverse effect on our financial results.

We purchase critical raw materials and parts for our equipment from single or limited sources, and could lose sales if these sources fail to fill our needs.

We depend on a limited number of suppliers for certain raw materials, components and equipment used in manufacturing our products, including key materials such as quartz tubing, and polishing solutions. We generally purchase these materials through standard purchase orders and not pursuant to long-term supply contracts, and no supplier guarantees supply of raw materials or equipment to us. If we lose any of our key suppliers, our manufacturing efforts could be significantly hampered and we could be prevented from timely producing and delivering products to our customers. Prior to investing in our subsidiaries and joint ventures, we sometimes experienced delays obtaining critical raw materials and spare parts, including gallium, and we could experience such delays again in the future due to

shortages of materials or for other reasons. Delays in receiving equipment or materials could result in higher costs and cause us to delay or reduce production of our products. If we have to delay or reduce production, we could fail to meet customer delivery schedules and our revenue and operating results could suffer.

We may not be able to identify or form additional complementary raw material joint ventures.

We might invest in additional joint venture companies in order to remain competitive in our marketplace and ensure a supply of critical raw materials. However, we may not be able to identify additional complementary joint venture opportunities or, even once opportunities are identified, we may not be able to reach agreement on the terms of the business venture with the other investment partners. Further, geopolitical tensions and trade wars could result in government agencies blocking such new joint ventures. New joint ventures could require cash investments or cause us to incur additional liabilities or other expenses, any of which could adversely affect our financial condition and operating results.

The financial condition of our customers may affect their ability to pay amounts owed to us.

Some of our customers may be undercapitalized and cope with cash flow issues. The U.S. bank failures in 2023 may affect our customers. Because of competitive market conditions, we may grant our customers extended payment terms when selling products to them. Subsequent to our fulfilling an order, some customers have been unable to make payments when due, reducing our cash balances and causing us to incur charges to allow for a possibility that some accounts might not be paid. We observed an increase in our accounts receivable in the first quarter of 2020 and believe this has resulted from work stoppages, shelter-in-place orders and general cautiousness due to the COVID-19 pandemic. In the past we, have had some customers file for bankruptcy. If our customers do not pay amounts owed to us then we will incur charges that would reduce our earnings.

We depend on the continuing efforts of our senior management team and other key personnel. If we lose members of our senior management team or other key personnel, or are unable to successfully recruit and train qualified personnel, our ability to manufacture and sell our products could be harmed.

Our future success depends on the continuing services of members of our senior management team and other key personnel. Our industry is characterized by high demand and intense competition for talent, and the turnover rate can be high. We compete for qualified management and other personnel with other specialty material companies and semiconductor companies. Our employees could leave our company with little or no prior notice and would be free to work for a competitor. If one or more of our senior executives or other key personnel were unable or unwilling to continue in their present positions, we may not be able to replace them easily or at all, and other senior management may be required to divert attention from other aspects of the business. The loss of any of these individuals or our ability to attract or retain qualified personnel could adversely affect our business.

Our results of operations may suffer if we do not effectively manage our inventory.

We must manage our inventory of raw materials, work in process and finished goods effectively to meet changing customer requirements, while keeping inventory costs down and improving gross margins. Although we seek to maintain sufficient inventory levels of certain materials to guard against interruptions in supply and to meet our near term needs, we may experience shortages of certain key materials. Alternatively, a sudden decline in demand could result in holding too much inventory which occurred in the second half of 2022. Some of our products and supplies have in the past and may in the future become obsolete while in inventory due to changing customer specifications, or become excess inventory due to decreased demand for our products and an inability to sell the inventory within a foreseeable period. This would result in charges that reduce our gross profit and gross margin. Furthermore, if market prices drop below the prices at which we value inventory, we would need to take a charge for a reduction in inventory values in accordance with the lower of cost or net realizable value valuation rule. We have in the past had to take inventory valuation and impairment charges. Any future unexpected changes in demand or increases in costs of production that cause us to take additional charges for un-saleable, obsolete or excess inventory, or to reduce inventory values, would adversely affect our results of operations.

The effect of terrorist threats and actions on the general economy could decrease our revenue.

Countries such as the United States and China continue to be on alert for terrorist activity. The potential near and long-term impact terrorist activities may have in regards to our suppliers, customers and markets for our products and the economy is uncertain. There may be embargos of ports or products, or destruction of shipments or our facilities, or attacks that affect our personnel. There may be other potentially adverse effects on our operating results due to significant events that we cannot foresee. Since we perform all of our manufacturing operations in China, terrorist activity or threats against U.S. owned enterprises are a particular concern to us.

III. Risks Related to International Aspects of Our Business

The Chinese central government is increasingly aware of air pollution and other forms of environmental pollution and their reform efforts can impact our manufacturing, including intermittent mandatory shutdowns.

The Chinese central government is demonstrating strong leadership to improve air quality and reduce environmental pollution. These efforts have impacted manufacturing companies through mandatory shutdowns, increased inspections and regulatory reforms. In the fourth quarter of 2017, many manufacturing companies in the greater Beijing area, including AXT, were instructed by the local government to cease most manufacturing for several days until the air quality improved. In the first quarter of 2018, from February 27 to March 31 over 300 manufacturing companies, including AXT, were again intermittently shut down by the local government for a total of ten days, or 30 percent of the remaining calendar days, due to severe air pollution. Our shipments were delayed and our revenue for the quarter was negatively impacted. We expect that mandatory factory shutdowns will occur in the future. If the frequency of such shutdowns increases, especially at the end of a quarter, or if the total number of days of shutdowns prevents us from producing enough wafers to ship, then these shutdowns will have a material adverse effect on our manufacturing output, revenue and factory utilization. Each of our raw material supply chain companies could also be impacted by environmental related orders from the central government.

Although we are a Delaware corporation and are neither a PRC operating company nor do we conduct our operations in China through the use of VIEs, in the event we inadvertently concluded that we do not require any permissions or approvals from the CSRC or other PRC central government authorities to complete a public offering of securities in the U.S. or applicable laws, regulations, or interpretations change, we may be required to obtain such permissions or approvals to complete such a public offering of securities.

We are a Delaware corporation and are neither a PRC operating company nor do we conduct our operations in China through the use of VIEs. All of our products are manufactured in the PRC by our PRC subsidiaries and PRC joint ventures. We believe that we do not require any permissions or approvals from the CSRC or other PRC central government authorities to complete a public offering of securities in the U.S. because we are a Delaware corporation with our principal corporate office in Fremont, California and the PRC laws and regulations that govern the listing of securities on a U.S. securities exchange apply to PRC companies. However, in the event that we inadvertently concluded that such permission or approvals are not required or applicable laws, regulations, or interpretations change and we are required to obtain such permissions or approvals in the future and we fail to obtain such permissions or approvals, then we may not be able to complete a public offering of securities in the U.S. We may also be pressured to delist our securities, which would force the holders to sell these securities and could result in a material adverse effect on the value of these securities. We may face sanctions by the CSRC or other PRC central government authorities or pressure from the PRC government in various business matters for failure to obtain such permissions or approvals. These sanctions or pressure may include fines and penalties on our operations in China, limitations on our operating privileges in China, delays in or restrictions on the repatriation of the proceeds from a public offering of securities in the U.S. into the PRC, restrictions on or prohibition of the payments or remittance of dividends by our subsidiaries in China, or other actions that could have a material and adverse effect on our business, financial condition, results of operations, reputation and prospects, as well as the trading price of our common stock.

The PRC central government may intervene in or influence our PRC operations at any time and the rules and regulations in China can change quickly with little advance notice.

The businesses of our PRC subsidiaries and PRC joint ventures are subject to complex and rapidly evolving laws and regulations in the PRC, which can change quickly with little advance notice. The PRC central government is a single party form of government with virtually unlimited authority and power to intervene in or influence commercial operations in China. In the past, we have experienced such intervention or influence by the PRC central government and a change in the rules and regulations in China when we were instructed by the Beijing municipal government to relocate our gallium arsenide manufacturing facility in Beijing and expect that such intervention or influence or change in the rules and regulations in China could occur in the future.

In the ordinary course of business, our PRC subsidiaries and PRC joint ventures require permits and licenses to operate in the PRC. Such permits and licenses include permits to use hazardous materials in manufacturing operations. From time to time, the PRC government issues new regulations, which may require additional actions on the part of our PRC subsidiaries and PRC joint ventures to comply. For example, on February 27, 2015, the China State Administration of Work Safety updated its list of hazardous substances. The previous list, which was published in 2002, did not restrict the materials that we use in our wafers. The new list added gallium arsenide. As a result of the newly published list, we were required to seek additional permits. Any such intervention or influence or change in the rules and regulations in China could result in a material change in our PRC operations and/or the value of our common stock.

The PRC central government may also exert more control over offerings conducted overseas and/or foreign investment in China-based issuers, which could result in a material change in our operations and/or the value of our common stock.

The PRC central government may also exert more control over offerings conducted overseas and/or foreign investment in China-based issuers, which could result in a material change in our operations and/or the value of our common stock. The PRC central government may also seek to significantly limit or completely hinder our ability to offer or continue to offer our securities to investors and cause the value of such securities to significantly decline or be worthless.

Dividends from within our corporate structure are subject to PRC withholding tax and SAFE approval.

Occasionally, one of our PRC subsidiaries or PRC raw material joint ventures declares and pays a dividend. These dividends generally occur when the PRC joint venture declares a dividend for all of its shareholders. We have no current intentions to distribute to our investors earnings under our corporate structure. Dividends paid to the Company are subject to a 10% PRC withholding tax. The Company is required to obtain approval from SAFE to transfer funds in or out of the PRC. SAFE requires a valid agreement to approve the transfers, which are processed through a bank. Other than PRC foreign exchange restrictions, the Company is not subject to any PRC restrictions and limitations on its ability to distribute earnings from its businesses. If SAFE approval is denied the dividend payable to the Company would be owed but would not be paid.

Our PRC subsidiaries and PRC joint ventures are subject to data security oversight.

Our PRC subsidiaries and PRC joint ventures are subject to oversight by the Cyberspace Administration of China (the “CAC”) regarding data security. Except for routine personal information necessary to process payroll and other benefits and emergency contact information, our PRC subsidiaries and PRC joint ventures do not collect or maintain personal information. All of our products are manufactured in the PRC by our PRC subsidiaries and PRC joint ventures. Although we are neither a PRC operating company nor do we conduct our operations in China through the use of VIEs, cybersecurity is increasingly a focus of the central government and the CAC could require AXT to comply with PRC cybersecurity regulations, which could cause us to make changes to our operations that could materially harm our business, financial condition and results of operations.

Enhanced trade tariffs, import restrictions, export restrictions, Chinese regulations or other trade barriers may materially harm our business.

All of our wafer substrates are manufactured in China and in the years 2022, 2021 and 2020, approximately 14%, 10% and 10% of our revenue were generated by sales to customers in North America, primarily in the U.S,

respectively. In September 2018, the Trump Administration announced a list of thousands of categories of goods that became subject to tariffs when imported into the United States from China. This pronouncement imposed tariffs on wafer substrates we imported into the United States. The initial tariff rate was 10% and subsequently was increased to 25%. In the first quarter of 2023 we paid approximately \$447,000 in tariffs. In the years 2022, 2021 and 2020, we paid approximately \$3.3 million, \$1.3 million and \$1.3 million, respectively, in tariffs. The future impact of tariffs and trade wars is uncertain. We may be required to raise prices, which may result in the loss of customers and our business, financial condition and results of operations may be materially harmed. Additionally, it is possible that our business could be adversely impacted by retaliatory trade measures taken by China or other countries in response to existing or future tariffs, which could cause us to raise prices or make changes to our operations, which could materially harm our business, financial condition and results of operations.

The economic and political conditions between China and the United States, in our view, create an unstable business environment. The United States government has restricted access by certain Chinese technology companies to items produced domestically and abroad from U.S. technology and software, which may impact our ability to maintain or grow our revenue. Trade restrictions against China have resulted in a greater determination within China to be self-sufficient and produce more goods domestically. Government agencies in China may be encouraging and supporting the founding of new companies, the addition of new products in existing companies and more vertical integration within companies. These factors have resulted in lower revenue from sales of our wafer substrates in China. Further, the continued threats of tariffs and other trade restrictions could have a generally disruptive impact on the global economy and, therefore, negatively impact our sales.

In addition, we may incur increases in costs and other adverse business consequences, including losses of customers and revenue or decreased gross margins, due to changes in tariffs, import or export restrictions, further trade barriers, or unexpected changes in regulatory requirements. For example, in July 2012, we received notice of retroactive value-added taxes (VATs) levied by the tax authorities in China, which applied for the period from July 1, 2011 to June 30, 2012. We expensed the retroactive VATs of approximately \$1.3 million in the quarter ended June 30, 2012, which resulted in a decrease in our gross margins. These VATs will continue to negatively impact our gross margins for the future quarters. Given the relatively fluid regulatory environment in China and the United States, there could be additional tax or other regulatory changes in the future. Any such changes could directly and materially adversely impact our financial results and general business condition.

The spread of COVID-19 has affected our business operations and financial performance.

The spread of COVID-19 has impacted our operations and financial performance. This outbreak has triggered references to the SARS outbreak, which occurred in 2003 and affected our business operations. Any severe occurrence of an outbreak of a contagious disease such as COVID-19, SARS, Avian Flu or Ebola may cause us or the government to temporarily close our manufacturing operations in China. In January 2020, virtually all companies in China were ordered to remain closed after the traditional Lunar New Year holiday ended, including our subsidiaries in China. In late March 2022, as a result of an outbreak of COVID-19, Shanghai was locked down and certain manufacturing facilities were required to close. In the second quarter of 2022, rising COVID-19 infections in Beijing resulted in concerns of a city-wide lockdown, which could have required our manufacturing facilities in Beijing to close temporarily. Although some apartment complexes were locked down there was no city-wide lockdown. In December 2022, the PRC government ended its zero-COVID policy. If there is a renewed surge of the COVID-19 pandemic in cities in which our PRC subsidiaries and PRC joint ventures are located, the Chinese government may require companies to close again. If one or more of our key suppliers is required to close for an extended period, we might not have enough raw material inventories to continue manufacturing operations. In addition, travel restrictions between China and the U.S. have disrupted our normal movement to and from China and this has impacted our efficiency. The outbreak has affected transportation and reduced the availability of air transport, caused port closures, and increased border controls and closures. If our manufacturing operations were closed for a significant period or we experience difficulty in shipping our products, we could lose revenue and market share, which would depress our financial performance and could be difficult to recapture. If one of our key customers is required to close for an extended period this may delay the placement of new orders. As a result, our revenue would decline. Further, customers might default on their obligations to us. In the first quarter of 2020 we observed an increase in our accounts receivable and believe this is the result of businesses slowing down and a general cautiousness due to the COVID-19 pandemic. Such events would negatively impact our financial performance.

Financial market volatility and adverse changes in the domestic, global, political and economic environment could have a significant adverse impact on our business, financial condition and operating results.

We are subject to the risks arising from adverse changes and uncertainty in domestic and global economies. Uncertain global economic and political conditions or low or negative growth in China, Europe or the United States, along with volatility in the financial markets and U.S. financial system, increasing national debt and fiscal concerns in various regions and the adoption and availability of fiscal and monetary stimulus measures to counteract the impact of the COVID-19 pandemic, pose challenges to our industry. Currently China's economy is slowing and this could impact our financial performance. In addition, tariffs, trade restrictions, trade wars, high levels of inflation, rising interest rates, the Russian invasion of Ukraine, Brexit, heightened tensions between the U.S. and China, and U.S. bank failures in 2023, among other factors, are creating an unstable environment and can disrupt or restrict commerce. Although we remain well-capitalized, the cost and availability of funds may be adversely affected by illiquid credit markets. Volatility in U.S. and international markets and economies may adversely affect our liquidity, financial condition and profitability. Another severe or prolonged economic downturn could result in a variety of risks to our business, including:

- increased volatility in our stock price;
- increased volatility in foreign currency exchange rates;
- delays in, or curtailment of, purchasing decisions by our customers or potential customers;
- increased credit risk associated with our customers or potential customers, particularly those that may operate in industries most affected by the economic downturn; and
- impairment of our tangible or intangible assets.

In the past, most recently in the fourth quarter of 2018 and continuing in 2019, we experienced delays in customer purchasing decisions and disruptions in a normal volume of customer orders that we believe were in part due to the uncertainties in the global economy, resulting in an adverse impact on consumer spending. During challenging and uncertain economic times and in tight credit markets, many customers delay or reduce technology purchases. Should similar events occur again, our business and operating results could be significantly and adversely affected.

We derive a significant portion of our revenue from international sales, and our ability to sustain and increase our international sales involves significant risks.

Approximately 88% of our revenue is from international sales. We expect that sales to customers outside the United States, particularly sales to customers in Japan, Taiwan, Europe and China, will continue to represent a significant portion of our revenue. Therefore, our revenue growth depends significantly on the expansion of our international sales and operations.

All of our manufacturing facilities and most of our suppliers are also located outside the United States. Managing our overseas operations presents challenges, including periodic regional economic downturns, trade balance issues, threats of trade wars, varying business conditions and demands, political instability, variations in enforcement of intellectual property and contract rights in different jurisdictions, differences in the ability to develop relationships with suppliers and other local businesses, changes in U.S. and international laws and regulations, including U.S. import and export restrictions, fluctuations in interest and currency exchange rates, the ability to provide sufficient levels of technical support in different locations, cultural differences and perceptions of U.S. companies, shipping delays and terrorist acts or acts of war, natural disasters and epidemics or pandemics, such as COVID-19, among other risks. Many of these challenges are present in China, which represents a large potential market for semiconductor devices. Global uncertainties with respect to: (i) economic growth rates in various countries; (ii) sustainability of demand for electronic products; (iii) capital spending by semiconductor manufacturers; (iv) price weakness for certain semiconductor devices; (v) changing and tightening environmental regulations; (vi) political instability in regions where we have operations and (vii) trade wars may also affect our business, financial condition and results of operations.

Our dependence on international sales involves a number of risks, including:

- changes in tariffs, import restrictions, export restrictions, or other trade barriers;
- unexpected changes in regulatory requirements;
- longer periods to collect accounts receivable;
- foreign exchange rate fluctuations;
- changes in export license requirements;
- political and economic instability; and
- unexpected changes in diplomatic and trade relationships.

Most of our sales are denominated in U.S. dollars, except for sales to our Chinese customers which are denominated in renminbi and our Japanese customers which are denominated in Japanese yen. We also have some small sales denominated in Euro. Increases in the value of the U.S. dollar could increase the price of our products in non-U.S. markets and make our products more expensive than competitors' products in these markets.

We are subject to foreign exchange gains and losses that materially impact our condensed consolidated statements of operations.

We are subject to foreign exchange gains and losses that may materially impact our condensed consolidated statements of operations. For example, in 2022, we incurred a foreign exchange gain of \$1.6 million and in 2021 and 2020 we incurred foreign exchange losses of \$434,000 and \$411,000, respectively.

The functional currency of our companies in China is the Chinese renminbi, the local currency. We can incur foreign exchange gains or losses when we pay dollars to one of our China-based companies or a third-party supplier in China. Similarly, if a company in China pays renminbi into one of our bank accounts transacting in dollars the renminbi will be converted to dollars and we can incur a foreign exchange gain or loss. Hedging renminbi will be considered in the future but it is complicated by the number of companies involved, the diversity of transactions and restrictions imposed by the banking system in China.

Sales to Japanese customers are denominated in Japanese yen. This subjects us to fluctuations in the exchange rates between the U.S. dollar and the Japanese yen and can result in foreign exchange gains and losses. This has been problematic in the past and, therefore, we instituted a foreign currency hedging program dealing with yen which has mitigated the problem.

Joint venture raw material companies in China bring certain risks.

Since our consolidated subsidiaries and all of our joint venture raw material companies reside in China, their activities could subject us to a number of risks associated with conducting operations internationally, including:

- unexpected changes in regulatory requirements that may limit our ability to manufacture, export the products of these companies or sell into particular jurisdictions, or impose multiple conflicting tax laws and regulations;
- the imposition of tariffs, trade barriers and duties;
- difficulties in managing geographically disparate operations;

- difficulties in enforcing agreements through non-U.S. legal systems;
- political and economic instability, civil unrest or war;
- terrorist activities that impact international commerce;
- difficulties in protecting our intellectual property rights, particularly in countries where the laws and practices do not protect proprietary rights to as great an extent as do the laws and practices of the United States;
- new or changing laws and policies affecting economic liberalization, foreign investment, currency convertibility or exchange rates, taxation or employment;
- new or changing PRC regulations and policies regarding data security and oversight by the CAC of our consolidated subsidiaries and all of our joint venture raw material companies; and
- nationalization of foreign-owned assets, including intellectual property.

Uncertainty regarding the United States' foreign policy, particularly with regards to China, could disrupt our business.

We manufacture our substrates in China and, in 2022, approximately 86% of our sales were to customers located outside the United States. Further, we have partial ownership of raw material companies in China as part of our supply chain. The United States' current foreign policy has created uncertainty and caution in the international business community, resulting in disruptions in manufacturing, import/export, trade tariffs, sales, investments and other business activity. Such disruptions have had an adverse impact on our financial performance and could continue in the future.

If China places restrictions on freight and transportation routes and on ports of entry and departure this could result in shipping delays or increased costs for shipping.

In August 2015, there was an explosion at the Port of Tianjin, China. As a result of this incident the government placed restrictions on importing certain materials and on freight routes used to transport these materials. We experienced some modest disruption from these restrictions. If the government were to place additional restrictions on the transportation of materials, then our ability to transport our raw materials or products could be limited and result in manufacturing delays or bottlenecks at shipping ports, affecting our ability to deliver products to our customers. During periods of such restrictions, we may increase our stock of critical materials (such as arsenic, gallium and other items) for use during the period that these restrictions are likely to last, which will increase our use of cash and increase our inventory level. Any of these restrictions could materially and adversely impact our results of operations and our financial condition.

Our operating results depend in large part on continued customer acceptance of our substrate products manufactured in China and continued improvements in product quality.

We manufacture all of our products in China, and source most of our raw materials in China. We have in the past experienced quality problems with our China manufactured products. Our previous quality problems caused us to lose market share to our competitors, as some of our customers reduced their orders until our wafer surface quality was as good and as consistent as that offered by our competitors and instead allocated their requirements for compound semiconductor substrates to our competitors. If we are unable to continue to achieve customer qualifications for our products, or if we are unable to control product quality, customers may not increase purchases of our products, our China facilities will become underutilized, and we will be unable to achieve revenue growth.

Changes in China's political, social, regulatory or economic environments may affect our financial performance.

Our financial performance may be affected by changes in China's political, social, regulatory or economic environments. The role of the Chinese central and local governments in the Chinese economy is significant. The Beijing municipal government's decision to move to the Tongzhou district, the original location of our China company, resulted in the city instructing virtually all existing manufacturing companies, including AXT, to relocate all or some of their manufacturing lines. We were instructed to move our gallium arsenide manufacturing line out of the area. Chinese policies toward hazardous materials, including arsenic, environmental controls, air pollution, economic liberalization, laws and policies affecting technology companies, foreign investment, currency exchange rates, taxation structure and other matters could change, resulting in greater restrictions on our ability to do business and operate our manufacturing facilities in China. We have observed a growing fluidity and tightening of regulations concerning hazardous materials, other environmental controls and air pollution. The Chinese government could revoke, terminate or suspend our operating licenses for reasons related to environmental control over the use of hazardous materials, air pollution, labor complaints, national security and similar reasons without compensation to us. Further, the central government encourages employees to report to the appropriate regulatory agencies possible safety or environmental violations, but there may not be actual violations. In days of severe air pollution the government has ordered manufacturing companies to stop all production. For example, in the first quarter of 2018, from February 27 to March 31, over 300 manufacturing companies, including us, were again intermittently shut down by the local government for a total of ten days due to severe air pollution. Our shipments were delayed and our revenue for the quarter was negatively impacted. We expect that mandatory factory shutdowns will occur in the future. Any failure on our part to comply with governmental regulations could result in the loss of our ability to manufacture our products. Further, any imposition of surcharges or any increase in Chinese tax rates or reduction or elimination of Chinese tax benefits could hurt our financial results.

Our international operations are exposed to potential adverse tax consequence in China.

Our international operations create a risk of potential adverse tax consequences. Taxes on income in our China-based companies are dependent upon acceptance of our operational practices and intercompany transfer pricing by local tax authorities as being on an arm's length basis. Due to inconsistencies among taxing authorities in application of the arm's length standard, transfer pricing challenges by tax authorities could, if successful, materially increase our consolidated income tax expense. We are subject to tax audits in China and an audit could result in the assessment of additional income tax against us. This could have a material adverse effect on our operating results or cash flows in the period or periods for which that determination is made and could result in increases to our overall tax expense in subsequent periods. Various taxing agencies in China are increasingly focused on tax reform and other legislative action to increase tax revenue. In addition to risks regarding income tax we have in the past been retroactively assessed value added taxes ("VAT" or sales tax) and such VAT assessments could occur again in the future.

If there are power shortages in China, we may have to temporarily close our China operations, which would adversely impact our ability to manufacture our products and meet customer orders, and would result in reduced revenue.

In the past, China has faced power shortages resulting in power demand outstripping supply in peak periods. Instability in electrical supply has caused sporadic outages among residential and commercial consumers causing the Chinese government to implement tough measures to ease the energy shortage. If further problems with power shortages occur in the future, we may be required to make temporary closures of our operations or of our subsidiary and joint venture raw material companies. We may be unable to manufacture our products and would then be unable to meet customer orders except from finished goods inventory on hand. As a result, our revenue could be adversely impacted, and our relationships with our customers could suffer, impacting our ability to generate future revenue. In addition, if power is shut off at any of our facilities at any time, either voluntarily or as a result of unplanned brownouts, during certain phases of our manufacturing process including our crystal growth phase, the work in process may be ruined and rendered unusable, causing us to incur costs that will not be covered by revenue, and negatively impacting our cost of revenue and gross margins.

Although the audit report is prepared by an independent registered public accounting firm that is currently inspected fully by the PCAOB, there is no guarantee that future audit reports will be prepared by an independent registered public accounting firm that is completely inspected by the PCAOB.

Our independent registered public accounting firm, BPM, is registered with the PCAOB and is subject to regular inspections by the PCAOB to assess its compliance with the applicable professional standards. Although we have operations in China, a jurisdiction where the PCAOB was, until recently, unable to conduct inspections without the approval of the Chinese government authorities, our independent registered public accounting firm is currently inspected fully by the PCAOB.

Inspections of other independent registered public accounting firms conducted by the PCAOB outside China have at times identified deficiencies in those independent registered public accounting firms' audit procedures and quality control procedures, which may be addressed as part of the inspection process to improve future audit quality. The lack of PCAOB inspections of audit work undertaken in China prevented the PCAOB from regularly evaluating independent registered public accounting firms' audits and their quality control procedures. As a result, to the extent that any component of our independent registered public accounting firm's work papers is or becomes located in China, such work papers may not be subject to inspection by the PCAOB. As a result, investors would be deprived of such PCAOB inspections, which could result in limitations or restrictions to our access of the U.S. capital markets.

As part of a continued regulatory focus in the United States on access to audit and other information currently protected by national law, in particular PRC laws, in June 2019, a bipartisan group of lawmakers introduced bills in both houses of the U.S. Congress which, if passed, would require the SEC to maintain a list of issuers for which PCAOB is not able to inspect or investigate the audit work performed by a non-U.S. independent registered public accounting firm completely. The proposed Ensuring Quality Information and Transparency for Abroad-Based Listings on our Exchanges Act prescribes increased disclosure requirements for these issuers and, beginning in 2025, the delisting from U.S. national securities exchanges such as the Nasdaq Global Select Market of issuers included on the SEC's list for three consecutive years. It is unclear if this proposed legislation will be enacted. Furthermore, there have been recent deliberations within the U.S. government regarding potentially limiting or restricting companies based in China from accessing U.S. capital markets. On May 20, 2020, the U.S. Senate passed the HFCA Act, which includes requirements for the SEC to identify issuers whose audit work is performed by independent registered public accounting firms that the PCAOB is unable to inspect or investigate completely because of a restriction imposed by a non-U.S. authority in the independent registered public accounting firms' local jurisdiction. The U.S. House of Representatives passed the HFCA Act on December 2, 2020, and the HFCA Act was signed into law on December 18, 2020. Additionally, in July 2020, the U.S. President's Working Group on Financial Markets issued recommendations for actions that can be taken by the executive branch, the SEC, the PCAOB or other federal agencies and department with respect to Chinese companies listed on U.S. stock exchanges and their independent registered public accounting firms, in an effort to protect investors in the United States. In response, on November 23, 2020, the SEC issued guidance highlighting certain risks (and their implications to U.S. investors) associated with investments in issuers based in China and summarizing enhanced disclosures the SEC recommends issuers based in China make regarding such risks. On March 18, 2021, the SEC adopted interim final rules to implement the HFCA Act, which requires the SEC to identify certain issuers that filed annual reports with audit reports issued by registered public accounting firms located in foreign jurisdictions and that the PCAOB is unable to inspect or investigate completely because of a position taken by an authority in those jurisdictions (the "Commission-Identified Issuers"). Specifically, the SEC implemented the submission and disclosure requirements of the HFCA Act. On December 2, 2021, the SEC issued amendments to finalize the interim final rules. Further, the SEC established procedures to identify Commission-Identified Issuers and prohibit the trading of the securities of Commission-Identified Issuers as required by the HFCA Act. We will be required to comply with these rules if the SEC identifies us as a Commission-Identified Issuer. Under the HFCA Act, our securities may be prohibited from trading on the Nasdaq Global Select Market or other U.S. stock exchanges if we are determined to be a Commission-Identified Issuer for three consecutive years, and this ultimately could result in our common stock being delisted. Furthermore, on June 22, 2021, the U.S. Senate passed the Accelerating Holding Foreign Companies Accountable Act, which, if enacted, would amend the HFCA Act and require the SEC to prohibit an issuer's securities from trading on any U.S. stock exchanges if the issuer is determined to be a Commission-Identified Issuer for two consecutive years instead of three. On December 15, 2021, the Accelerating Holding Foreign Companies Accountable Act was introduced to the U.S. House of Representatives. On September 22, 2021, the PCAOB adopted a final rule implementing the HFCA Act, which provides a framework for the PCAOB to use when determining, as contemplated under the HFCA Act, whether the PCAOB is unable to inspect or investigate completely independent registered public accounting firms located in a non-U.S. jurisdiction because of a position taken by one or more authorities in that jurisdiction and was approved by the SEC on November 5, 2021. On December 16, 2021, the PCAOB issued a report on its determinations that the PCAOB is unable

to inspect or investigate completely registered public accounting firms headquartered in the PRC and Hong Kong because of positions taken by PRC authorities in those jurisdictions.

Beginning in March 2022, the SEC listed companies on either its conclusive list of issuers identified under the HFCA Act or its provisional list of issuers identified under the HFCA Act. Companies listed on the SEC's conclusive list of issuers identified under the HFCA Act are determined to be Commission-Identified Issuers. The SEC did not list AXT, Inc. on either its conclusive list of issuers identified under the HFCA Act or its provisional list of issuers identified under the HFCA Act.

On December 15, 2022, the PCAOB vacated its 2021 determinations that the positions taken by authorities in the PRC and Hong Kong prevented it from inspecting and investigating completely registered public accounting firms headquartered in those jurisdictions. As a result, the SEC will not provisionally or conclusively identify an issuer as a Commission-Identified Issuer if it files an annual report with an audit report issued by a registered public accounting firm headquartered in either jurisdiction on or after December 15, 2022, until such time as the PCAOB issues a new determination. The SEC will continue to include any Commission-Identified Issuer on the provisional or conclusive list if they filed an annual report with an audit report issued by a registered public accounting firm headquartered in mainland China and Hong Kong prior to the PCAOB's decision to vacate its 2021 determinations.

While an agreement has been reached among the CSRC, the SEC and the PCAOB regarding the inspection of PCAOB-independent registered public accounting firms in China, there can be no assurance that we will be able to comply with requirements imposed by U.S. regulators. If the PRC authorities do not fully perform their obligations under the agreement with the PCAOB in the future, or if authorities in the PRC otherwise take positions that render the PCAOB unable to inspect or investigate completely registered public accounting firms headquartered in the PRC and Hong Kong, the PCAOB will make determinations under the HFCA Act. Delisting of our common stock would force holders of our common stock to sell their shares. The market price of our common stock could be adversely affected as a result of anticipated negative impacts of these executive or legislative actions upon, as well as negative investor sentiment towards, companies with operations in China that are listed in the United States, regardless of whether these executive or legislative actions are implemented and regardless of our actual operating performance.

IV. Risks Related to Our Financial Results and Capital Structure

We may utilize our cash balances for relocating manufacturing lines, adding capacity, acquiring state-of-the-art equipment or offsetting a business downturn resulting in the decline of our existing cash and if we need additional capital, funds may not be available on acceptable terms, or at all.

Our liquidity is affected by many factors, including among others, the relocation of our gallium arsenide manufacturing lines, the expansion of our capacity to meet market demand, the acquisition of state-of-the-art equipment, other capital expenditures, operating activities, the effect of exchange rate changes and other factors related to the uncertainties of the industry and global economies. Such matters could draw down our cash reserves, which could adversely affect our financial condition, require us to incur debt, reduce our value and possibly impinge our ability to raise debt and equity funding in the future, at a time when we might need to raise additional cash or elect to raise additional cash. Accordingly, there can be no assurance that events will not require us to seek additional capital or, if required, that such capital would be available on terms acceptable to us, if at all.

The terms of the private equity raised in China as a first step toward an IPO on the STAR Market grant each investor a right of redemption if Tongmei fails to achieve its IPO.

Pursuant to the Capital Investment Agreements with the Investors, each Investor has the right to require AXT to redeem any or all Tongmei shares held by such Investor at the original purchase price paid by such Investor, without interest, in the event the IPO fails to pass the audit of the Shanghai Stock Exchange, is not approved by the CSRC or Tongmei cancels the IPO application. The aggregate redemption amount is approximately \$49 million.

Tongmei submitted its IPO application to the Shanghai Stock Exchange and it was formally accepted for review on January 10, 2022. The Shanghai Stock Exchange approved the IPO application on July 12, 2022. On August 1, 2022, the CSRC accepted for review Tongmei's IPO application. The STAR Market IPO remains subject to review and approval by the CSRC and other authorities. The process of going public on the STAR Market includes several periods of review and, therefore, is a lengthy process. Subject to review and approval by the CSRC and other authorities, Tongmei expects to accomplish this goal in the coming months. The listing of Tongmei on the STAR Market will not change the status of AXT as a U.S. public company. There can be no assurances that Tongmei will complete its IPO in 2023 or at all. In the event that investors exercise their redemption rights, we may be required to seek additional capital in order to redeem their Tongmei shares and there would be no assurances that such capital would be available on terms acceptable to us, if at all. Any redemptions could have a material adverse effect on our business, financial condition and results of operations.

Unpredictable fluctuations in our operating results could disappoint analysts or our investors, which could cause our stock price to decline.

We have experienced, and may continue to experience, significant fluctuations in our revenue, gross margins and earnings. Our quarterly and annual revenue and operating results have varied significantly in the past and may vary significantly in the future due to a number of factors, including:

- our ability to develop, manufacture and deliver high quality products in a timely and cost-effective manner;
- unforeseen disruptions at our new sites;
- disruptions in manufacturing if air pollution, or other environmental hazards, or outbreaks of contagious diseases causes the Chinese government to order work stoppages;
- fluctuation of our manufacturing yields;
- decreases in the prices of our or our competitors' products;
- fluctuations in demand for our products;
- the volume and timing of orders from our customers, and cancellations, push-outs and delays of customer orders once booked;
- decline in general economic conditions or downturns in the industry in which we compete;
- expansion of our manufacturing capacity;
- expansion of our operations in China;
- limited availability and increased cost of raw materials;
- costs incurred in connection with any future acquisitions of businesses or technologies; and
- increases in our expenses, including expenses for research and development.

Due to these factors, we believe that period-to-period comparisons of our operating results may not be meaningful indicators of our future performance.

A substantial percentage of our operating expenses are fixed, and we may be unable to adjust spending to compensate for an unexpected shortfall in revenue. As a result, any delay in generating revenue could cause our

operating results to fall below the expectations of market analysts or investors, which could also cause our stock price to decline.

If our operating results and financial performance do not meet the guidance that we have provided to the public, our stock price may decline.

We provide public guidance on our expected operating and financial results. Although we believe that this guidance provides our stockholders, investors and analysts with a better understanding of our expectations for the future, such guidance is comprised of forward-looking statements subject to the risks and uncertainties described in this Quarterly Report on Form 10-Q and in our other public filings and public statements. Our actual results may not meet the guidance we have provided. If our operating or financial results do not meet our guidance or the expectations of investment analysts, our stock price may decline.

We have adopted certain anti-takeover measures that may make it more difficult for a third party to acquire us.

Our board of directors has the authority to issue up to 800,000 shares of preferred stock in addition to the outstanding shares of Series A preferred stock and to determine the price, rights, preferences and privileges of those shares without any further vote or action by the stockholders. The rights of the holders of common stock will be subject to, and may be adversely affected by, the rights of the holders of any preferred stock that may be issued in the future. The issuance of shares of preferred stock could have the effect of making it more difficult for a third party to acquire a majority of our outstanding voting stock. We have no present intention to issue additional shares of preferred stock.

Provisions in our restated certificate of incorporation and amended and restated bylaws may have the effect of delaying or preventing a merger, acquisition or change of control, or changes in our management, which could adversely affect the market price of our common stock. The following are some examples of these provisions:

- the division of our Board of Directors into three separate classes, each with three-year terms;
- the right of our Board of Directors to elect a director to fill a space created by a board vacancy or the expansion of the board;
- the ability of our Board of Directors to alter our amended and restated bylaws; and
- the requirement that only our Board of Directors or the holders of at least 10% of our outstanding shares may call a special meeting of our stockholders.

Furthermore, because we are incorporated in Delaware, we are subject to the provisions of Section 203 of the Delaware General Corporation Law. These provisions prohibit us from engaging in any business combination with any interested stockholder (a stockholder who owns 15% or more of our outstanding voting stock) for a period of three years following the time that such stockholder became an interested stockholder, unless:

- 66 $\frac{2}{3}$ % of the shares of voting stock not owned by the interested stockholder approve the merger or combination, or
- the Board of Directors approves the merger or combination or the transaction which resulted in the stockholder becoming an interested stockholder.

Our common stock may be delisted from The Nasdaq Global Select Market, which could negatively impact the price of our common stock and our ability to access the capital markets.

Our common stock is listed on The Nasdaq Global Select Market. The bid price of our common stock has in the past closed below the \$1.00 minimum per share bid price required for continued inclusion on The Nasdaq Global Select

Market under Marketplace Rule 5450(a). If the bid price of our common stock remains below \$1.00 per share for thirty consecutive business days, we could be subject to delisting from the Nasdaq Global Select Market.

Any delisting from The Nasdaq Global Select Market could have an adverse effect on our business and on the trading of our common stock. If a delisting of our common stock were to occur, our common stock would trade in the over-the-counter market and be quoted on a service such as those provided by OTC Markets Group, Inc. Such alternatives are generally considered to be less efficient markets, and our stock price, as well as the liquidity of our common stock, may be adversely impacted as a result. Delisting from The Nasdaq Global Select Market could also have other negative results, including the potential loss of confidence by customers, suppliers and employees, the loss of institutional investor interest and fewer business development opportunities, as well as the loss of liquidity for our stockholders.

Our ability to use our net operating loss carryforwards and certain other tax attributes may be limited.

As of December 31, 2022, we had U.S. federal net operating loss carryforwards of approximately \$31.9 million. We have net operating loss carryforwards of approximately \$21,000, primarily in the state of California, as of December 31, 2022. We do not expect to utilize the loss carryforwards in the next several years unless Tongmei pays a dividend. Under Sections 382 and 383 of the Internal Revenue Code of 1986, as amended, if a corporation undergoes an "ownership change," the corporation's ability to use its pre-change net operating loss carryforwards and other pre-change tax attributes, such as research tax credits, to offset its post-change income and taxes may be limited. In general, an "ownership change" occurs if there is a cumulative change in our ownership by "5% shareholders" that exceeds 50 percentage points over a rolling three-year period. Similar rules may apply under state tax laws. We might have undergone prior ownership changes, and we may undergo ownership changes in the future, which may result in limitations on our net operating loss carryforwards and other tax attributes. Any such limitations on our ability to use our net operating loss carryforwards and other tax attributes could adversely impact our business, financial condition and results of operations.

V. Risks Related to Our Intellectual Property

Intellectual property infringement claims may be costly to resolve and could divert management attention.

Other companies may hold or obtain patents on inventions or may otherwise claim proprietary rights to technology necessary to our business. The markets in which we compete are comprised of competitors that in some cases hold substantial patent portfolios covering aspects of products that could be similar to ours. We could become subject to claims that we are infringing patent, trademark, copyright or other proprietary rights of others. We may incur expenses to defend ourselves against such claims or enter into cross license agreements that require us to pay royalty payments to resolve such claims. For example, in 2020, we and a competitor entered into a cross license and covenant agreement, which has a term that began on January 1, 2020 and expires on December 31, 2029. We have in the past been involved in lawsuits alleging patent infringement, and could in the future be involved in similar litigation.

If we are unable to protect our intellectual property, including our non-patented proprietary process technology, we may lose valuable assets or incur costly litigation.

We rely on a combination of patents, copyrights, trademarks, trade secrets and trade secret laws, non-disclosure agreements and other intellectual property protection methods to protect our proprietary technology. We believe that our internal, non-patented proprietary process technology methods, systems and processes are a valuable and critical element of our intellectual property. We must establish and maintain safeguards to avoid the theft of these processes. Our ability to establish and maintain a position of technology leadership also depends on the skills of our development personnel. Despite our efforts to protect our intellectual property, third parties can develop products or processes similar to ours. Our means of protecting our proprietary rights may not be adequate, and our competitors may independently develop similar technology, duplicate our products or design around our patents. We believe that at least two of our competitors ship GaAs substrates produced using a process similar to our VGF process. Our competitors may also develop and patent improvements to the VGF technology upon which we rely, and thus may limit any exclusivity we enjoy by virtue of our patents or trade secrets.

It is possible that pending or future United States or foreign patent applications made by us will not be approved, that our issued patents will not protect our intellectual property, or that third parties will challenge our ownership rights or the validity of our patents. In addition, the laws of some foreign countries may not protect our proprietary rights to as great an extent as do the laws of the United States and it may be more difficult to monitor the use of our intellectual property. Our competitors may be able to legitimately ascertain non-patented proprietary technology embedded in our systems. If this occurs, we may not be able to prevent the development of technology substantially similar to ours.

We may have to resort to costly litigation to enforce our intellectual property rights, to protect our trade secrets or know-how or to determine their scope, validity or enforceability. Enforcing or defending our proprietary technology is expensive, could cause us to divert resources and may not prove successful. Our protective measures may prove inadequate to protect our proprietary rights, and if we fail to enforce or protect our rights, we could lose valuable assets.

VI. Risks Related to Compliance, Environmental Regulations and Other Legal Matters

If we, or any of our partially owned supply chain companies, fail to comply with environmental and safety regulations, we may be subject to significant fines or forced to cease our operations.

We are subject to federal, state and local environmental and safety laws and regulations in all of our operating locations, including laws and regulations of China, such as laws and regulations related to the development, manufacture and use of our products, the use of hazardous materials, the operation of our facilities, and the use of our real property. These laws and regulations govern the use, storage, discharge and disposal of hazardous materials during manufacturing, research and development, and sales demonstrations. If we, or any of our partially owned supply chain companies, fail to comply with applicable regulations, we could be subject to substantial liability for clean-up efforts, personal injury, fines or suspension or be forced to close or temporarily cease our operations, and/or suspend or terminate the development, manufacture or use of certain of our products, the use of our facilities, or the use of our real property, each of which could have a material adverse effect on our business, financial condition and results of operations.

The Chinese central government is demonstrating strong leadership to improve air quality and reduce environmental pollution. The central government encourages employees to report to the appropriate regulatory agencies possible safety or environmental violations but there may not be actual violations. These efforts have impacted manufacturing companies through mandatory shutdowns, increased inspections and regulatory reforms. In the first quarter of 2018, from February 27 to March 31 over 300 manufacturing companies were again intermittently shut down by the local government for a total of ten days, or 30 percent of the remaining calendar days, due to severe air pollution. Our shipments were delayed and our revenue for the quarter was negatively impacted. We expect that mandatory factory shutdowns will occur in the future. If the frequency of such shutdowns increases, especially at the end of a quarter, or if the total number of days of shutdowns prevents us from producing enough wafers to ship, then the shutdowns will have a material adverse effect on our manufacturing output, revenue and factory utilization. We believe the relocation of our gallium arsenide and germanium manufacturing lines mitigates our exposure to factory shutdowns. Each of our raw material supply chain companies could also be impacted by environmental related orders from the central government.

In addition, from time to time, the Chinese government issues new regulations, which may require additional actions on our part to comply. For example, on February 27, 2015, the China State Administration of Work Safety updated its list of hazardous substances. The previous list, which was published in 2002, did not restrict the materials that we use in our wafers. The new list added gallium arsenide. As a result of the newly published list, we were required to seek additional permits.

We could be subject to suits for personal injuries caused by hazardous materials.

In 2005, a complaint was filed against us alleging personal injury, general negligence, intentional tort, wage loss and other damages, including punitive damages, as a result of exposure of plaintiffs to high levels of gallium arsenide in gallium arsenide wafers, and methanol. Other current and/or former employees could bring litigation against us in the future. Although we have in place engineering, administrative and personnel protective equipment programs to address these issues, our ability to expand or continue to operate our present locations could be restricted or we could be required

to acquire costly remediation equipment or incur other significant expenses if we were found liable for failure to comply with environmental and safety regulations. Existing or future changes in laws or regulations in the United States and China may require us to incur significant expenditures or liabilities, or may restrict our operations. In addition, our employees could be exposed to chemicals or other hazardous materials at our facilities and we may be subject to lawsuits seeking damages for wrongful death or personal injuries allegedly caused by exposure to chemicals or hazardous materials at our facilities.

Litigation is inherently uncertain and while we would expect to defend ourselves vigorously, it is possible that our business, financial condition, results of operations or cash flows could be affected in any particular period by litigation pending and any additional litigation brought against us. In addition, future litigation could divert management's attention from our business and operations, causing our business and financial results to suffer. We could incur defense or settlement costs in excess of the insurance covering these litigation matters, or that could result in significant judgments against us or cause us to incur costly settlements, in excess of our insurance limits.

We are subject to internal control evaluations and attestation requirements of Section 404 of the Sarbanes-Oxley Act.

Pursuant to Section 404 of the Sarbanes-Oxley Act of 2002, we must include in our Annual Report on Form 10-K a report of management on the effectiveness of our internal control over financial reporting. Ongoing compliance with this requirement is complex, costly and time-consuming and it extends to our companies in China. If: (1) we fail to maintain effective internal control over financial reporting; or (2) our management does not timely assess the adequacy of such internal control, we could be subject to regulatory sanctions and the public's perception of us may be adversely impacted.

We need to continue to improve or implement our systems, procedures and controls.

We rely on certain manual processes for data collection and information processing, as do our joint venture companies. If we fail to manage these procedures properly or fail to effectively manage a transition from manual processes to automated processes, our systems and controls may be disrupted. To manage our business effectively, we may need to implement additional management information systems, further develop our operating, administrative, financial and accounting systems and controls, add experienced senior level managers, and maintain close coordination among our executive, engineering, accounting, marketing, sales and operations organizations.

Item 2. Unregistered Sales of Equity Securities and Use of Proceeds

Not applicable.

Item 3. Defaults upon Senior Securities

None

Item 4. Mine Safety Disclosures

Not applicable.

Item 5. Other Information

None

Item 6. Exhibits

a. Exhibits

Exhibit Number	Description
31.1	Certification by Chief Executive Officer Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification by Chief Financial Officer Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1	Certification by Chief Executive Officer Pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
32.2	Certification by Chief Financial Officer Pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101.INS	Inline XBRL Instance.
101.SCH	Inline XBRL Taxonomy Extension Schema.
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase.
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase.
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase.
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase.
104	Cover Page Interactive Data File (formatted as inline XBRL and contained in Exhibit 101)

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SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this Report to be signed on its behalf by the undersigned, thereunto duly authorized.

AXT, INC.

Dated: May 10, 2023

By: /s/ MORRIS S. YOUNG

Morris S. Young
Chief Executive Officer and Chairman of the Board of Directors
(Principal Executive Officer)

/s/ GARY L. FISCHER

Gary L. Fischer
Chief Financial Officer and Corporate Secretary
(Principal Financial Officer and Principal Accounting Officer)

1. I have reviewed this quarterly report on Form 10-Q of AXT, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles.
 - (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

By: /s/ MORRIS S. YOUNG
Morris S. Young
Chief Executive Officer
(Principal Executive Officer)

**Certification Pursuant to
18 U.S.C. Rule 13a-14(a)/15d-14(a)
As Adopted Pursuant to
Section 302 of the Sarbanes-Oxley Act of 2002**

I, Gary L. Fischer, certify that:

1. I have reviewed this quarterly report on Form 10-Q of AXT, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles.
 - (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Dated: May 10, 2023

By: /s/ GARY L. FISCHER
Gary L. Fischer
Chief Financial Officer and
Corporate Secretary
(Principal Financial Officer and
Principal Accounting Officer)

**Certification Pursuant to
18 U.S.C. Section 1350
As Adopted Pursuant to
Section 906 of the Sarbanes-Oxley Act of 2002**

In connection with the Quarterly Report of AXT, Inc. (the "Company") on Form 10-Q for the quarter ended March 31, 2023 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Morris S. Young, Chief Executive Officer of the Company, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 ("Section 906"), that, to the best of my knowledge:

- (1) The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m); and
- (2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated: May 10, 2023

By: /s/ MORRIS S. YOUNG
 Morris S. Young
 Chief Executive Officer
 (Principal Executive Officer)

**Certification Pursuant to
18 U.S.C. Section 1350
As Adopted Pursuant to
Section 906 of the Sarbanes-Oxley Act of 2002**

In connection with the Quarterly Report of AXT, Inc. (the "Company") on Form 10-Q for the quarter ended March 31, 2023, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Gary L. Fischer, Chief Financial Officer and Corporate Secretary of the Company, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 ("Section 906"), that, to the best of my knowledge:

- (1) The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m); and
- (2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated: May 10, 2023

By: /s/ GARY L. FISCHER
Gary L. Fischer
Chief Financial Officer and
Corporate Secretary
(Principal Financial Officer and
Principal Accounting Officer)
