

**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 September 30, 2022

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: 001-36481

ASPEN AEROGELS, INC.

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

30 Forbes Road, Building B
Northborough, Massachusetts
(Address of principal executive offices)

04-3559972
(I.R.S. Employer
Identification No.)

01532
(Zip Code)

Registrant's telephone number, including area code: (508) 691-1111

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

Title of each class	Trading Symbol	Name of exchange on which registered
Common Stock, par value \$0.00001 per share	ASPN	The New York Stock Exchange

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, a 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 ☒

As of November 4, 2022, the registrant had 40,909,480 shares of common stock outstanding.

ASPEN AEROGELS, INC.

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Trademarks, Trade Names and Service Marks

We own or have rights to use “Aspen Aerogels,” “Cryogel,” “Pyrogel,” “Spaceloft,” “PyroThin,” the Aspen Aerogels logo and other trademarks, service marks and trade names of Aspen Aerogels, Inc. appearing in this Quarterly Report on Form 10-Q. Solely for convenience, the trademarks, service marks and trade names referred to in this report are presented without the ® and TM symbols, but such references are not intended to indicate, in any way, that the owner thereof will not assert, to the fullest extent under applicable law, such owner’s rights to these trademarks, service marks and trade names. This report contains additional trademarks, service marks and trade names of other companies, which, to our knowledge, are the property of their respective owners.

PART I — FINANCIAL INFORMATION

Item 1. Financial Statements.

ASPEN AEROGELS, INC.
Consolidated Balance Sheets
(Unaudited)

	September 30, 2022	December 31, 2021
	(In thousands, except share and per share data)	
Assets		
Current assets:		
Cash and cash equivalents	\$ 102,398	\$ 76,564
Accounts receivable, net of allowances of \$183 and \$150	27,117	20,426
Inventories	20,600	11,987
Prepaid expenses and other current assets	6,159	3,173
Total current assets	156,274	112,150
Property, plant and equipment, net	210,113	55,778
Operating lease right-of-use assets	16,323	13,531
Other long-term assets	2,704	1,495
Total assets	<u>\$ 385,414</u>	<u>\$ 182,954</u>
Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable	\$ 58,323	\$ 17,440
Accrued expenses	12,737	10,819
Current portion of prepayment liability	5,000	4,728
Deferred revenue	2,356	1,321
Operating lease liabilities	2,541	2,247
Total current liabilities	80,957	36,555
Prepayment liability	—	5,000
Convertible note - related party	105,218	—
Operating lease liabilities long-term	16,833	12,991
Total liabilities	<u>203,008</u>	<u>54,546</u>
Commitments and contingencies (Note 10)		
Stockholders' equity:		
Preferred stock, \$0.00001 par value; 5,000,000 shares authorized, no shares issued and outstanding at September 30, 2022 and December 31, 2021	—	—
Common stock, \$0.00001 par value; 125,000,000 shares authorized, 40,841,127 and 33,218,115 shares issued and outstanding at September 30, 2022 and December 31, 2021, respectively	—	—
Additional paid-in capital	800,588	673,461
Accumulated deficit	(618,182)	(545,053)
Total stockholders' equity	<u>182,406</u>	<u>128,408</u>
Total liabilities and stockholders' equity	<u>\$ 385,414</u>	<u>\$ 182,954</u>

See accompanying notes to unaudited consolidated financial statements.

ASPEN AEROGELS, INC.
Consolidated Statements of Operations
(Unaudited)

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2022	2021	2022	2021
	(In thousands, except share and per share data)		(In thousands, except share and per share data)	
Revenue	\$ 36,706	\$ 30,380	\$ 120,753	\$ 90,147
Cost of revenue	43,065	27,313	130,111	78,544
Gross (loss) profit	(6,359)	3,067	(9,358)	11,603
Operating expenses:				
Research and development	4,694	3,077	12,733	8,128
Sales and marketing	7,293	4,915	20,944	11,784
General and administrative	9,963	6,573	26,544	15,978
Total operating expenses	21,950	14,565	60,221	35,890
Loss from operations	(28,309)	(11,498)	(69,579)	(24,287)
Other income (expense)				
Interest expense, convertible note - related party	(1,734)	—	(4,103)	—
Interest income (expense), net	448	(58)	553	(188)
Gain on extinguishment of debt	—	3,734	—	3,734
Total other income (expense), net	(1,286)	3,676	(3,550)	3,546
Net loss	\$ (29,595)	\$ (7,822)	\$ (73,129)	\$ (20,741)
Net loss per share:				
Basic and diluted	\$ (0.75)	\$ (0.24)	\$ (2.03)	\$ (0.70)
Weighted-average common shares outstanding:				
Basic and diluted	39,533,695	32,523,405	36,047,879	29,685,936

See accompanying notes to unaudited consolidated financial statements.

ASPEN AEROGELS, INC.

Consolidated Statements of Stockholders' Equity

(Unaudited)

(In thousands, except share data)

	Preferred Stock \$0.00001 Par Value		Common Stock \$0.00001 Par Value		Additional Paid-in Capital	Accumulated Deficit	Total Stockholders' Equity
	Shares	Value	Shares	Value			
Balance at December 31, 2021	—	\$ —	33,218,115	\$ —	\$ 673,461	\$ (545,053)	\$ 128,408
Net loss	—	—	—	—	—	(19,484)	(19,484)
Stock compensation expense	—	—	—	—	1,828	—	1,828
Vesting of restricted stock units	—	—	166,211	—	(2,315)	—	(2,315)
Proceeds from employee stock option exercises	—	—	4,681	—	38	—	38
Proceeds from at-the-market offering, net of commissions of \$729 and issuance costs of \$318	—	—	737,288	—	23,272	—	23,272
Proceeds from private placement of common stock, net of fees and issuance costs of \$136	—	—	1,791,986	—	49,864	—	49,864
Balance at March 31, 2022	—	\$ —	35,918,281	\$ —	\$ 746,148	\$ (564,537)	\$ 181,611
Net loss	—	—	—	—	—	(24,050)	(24,050)
Stock compensation expense	—	—	—	—	2,295	—	2,295
Issuance of restricted stock	—	—	391,324	—	—	—	—
Vesting of restricted stock units	—	—	2,569	—	(24)	—	(24)
Proceeds from employee stock option exercises	—	—	21,110	—	136	—	136
Proceeds from at-the-market offering, net of commissions of \$149 and issuance costs of \$28	—	—	145,000	—	4,786	—	4,786
Balance at June 30, 2022	—	\$ —	36,478,284	\$ —	\$ 753,341	\$ (588,587)	\$ 164,754
Net loss	—	—	—	—	—	(29,595)	(29,595)
Stock compensation expense	—	—	—	—	2,590	—	2,590
Issuance of restricted stock	—	—	3,495	—	—	—	—
Vesting of restricted stock units	—	—	236	—	—	—	—
Proceeds from at-the-market offering, net of commissions of \$1,391 and issuance costs of \$285	—	—	4,359,112	—	44,657	—	44,657
Balance at September 30, 2022	—	\$ —	40,841,127	\$ —	\$ 800,588	\$ (618,182)	\$ 182,406

	Preferred Stock \$0.00001 Par Value		Common Stock \$0.00001 Par Value		Additional Paid-in Capital	Accumulated Deficit	Total Stockholders' Equity
	Shares	Value	Shares	Value			
Balance at December 31, 2020	—	\$ —	27,821,685	\$ —	\$ 575,811	\$ (507,959)	\$ 67,852
Net loss	—	—	—	—	—	(6,250)	(6,250)
Stock compensation expense	—	—	—	—	976	—	976
Vesting of restricted stock units	—	—	246,737	—	(2,613)	—	(2,613)
Proceeds from employee stock option exercises	—	—	48,056	—	463	—	463
Proceeds from at-the-market offering, net of commissions and fees of \$193 and issuance costs of \$17	—	—	305,182	—	6,215	—	6,215
Forfeiture of performance-based restricted stock	—	—	(78,125)	—	—	—	—
Balance at March 31, 2021	—	\$ —	28,343,535	\$ —	\$ 580,852	\$ (514,209)	\$ 66,643
Net loss	—	—	—	—	—	(6,669)	(6,669)
Stock compensation expense	—	—	—	—	1,070	—	1,070
Issuance of restricted stock	—	—	476,550	—	—	—	—
Vesting of restricted stock units	—	—	6,207	—	(64)	—	(64)
Proceeds from employee stock option exercises	—	—	23,886	—	230	—	230
Proceeds from at-the-market offering, net of commissions and fees of \$383 and issuance costs of \$27	—	—	594,799	—	12,352	—	12,352
Proceeds from private placement common stock offering, net of fees and issuance costs of \$1,414	—	—	3,462,124	—	73,586	—	73,586
Balance at June 30, 2021	—	\$ —	32,907,101	\$ —	\$ 668,026	\$ (520,878)	\$ 147,148
Net loss	—	—	—	—	—	(7,822)	(7,822)
Stock compensation expense	—	—	—	—	1,554	—	1,554
Proceeds from employee stock option exercises	—	—	140,793	—	836	—	836
Proceeds from at-the-market offering, net of commissions and fees of \$25	—	—	30,000	—	810	—	810
Registration fees for private placement of common stock	—	—	—	—	(68)	—	(68)
Balance at September 30, 2021	—	\$ —	33,077,894	\$ —	\$ 671,158	\$ (528,700)	\$ 142,458

See accompanying notes to unaudited consolidated financial statements.

ASPEN AEROGELS, INC.
Consolidated Statements of Cash Flows
(Unaudited)

	Nine Months Ended September 30,	
	2022	2021
	(In thousands)	
Cash flows from operating activities:		
Net loss	\$ (73,129)	\$ (20,741)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation	6,692	6,856
Gain on extinguishment of debt	—	(3,734)
Accretion of interest on convertible note - related party	4,103	—
Amortization of convertible note issuance costs	23	—
Amortization of debt issuance costs	—	18
Provision for bad debt	42	(97)
Stock-compensation expense	6,713	3,600
Reduction in the carrying amount of operating lease right-of-use assets	1,925	1,057
Changes in operating assets and liabilities:		
Accounts receivable	(6,733)	(2,928)
Inventories	(8,613)	3,387
Prepaid expenses and other assets	(3,055)	(2,545)
Accounts payable	481	3,770
Accrued expenses	1,918	5,955
Deferred revenue	1,035	(255)
Operating lease liabilities	(1,721)	(922)
Net cash used in operating activities	(70,319)	(6,579)
Cash flows from investing activities:		
Capital expenditures	(119,348)	(6,133)
Net cash used in investing activities	(119,348)	(6,133)
Cash flows from financing activities:		
Proceeds from issuance of convertible note related party	100,000	—
Issuance costs from convertible note	(185)	—
Proceeds from employee stock option exercises	174	1,529
Payments made for employee restricted stock tax withholdings	(2,340)	(2,677)
Proceeds from at-the-market offering, net of commissions of \$2,269 and \$601	73,348	19,420
Fees and issuance costs from at-the-market offering	(631)	(43)
Proceeds from private placement of common stock	50,000	75,000
Fees and issuance costs from private placement of common stock	(137)	(1,482)
Repayment of prepayment liability	(4,728)	—
Net cash provided by financing activities	215,501	91,747
Net increase in cash	25,834	79,035
Cash and cash equivalents at beginning of period	76,564	16,496
Cash and cash equivalents at end of period	<u>\$ 102,398</u>	<u>\$ 95,531</u>
Supplemental disclosures of cash flow information:		
Interest paid	\$ 130	\$ 168
Income taxes paid	\$ —	\$ —
Supplemental disclosures of non-cash activities:		
Right-of-use assets obtained in exchange for new operating lease liabilities	\$ 5,857	\$ 10,111
Capitalized interest	\$ 1,277	\$ —
Changes in accrued capital expenditures	\$ 40,402	\$ 690

See accompanying notes to unaudited consolidated financial statements.

ASPEN AEROGELS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
(UNAUDITED)

(1) Description of Business and Basis of Presentation

Nature of Business

Aspen Aerogels, Inc. (the Company) is an aerogel technology company that designs, develops and manufactures innovative, high-performance aerogel insulation used primarily in the energy infrastructure and sustainable building materials markets. In addition, the Company has introduced a line of aerogel thermal barriers for use in battery packs in the electric vehicle market. The Company is also developing applications for its aerogel technology in the battery materials and a number of other high-potential markets.

The Company maintains its corporate offices in Marlborough and Northborough, Massachusetts. The Company has three wholly owned subsidiaries: Aspen Aerogels Rhode Island, LLC, Aspen Aerogels Germany, GmbH and Aspen Aerogels Georgia, LLC.

Liquidity

During the nine months ended September 30, 2022, the Company incurred a net loss of \$73.1 million, used \$70.3 million of cash in operations, used \$119.3 million of cash for capital expenditures, received net proceeds of \$72.7 million through an at-the-market (ATM) offering of the Company's common stock from the sale of 5,241,400 shares of the Company's common stock, and received net proceeds of \$49.9 million through a private placement of the Company's common stock. On February 15, 2022, the Company entered into a note purchase agreement with an affiliate of Koch Strategic Platforms, LLC (Koch), relating to the issuance and sale of \$100.0 million of the Company's convertible debt (see note 9). The Company had cash and cash equivalents of \$102.4 million, a \$5.0 million current prepayment liability (see note 10), and no outstanding borrowings under its revolving line of credit (see note 7). After giving effect to \$1.3 million of outstanding letters of credit, the amount available to the Company at September 30, 2022 under the revolving line of credit was \$13.3 million. The revolving line of credit matures on December 1, 2022.

The Company is increasing investment in the research and development of next-generation aerogel products and manufacturing process technologies. In addition, the Company has developed a number of promising aerogel products and technologies for the electric vehicle market. The Company believes that the commercial potential for the Company's products and technology in the electric vehicle market is significant. Accordingly, the Company is hiring additional personnel, incurring additional operating expenses, and incurring significant capital expenditures to expand silica aerogel manufacturing capacity, build an automated thermal barrier fabrication operation, enhance research and development laboratory facilities and equipment, and construct a battery materials facility, among other efforts.

The Company expects its existing cash balance and the amount anticipated to be available under the existing revolving line of credit will be sufficient to support current operating requirements, current research and development activities and the initial capital expenditures required to support the evolving commercial opportunity in the electric vehicle market and other strategic business initiatives. However, the Company plans to supplement its cash balance and available credit with equity financings, debt financings, customer prepayments, or technology licensing fees to provide the additional capital necessary to purchase the capital equipment, construct the new facilities, establish the operations and complete the aerogel capacity expansions required to support these evolving commercial opportunities and strategic business initiatives.

Unaudited Interim Financial Information

The accompanying unaudited interim consolidated financial statements include the accounts of the Company and have been prepared in accordance with accounting principles generally accepted in the United States of America (U.S. GAAP) and with the instructions to Form 10-Q and Article 10 of Regulation S-X. Certain information and disclosures normally included in the consolidated financial statements prepared in accordance with U.S. GAAP have been condensed or omitted pursuant to such rules and regulations. As such, the information included in this Quarterly Report on Form 10-Q should be read in conjunction with the audited consolidated financial statements and accompanying notes in our Annual Report on Form 10-K for the year ended December 31, 2021 (the Annual Report), filed with the U.S. Securities and Exchange Commission on March 1, 2022.

In the opinion of the Company's management, the unaudited interim consolidated financial statements have been prepared on the same basis as the audited consolidated financial statements and include all adjustments that are of a normal recurring nature and necessary for the fair statement of the Company's financial position as of September 30, 2022 and the results of its operations and stockholders' equity for the three and nine months ended September 30, 2022 and 2021 and the cash flows for the nine-month periods then ended. The Company has evaluated subsequent events through the date of this filing.

The Company's results of operations for the three and nine months ended September 30, 2022 are not necessarily indicative of the results to be expected for the year ending December 31, 2022 or any other period. In addition, the Company is uncertain of the continued duration and severity of the COVID-19 pandemic and the impact it will have on the Company's results of operations for the year ending December 31, 2022 or any other period.

(2) Significant Accounting Policies

Principles of Consolidation

The accompanying consolidated financial statements, which have been prepared in accordance with U.S. GAAP, include the accounts of the Company and its wholly owned subsidiaries. All intercompany balances and transactions have been eliminated in consolidation.

Use of Estimates

The preparation of the consolidated financial statements requires the Company to make a number of estimates and assumptions that affect the reported amounts of assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenues and expenses during the reporting period. Significant items subject to such estimates and assumptions include allowances for doubtful accounts, sales returns and allowances, product warranty costs, inventory valuation, the carrying amount of property and equipment, right-of-use assets, convertible note, lease liabilities, stock-based compensation, and deferred income taxes. The Company evaluates its estimates and assumptions on an on-going basis using historical experience and other factors, including current economic conditions, which are believed to be reasonable under the circumstances. Management adjusts such estimates and assumptions when facts and circumstances warrant. Illiquid credit markets, volatile equity markets and declines in business investment can increase the uncertainty inherent in such estimates and assumptions. As future events and their effects cannot be determined with precision, actual results could differ significantly from these estimates. Changes in these estimates resulting from continuing changes in the economic environment will be reflected in the financial statements in future periods.

Cash and Cash Equivalents

Cash equivalents include short-term, highly liquid instruments, which consist of money market accounts and high-quality debt securities issued by the U.S. government via cash sweep accounts. All cash and cash equivalents are maintained with major financial institutions in North America. Deposits with these financial institutions may exceed the amount of insurance provided on such deposits; however, these deposits typically may be redeemed upon demand and, therefore, bear minimal risk.

Concentration of Credit Risk

Financial instruments, which potentially expose the Company to concentrations of credit risk, consist principally of accounts receivable. The Company's customers are primarily insulation distributors, insulation contractors, insulation fabricators and select energy and automotive end-users located throughout the world. The Company performs ongoing credit evaluations of its customers' financial condition and generally requires no collateral to secure accounts receivable. The Company maintains an allowance for doubtful accounts based on its assessment of the collectability of accounts receivable. The Company reviews the allowance for doubtful accounts quarterly. During the nine months ended September 30, 2022, the Company recorded a reduction for estimated customer uncollectible accounts receivable of less than \$0.1 million. During the nine months ended September 30, 2021, the Company recorded a reduction for estimated customer uncollectible accounts receivable of \$0.1 million and had collections of \$0.2 million of previously reserved customer accounts receivables.

Revenue Recognition

The Company recognizes revenue in accordance with Accounting Standards Codification 606, Revenue from Contracts with Customers (ASC 606). See note 3 for further details.

Leases

The Company accounts for its leases in accordance with Accounting Standards Update (ASU) 2016-02 (Topic 842). See note 11 for further details.

Stock-based Compensation

Stock-based compensation expense is measured at the grant date based on the fair value of the award. Expense is recognized on a straight-line basis over the requisite service period for all awards with service conditions. For performance-based awards, the grant date fair value is recognized as expense when the condition is probable of being achieved and then on a graded basis over the requisite service period. The Company uses the Black-Scholes option-pricing model to determine the fair value of service-based option awards, which requires a number of complex and subjective assumptions including the fair value of the underlying security, the expected volatility of the underlying security, a risk-free interest rate and the expected term of the option. The fair value of restricted stock and restricted stock unit grants is determined using the closing trading price of the Company's common stock on the date of grant. The fair value of awards containing market conditions is determined using a Monte-Carlo simulation model based upon the nature of the conditions, the expected volatility of the underlying security, and other relevant factors.

During the nine months ended September 30, 2022, the Company granted 171,969 restricted common stock units (RSUs) with a grant date fair value of \$4.3 million and non-qualified stock options (NSOs) to purchase 432,480 shares of common stock with a grant date fair value of \$6.4 million to employees under the 2014 Employee, Director, and Consultant Equity Incentive Plan (the 2014 Equity Plan). The RSUs and NSOs granted to employees will vest over a three-year period. During the nine months ended September 30, 2022, the Company also granted 19,689 shares of restricted common stock with a grant date fair value of \$0.4 million and NSOs to purchase 19,068 shares of common stock with a grant date fair value of \$0.2 million to its non-employee directors under the 2014 Equity Plan. The restricted common stock and NSOs granted to non-employee directors vest upon the earlier of the date that is the one-year anniversary of the grant date or the day prior to the Company's annual meeting of stockholders to be held in 2023.

On June 2, 2022, the Company issued 53,590 shares of restricted common stock, pursuant to a performance-based restricted stock agreement, to each of certain employees. The restricted common stock vests in tranches, subject to achievement of certain time and performance vesting conditions, as defined, over a three-to-five year period. The Company used a Monte-Carlo simulation model to estimate the grant date fair value of the awards. The equity awards had a total aggregate fair value of \$4.0 million at the time of grant.

Stock-based compensation is included in cost of revenue or operating expenses, as applicable, and consists of the following:

	Three Months Ended		Nine Months Ended	
	September 30,		September 30,	
	2022	2021	2022	2021
	(In thousands)		(In thousands)	
Cost of product revenue	\$ 270	\$ 132	\$ 656	\$ 373
Research and development expenses	306	186	843	564
Sales and marketing expenses	548	213	1,328	587
General and administrative expenses	1,466	1,023	3,886	2,076
Total stock-based compensation	<u>\$ 2,590</u>	<u>\$ 1,554</u>	<u>\$ 6,713</u>	<u>\$ 3,600</u>

Pursuant to the "evergreen" provisions of the 2014 Equity Plan, the number of shares of common stock authorized for issuance under the plan automatically increased by 664,362 shares to 9,195,775 shares effective January 1, 2022.

As of September 30, 2022, 4,249,107 shares of common stock were reserved for issuance upon the exercise or vesting of outstanding stock-based awards granted under the 2014 Equity Plan and 2001 Equity Incentive Plan, as amended (the 2001 Equity Plan). Any cancellations or forfeitures of the options outstanding under the 2001 Equity Plan will result in the shares reserved for issuance upon exercise of such options becoming available for grant under the 2014 Equity Plan. As of September 30, 2022, the

Company has either reserved in connection with statutory tax withholdings or issued a total of 4,580,983 shares under the 2014 Equity Plan. As of September 30, 2022, there were 365,685 shares of common stock available for future grant under the 2014 Equity Plan.

Net Loss per Share

The Company calculates net loss per share of common stock based on the weighted-average number of shares of common stock outstanding during each period. Potential common stock equivalents are determined using the treasury stock method. The weighted-average number of shares of common stock included in the computation of diluted net loss gives effect to all potentially dilutive common equivalent shares, including outstanding stock options and RSUs. Common equivalent shares are excluded from the computation of diluted net loss per share if their effect is antidilutive.

Warranty

The Company provides warranties for its products and records the estimated cost within cost of revenue in the period that the related revenue is recorded.

The Company's standard warranty period for energy industrial products extends to one year from the date of shipment. This standard warranty provides that the Company's products will be free from defects in material and workmanship, and will, under normal use, conform to the specifications for the product. The Company's products may be utilized in systems that involve new technical demands and new configurations. Accordingly, the Company regularly reviews and assesses whether warranty reserves should be recorded in the period the related revenue is recorded.

The Company's thermal barrier products provide quality and warranty provisions customary in the automotive industry.

The Company recorded warranty expense related to its thermal barrier products of \$0.1 million during the nine months ended September 30, 2022. The Company did not record any warranty expense during the nine months ended September 30, 2021.

Recently Issued Accounting Standards

From time to time, new accounting pronouncements are issued by the Financial Accounting Standards Board (FASB) or other standard setting bodies. Recently issued standards typically do not require adoption until a future effective date. Prior to their effective date, the Company evaluates the pronouncements to determine the potential effects of adoption to its consolidated financial statements.

Standards Implemented Since December 31, 2021

During the nine months ended September 30, 2022, the Company adopted Accounting Standards Update (ASU) 2020-06, Debt-Debt with Conversion and Other Options (Topic 470) and Derivatives and Hedging-Contracts in Entity's Own Equity (Topic 815): Accounting for Convertible Instruments and Contracts in an Entity's Own Equity. This ASU simplifies the accounting for convertible instruments by eliminating the cash conversion and beneficial conversion feature models used to separately account for embedded conversion features as a component of equity. Instead, the entity will account for the convertible debt or convertible preferred stock securities as a single unit of account, unless the conversion feature requires bifurcation and recognition as derivatives. Additionally, the guidance requires entities to use the if-converted method for all convertible instruments in the diluted earnings per share calculation and include the effect of potential share settlement for instruments that may be settled in cash or shares. The Company has applied the provisions of the standards to the embedded derivative features of its convertible note – related party that was issued on February 18, 2022 and determined the fair value to be immaterial at issuance and as of September 30, 2022.

Standards to be Implemented

In December 2021, the FASB issued ASU 2021-10, *Government Assistance Topic 832*, which, provides increased transparency by requiring business entities to disclose information about certain types of government assistance received. Public entities are required to apply the new standard for annual reporting periods beginning after December 15, 2021 and interim periods within those fiscal periods. This standard is to be applied prospectively. Early adoption is permitted as of the beginning of an interim or annual period. We are evaluating the adoption and impact of ASU 2021-10 on our consolidated financial statements in regards to expected incentives associated with our manufacturing facility in Bulloch County, Georgia.

The Company believes that the impact of recently issued accounting standards that are not yet effective will not have a material impact on its consolidated financial statements.

(3) Revenue from Contracts with Customers

Revenue Recognition

Revenue is recognized when a customer obtains control of promised goods or services in an amount that reflects the consideration which the entity expects to receive in exchange for those goods or services. To determine revenue recognition for arrangements within the scope of ASC 606, the Company performs the following five steps: (i) identification of the contract with a customer; (ii) identification of the performance obligations in the contract; (iii) determination of the transaction price; (iv) allocation of the transaction price to the separate performance obligations in the contract; and (v) recognition of the revenue associated with performance obligations as they are satisfied. The Company applies the five-step model to contracts when it is probable that the Company will collect the consideration it is entitled to in exchange for the goods or services it transfers to the customer. At contract inception, once the contract is determined to be within the scope of ASC 606, the Company assesses the goods or services promised within each contract and determines those that are performance obligations and assesses whether each promised good or service is distinct. If the contract contains a single performance obligation, the entire transaction price is allocated to the single performance obligation. Contracts that contain multiple performance obligations require an allocation of the transaction price based on the estimated relative standalone-selling prices of the promised products or services underlying each performance obligation. The Company determines standalone-selling prices based on the price at which the performance obligation is sold separately. If the standalone-selling price is not observable through past transactions, the Company estimates the standalone-selling price considering available information such as market conditions and internally approved pricing guidelines related to the performance obligations. The Company then recognizes as revenue the amount of the transaction price that is allocated to the respective performance obligation when (or as) the performance obligation is satisfied.

When determining the transaction price of a contract, an adjustment is made if payment from a customer occurs either significantly before or significantly after performance, resulting in a significant financing component. Applying the practical expedient in paragraph ASC 606-10-32-18, the Company does not assess whether a significant financing component exists if the period between when the Company performs its obligations under the contract and when the customer pays is one year or less. The Company did not have any contracts outstanding at December 31, 2021 and did not enter into any contracts during the nine months ended September 30, 2022 that contained a significant financing component.

The Company records deferred revenue for product sales when (i) the Company has delivered products, but other revenue recognition criteria have not been satisfied, or (ii) payments have been received in advance of the completion of required performance obligations.

Shipping and Handling Costs

Shipping and handling costs associated with outbound freight after control over a product has transferred to a customer are accounted for as fulfillment costs and are included in the cost of product revenue. The associated amount of revenue recognized includes the consideration to which the Company expects to be entitled to receive in exchange for incurring these shipping and handling costs.

Energy Industrial

The Company generally enters into contracts containing one type of performance obligation. The Company recognizes revenue when the performance obligation is satisfied, which is generally upon delivery according to contractual shipping terms within customer purchase orders.

The Company also enters into rebate agreements with certain customers. These agreements may be considered an additional performance obligation of the Company or variable consideration within a contract. Rebates are recorded as a reduction of revenue in the period the related revenue is recognized. A corresponding liability is recorded as a component of deferred revenue on the consolidated balance sheets. These arrangements are primarily based on the customer attaining contractually specified sales volumes.

The Company estimates the amount of its sales that may be returned by its customers and records this estimate as a reduction of revenue in the period the related revenue is recognized. The Company currently estimates return liabilities using historical rates of

return, current quarter credit sales, and specific items of exposure on a contract-by-contract basis. Sales return reserves were approximately \$0.1 million at both September 30, 2022 and December 31, 2021.

Subsea Projects

The Company manufactures and sells subsea products that are designed for pipe-in-pipe applications in offshore oil production and are typically customized to meet customer specifications. Subsea products typically have no alternative use and contain an enforceable right to payment. Customer invoicing terms for subsea products are typically based on certain milestones within the production and delivery schedule. Under the provisions of ASC 606, the Company recognizes revenue at a point in time when transfer of control of the products is passed to the customer, or over time utilizing the input method. The timing of revenue recognition is assessed on a contract-by-contract basis. During the nine months ended September 30, 2022 and 2021, the Company recognized revenue of \$4.4 million and \$3.7 million, respectively, from subsea projects.

Thermal Barriers

The Company supplies fabricated, multi-part thermal barriers for use in battery packs in the electric vehicle market. These thermal barriers are customized to meet customer specifications. Thermal barrier products typically have no alternative use and may contain an enforceable right to payment. Under the provisions of ASC 606, the Company may recognize revenue at a point in time when transfer of the control of the products is passed to the customer, or over time utilizing the input method. The timing of revenue recognition is assessed on a contract-by-contract basis. During the nine months ended September 30, 2022 and 2021, the Company recognized revenue of \$30.3 million and \$1.2 million, respectively, from thermal barrier contracts.

Disaggregation of Revenue

In the following tables, revenue is disaggregated by primary geographical region and source of revenue:

	Three Months Ended September 30,					
	2022			2021		
	U.S.	International	Total	U.S.	International	Total
	(In thousands)					
Geographical region						
Asia	\$ —	\$ 7,296	\$ 7,296	\$ —	\$ 5,283	\$ 5,283
Canada	—	928	928	—	256	256
Europe	—	4,281	4,281	—	7,553	7,553
Latin America	—	84	84	—	554	554
U.S.	24,117	—	24,117	16,734	—	16,734
Total revenue	<u>\$ 24,117</u>	<u>\$ 12,589</u>	<u>\$ 36,706</u>	<u>\$ 16,734</u>	<u>\$ 13,646</u>	<u>\$ 30,380</u>
Source of revenue						
Energy industrial	\$ 13,504	\$ 9,909	\$ 23,413	\$ 15,835	\$ 11,000	\$ 26,835
Subsea projects	6	1,333	1,339	—	2,613	2,613
Thermal barrier	10,607	1,347	11,954	899	33	932
Total revenue	<u>\$ 24,117</u>	<u>\$ 12,589</u>	<u>\$ 36,706</u>	<u>\$ 16,734</u>	<u>\$ 13,646</u>	<u>\$ 30,380</u>

	Nine Months Ended September 30,					
	2022			2021		
	U.S.	International	Total	U.S.	International	Total
(In thousands)						
Geographical region						
Asia	\$ —	\$ 26,271	\$ 26,271	\$ —	\$ 15,424	\$ 15,424
Canada	—	3,240	3,240	—	2,211	2,211
Europe	—	14,352	14,352	—	24,234	24,234
Latin America	—	2,985	2,985	—	3,245	3,245
U.S.	73,905	—	73,905	45,033	—	45,033
Total revenue	\$ 73,905	\$ 46,848	\$ 120,753	\$ 45,033	\$ 45,114	\$ 90,147
Source of revenue						
Energy industrial	\$ 46,524	\$ 39,469	\$ 85,993	\$ 43,905	\$ 41,311	\$ 85,216
Subsea projects	1,465	2,946	4,411	—	3,687	3,687
Thermal barrier	25,916	4,433	30,349	1,128	116	1,244
Total revenue	\$ 73,905	\$ 46,848	\$ 120,753	\$ 45,033	\$ 45,114	\$ 90,147

Contract Balances

The following table presents changes in the Company's contract assets and contract liabilities during the nine months ended September 30, 2022:

	Balance at December 31, 2021	Additions	Deductions	Balance at September 30, 2022
(In thousands)				
Contract assets				
Subsea projects	\$ 1,448	\$ 5,235	\$ (5,295)	\$ 1,388
Research services	148	77	(225)	—
Thermal barrier	235	—	(235)	—
Total contract assets	\$ 1,831	\$ 5,312	\$ (5,755)	\$ 1,388
Contract liabilities				
Deferred revenue				
Energy industrial	\$ 1,321	\$ 1,940	\$ (1,729)	\$ 1,532
Subsea projects	—	2,385	(1,561)	824
Prepayment liability	9,728	—	(4,728)	5,000
Total contract liabilities	\$ 11,049	\$ 4,325	\$ (8,018)	\$ 7,356

During the nine months ended September 30, 2022, the Company recognized \$1.3 million of revenue that was included in deferred revenue as of December 31, 2021.

A contract asset is recorded when the Company satisfies a performance obligation by transferring a promised good or service and has earned the right to consideration from its customer. These assets may represent a conditional or unconditional right to consideration and are included within accounts receivable and other current assets on the consolidated balance sheets.

A contract liability is recorded when consideration is received, or such consideration is unconditionally due, from a customer prior to transferring goods or services under the terms of the contract. Contract liabilities are recognized as revenue after control of the products or services is transferred to the customer and all revenue recognition criteria have been met.

(4) Inventories

Inventories consist of the following:

	September 30, 2022	December 31, 2021
	(In thousands)	
Raw materials	\$ 15,636	\$ 7,312
Finished goods	4,964	4,675
Total	<u>\$ 20,600</u>	<u>\$ 11,987</u>

(5) Property, Plant and Equipment, Net

Property, plant and equipment consist of the following:

	September 30, 2022	December 31, 2021	Useful life
	(In thousands)		
Construction in progress	\$ 158,726	\$ 13,456	—
Buildings	25,293	24,016	30 years
Machinery and equipment	143,804	130,529	3-10 years
Computer equipment and software	9,900	9,457	3 years
Total	337,723	177,458	
Accumulated depreciation	(127,610)	(121,680)	
Property, plant and equipment, net	<u>\$ 210,113</u>	<u>\$ 55,778</u>	

Depreciation expense was \$6.7 million and \$6.9 million for the nine months ended September 30, 2022 and 2021, respectively.

Construction in progress totaled \$158.7 million and \$13.5 million at September 30, 2022 and December 31, 2021, respectively. The balance at September 30, 2022 and December 31, 2021 included engineering designs and construction costs totaling \$129.4 million and \$6.1 million, respectively, for a planned aerogel manufacturing facility in Bulloch County, Georgia.

(6) Accrued Expenses

Accrued expenses consist of the following:

	September 30, 2022	December 31, 2021
	(In thousands)	
Employee compensation	\$ 9,216	\$ 8,991
Other accrued expenses	3,521	1,828
Total	<u>\$ 12,737</u>	<u>\$ 10,819</u>

(7) Revolving Line of Credit

The Company is party to the Second Amended and Restated Loan and Security Agreement with Silicon Valley Bank (Loan Agreement). On March 12, 2021, the Loan Agreement was amended and restated to extend the maturity date of the revolving credit facility to April 28, 2022 and to establish financial covenants on certain minimum Adjusted EBITDA levels and minimum Adjusted Quick Ratio covenants, each as defined in the Loan Agreement. At various dates in 2021, and subsequently on March 31, 2022, April 28, 2022, June 23, 2022, and August 26, 2022, the Company entered into amendments to the Loan Agreement to revise certain financial covenants, among other things. On October 14, 2022, the Loan Agreement was amended to extend the maturity date of the revolving credit facility to December 1, 2022.

Under the revolving credit facility, the Company is permitted to borrow a maximum of \$20.0 million, subject to continued covenant compliance and borrowing base requirements. The interest rate applicable to borrowings under the revolving credit facility is based on the prime rate, subject to a minimum rate of 4.00% per annum. The rates applicable to borrowings vary from prime rate plus 0.75% per annum to prime rate plus 2.00% per annum. In addition, the Company is required to pay a monthly unused revolving line facility fee of 0.50% per annum of the average unused portion of the revolving credit facility.

Under the Loan Agreement, the Company is required to comply with both non-financial and financial covenants, including a minimum Adjusted EBITDA covenant and a minimum Adjusted Quick Ratio covenant. As of September 30, 2022, the Company was in compliance with all such covenants. Obligations under the Loan Agreement are secured by a security interest in all assets of the Company, including those at the East Providence facility, except for certain exclusions. The Company intends to extend or replace the facility prior to its maturity.

As of September 30, 2022 and December 31, 2021, the Company had no amounts drawn from the revolving credit facility.

The Company has provided letters of credit to secure obligations under certain commercial contracts and other obligations. The Company had outstanding letters of credit backed by the revolving credit facility of \$1.3 million at both September 30, 2022 and December 31, 2021, respectively, which reduce the funds otherwise available to the Company under the facility.

As of September 30, 2022, the amount available to the Company under the revolving credit facility was \$13.3 million after giving effect to the \$1.3 million of outstanding letters of credit.

(8) Related Party Transactions

Convertible Note

During the nine months ended September 30, 2022, the Company issued a \$100.0 million aggregate principal amount convertible note to Wood River Capital, LLC, an entity affiliated with Koch Strategic Platforms, LLC (the 2022 Convertible Note). Refer to note 9 for more information.

During the nine months ended September 30, 2022, the Company incurred \$5.4 million of interest from the 2022 Convertible Note, of which \$1.3 million was capitalized as part of the construction in progress for the planned manufacturing facility in Bulloch County, Georgia.

Common Stock Private Placement

During the nine months ended September 30, 2022, the Company sold 1,791,986 shares of common stock to Wood River Capital, LLC, an entity affiliated with Koch Strategic Platforms, LLC, at a purchase price equal to \$27.902 per share, for aggregate gross proceeds of approximately \$50.0 million.

Other

During the nine months ended September 30, 2022, the Company recorded costs of \$5.9 million as a component of construction in progress in connection with the planned aerogel manufacturing facility in Bulloch County, Georgia in fees from Koch Project Solutions, LLC, an entity affiliated with Koch Strategic Platforms, LLC for project management services.

During the nine months ended September 30, 2022, the Company sold 135,870 shares of its common stock to Robert M. Gervis, a director of the Company, in the Company's at-the-market offering pursuant to a sales agreement, dated March 16, 2022, by and among the Company and Cowen and Company, LLC and Piper Sandler & Co. (the Sales Agreement), for net proceeds of \$4.4 million.

(9) Convertible Note – Related Party

2022 Convertible Note

On February 15, 2022, the Company entered into a note purchase agreement (the Note Purchase Agreement) with Wood River Capital LLC, an entity affiliated with Koch Strategic Platforms, LLC, relating to the issuance and sale to Koch of the 2022 Convertible Note in the aggregate principal amount of \$100.0 million. The transactions contemplated by the Note Purchase Agreement closed on February 18, 2022 (the Issue Date). The maturity date of the 2022 Convertible Note is February 18, 2027, subject to earlier conversion, redemption, or repurchase.

The 2022 Convertible Note is a senior unsecured obligation of the Company and ranks equal in right of payment to all senior unsecured indebtedness of the Company, and will rank senior in right of payment to any indebtedness that is contractually subordinated to the 2022 Convertible Note.

The Company elected to repay the contractual interest due on June 30, 2022 in-kind as an increase to the principal amount of \$2.9 million. The contractual interest attributable to the 2022 Convertible Note was recorded as an addition to the convertible note – related party balance on the condensed consolidated balance sheets.

In accordance with ASU 2020-06, the 2022 Convertible Note is accounted for as a single unit of account and consists of the following:

	<u>September 30,</u> <u>2022</u>
Convertible note, principal	\$ 100,000
Payment in-kind	2,941
Accrued interest	2,440
Debt issuance costs, net of accumulated amortization	(163)
Convertible note	<u>\$ 105,218</u>

Contractual Interest Rates

The 2022 Convertible Note was issued at par and bears interest at the Secured Overnight Financing Rate (SOFR) plus 5.50% per annum if interest is paid in cash, or, if interest is paid in-kind as an increase in the principal amount of the outstanding note, at the SOFR plus 6.50% per annum. Under the terms of the Convertible Note, SOFR has a floor of 1% and a cap of 3%. Interest on the 2022 Convertible Note is payable semi-annually in arrears on June 30 and December 30. The Company, at its option, is permitted to settle each semi-annual interest payment in cash, in-kind, or any combination thereof.

The Company settled the June 30, 2022 interest payment of \$2.9 million as payment in-kind.

Accrued interest was \$2.4 million as of September 30, 2022, of which debt issuance costs comprised less than \$0.2 million. The effective interest rate approximated the contract interest rate for the nine months ended September 30, 2022.

Conversion Rights

The 2022 Convertible Note is convertible at the option of the holder at any time prior to the business day immediately preceding the maturity date at an initial conversion rate of 28.623257 shares of the Company's common stock per \$1,000 of capitalized principal. The effective conversion price is approximately \$34.936625 per share (the Conversion Price). The Conversion Price is subject to adjustment upon the occurrence of certain dilutive events such as stock splits and combinations, stock dividends, mergers and spin-off. For the three and nine months ended September 30, 2022 and 2021, there were no adjustments to Conversion Price. As of September 30, 2022, 3,016,319 shares of the Company's common stock were issuable upon conversion of the 2022 Convertible Note. The Company has the right to settle conversions in shares of common stock, cash, or any combination thereof. If the closing price per share of the Company's common stock on the New York Stock Exchange is at least 130% of the Conversion Price for 20 consecutive trading days, the Company may elect to convert the principal and accrued interest owing under the Notes, plus a make-whole amount equal to the sum of the present values of the remaining interest payments that would have otherwise been payable from the date of such conversion, redemption or repurchase, as applicable, through maturity (the Make-Whole Amount), into the Company's common stock at the Conversion Price.

Optional Redemption

The 2022 Convertible Note is redeemable at the Company's option at any time and in the event that the volume weighted average price of the Company's common stock for the 10 trading days immediately preceding the date on which the Company provides the redemption notice has been at least 130% of the Conversion Price then in effect at a redemption price of 100% of the principal amount, plus accrued and unpaid interest (excluding the redemption date), plus the Make-Whole Amount.

Contingent Redemption

Upon the occurrence of certain fundamental changes described in the Indenture (each, a Fundamental Change), the Holder of the Note may require that the Company repurchase all or part of the principal amount of the Note at a purchase price of 100% of the principal amount of such Note, plus accrued and unpaid interest to, but excluding, the Fundamental Change repurchase date, plus the Make-Whole Amount. The Indenture includes customary "events of default," which may result in the acceleration of the maturity of the Note.

Embedded Derivatives

The Company determined that the Make-Whole feature of the 2022 Convertible Note requires bifurcation in accordance with Accounting Standards Codification 815, Derivatives and Hedging (ASC 815). Accordingly, the Company must separately account for the feature at fair value with changes in fair value reported in current period earnings. The fair value of the Make-Whole was determined to be immaterial as of February 18, 2022 and September 30, 2022.

(10) Commitments and Contingencies

Cloud Computing Agreement

The Company is party to a cloud computing agreement that is a service contract for enterprise resource planning software. During the nine months ended September 30, 2022, the Company amended the agreement to a new five-year term. As of September 30, 2022, the Company capitalized \$1.9 million of costs related to implementation of the agreement that will begin to amortize during 2022. The capitalized implementation costs are classified on the consolidated balance sheets as follows:

	September 30, 2022	December 31, 2021
	(In thousands)	
Cloud computing costs included in other current assets	\$ 356	\$ 390
Cloud computing costs included in other assets	1,679	637
Amortization of cloud computing costs	(149)	—
Total capitalized cloud computing costs	<u>\$ 1,886</u>	<u>\$ 1,027</u>

Thermal Barrier Contracts

The Company is party to production contracts with a major U.S. automotive original equipment manufacturer (OEM) to supply fabricated, multi-part thermal barriers (Barriers) for use in the battery system of its next-generation electric vehicles (Contracts). Pursuant to the Contracts, the Company is obligated to supply Barriers at fixed annual prices and at volumes to be specified by the OEM up to a daily maximum quantity through the respective terms of the agreements, which expire at various times from 2026 through 2034. While the OEM has agreed to purchase its requirement for Barriers from the Company for locations to be designated from time to time by the OEM, it has no obligation to purchase any minimum quantity of Barriers under the Contracts. In addition, the OEM may terminate the Contracts at any time and for any or no reason. All other terms of the Contracts are generally consistent with the OEM's standard purchase terms, including quality and warranty provisions customary in automotive industry.

BASF Supply Agreement

The Company was party to a supply agreement, as amended, with BASF Polyurethanes GmbH (BASF) (the Supply Agreement) and a joint development agreement with BASF SE (the JDA). Pursuant to the Supply Agreement, the Company agreed to sell

exclusively to BASF certain of the Company's products at annual volumes specified by BASF, subject to certain volume limits, through December 31, 2027.

Through the year ended December 31, 2019, BASF made two prepayments each in the amount of \$5.0 million to the Company. BASF had the right to request that 25.3% of any amount invoiced by the Company to BASF for Spaceloft A2 were to be credited against the outstanding balance of the prepayments. BASF also had the right to request that the Company repay any uncredited amount of the first prepayment to BASF following a six-week notice period on or after January 1, 2022 and the second prepayment on or after January 1, 2023.

As of September 30, 2022, the Company had received \$10.0 million in prepayments from BASF and applied approximately \$0.3 million of credits against amounts invoiced to BASF for Spaceloft A2.

During 2021, the Company and BASF jointly announced that BASF would discontinue further marketing and sale of Spaceloft A2 as of November 15, 2021. After that date, BASF customers have had the right to purchase Spaceloft A2 directly from the Company.

On December 15, 2021, the Company terminated the supply arrangement and JDA with BASF and BASF SE, respectively. As part of the termination, the Company and BASF agreed that any uncredited prepayment balances would remain outstanding and subject to repayment upon BASF's request following the requisite six-week notice periods after January 1, 2022 and January 1, 2023, respectively. On January 31, 2022, BASF requested that an outstanding prepayment balance of \$4.7 million be repaid and the Company made the requested repayment on February 17, 2022.

The prepayment liability consists of the following:

	September 30, 2022	December 31, 2021
	(In thousands)	
Prepayment liability	\$ 5,000	\$ 9,728
Current portion of prepayment liability	(5,000)	(4,728)
Prepayment liability, long-term	\$ —	\$ 5,000

Federal, State and Local Environmental Regulations

The Company is subject to federal, state and local laws and regulations relating to the environment. These laws generally provide for control of pollutants released into the environment and require responsible parties to undertake remediation. Penalties may be imposed for noncompliance.

Litigation

The Company is, from time to time, a party to litigation that arises in the normal course of its business operations. See Part II, Item 1 "Legal Proceedings" of this Quarterly Report on Form 10-Q for a description of certain of the Company's current legal proceedings. The Company is not presently a party to any litigation for which it believes a loss is probable requiring an amount to be accrued or a possible loss contingency requiring disclosure.

(11) Leases

The Company leases office, laboratory, warehouse and fabrication space in Massachusetts, Rhode Island and Monterrey, Mexico under operating leases. Under these agreements, the Company is obligated to pay annual rent, real estate taxes, and certain other operating expenses. The Company also leases equipment under operating leases. The Company's operating leases expire at various dates through 2034.

The Company determines if an arrangement is a lease at inception. Right-of-use (ROU) assets represent the Company's right to use an underlying asset for the lease term and lease liabilities represent the Company's payment obligations under the lease. Operating lease ROU assets and liabilities are recognized based on the present value of lease payments over the lease term. To measure its lease liabilities, the Company uses its incremental borrowing rate or the rate implicit in the lease, if available. The Company calculates its incremental borrowing rate using a synthetic credit rating analysis based on Moody's Building Materials Industry Rating Methodology. ROU assets also include any direct costs and prepaid lease payments but exclude any lease incentives received. The

Company's lease terms may include options to extend or terminate the lease when it is reasonably certain that the Company will exercise that option. Lease expense for lease payments is recognized on a straight-line basis over the lease term.

The Company elected the short-term lease recognition exemption for all leases that qualify. For leases that qualify for this exemption, the Company does not recognize ROU assets or lease liabilities. For lease agreements with lease and non-lease components, the Company accounts for each component separately. However, in the case of equipment leases, the Company accounts for lease and non-lease components as a single component.

Maturities of operating lease liabilities as of September 30, 2022 are as follows:

Year	Operating Leases (In thousands)
2022 (excluding the nine months ended September 30, 2022)	\$ 1,010
2023	3,578
2024	2,874
2025	2,638
2026	2,245
Thereafter	13,941
Total lease payments	26,286
Less imputed interest	(6,912)
Total lease liabilities	<u>\$ 19,374</u>

The Company incurred operating lease costs of \$2.9 million and \$1.5 million during the nine months ended September 30, 2022 and 2021, respectively. Cash payments related to operating lease liabilities were \$2.6 million and \$1.3 million during the nine months ended September 30, 2022 and 2021, respectively.

As of September 30, 2022, the weighted average remaining lease term for operating leases was 9.5 years. As of September 30, 2022, the weighted average discount rate for operating leases was 6.6%.

As of September 30, 2022, the Company had additional operating equipment leases that will commence during 2022 with total lease payments of less than \$0.1 million and a weighted average lease term of 1.8 years.

As of September 30, 2022, the Company had no additional operating real estate lease that would commence during 2022.

(12) CARES Act Payroll Tax Deferral

The Company elected to defer approximately \$0.9 million of its employer payroll tax obligation for the period from March 27, 2020 to December 31, 2020 pursuant to the provisions of the CARES Act. The Company was required to remit 50 percent of the deferred tax balance on or before December 31, 2021 and the remaining 50 percent on or before December 31, 2022. As of December 31, 2021, the Company had remitted its initial repayment obligation. As of September 30, 2022 and December 31, 2021, a corresponding liability of \$0.4 million was recorded as a component of accrued expenses on the consolidated balance sheets.

(13) Net Loss Per Share

The computation of basic and diluted net loss per share consists of the following:

	Three Months Ended		Nine Months Ended	
	September 30,		September 30,	
	2022	2021	2022	2021
(In thousands, except share and per share data)				
Numerator:				
Net loss	\$ (29,595)	\$ (7,822)	\$ (73,129)	\$ (20,741)
Denominator:				
Weighted average shares outstanding, basic and diluted	39,533,695	32,523,405	36,047,879	29,685,936
Net loss per share, basic and diluted	\$ (0.75)	\$ (0.24)	\$ (2.03)	\$ (0.70)

Potentially dilutive common shares that were excluded from the computation of diluted net loss per share because they were anti-dilutive consist of the following:

	Three and Nine Months Ended	
	September 30,	
	2022	2021
Common stock options	3,989,342	3,694,679
Restricted common stock units	259,766	348,624
Restricted common stock awards	856,435	476,550
Convertible note, if converted	3,016,319	—
Total	8,121,862	4,519,853

As the Company incurred a net loss for the three and nine months ended, September 30, 2022 and 2021, the potential dilutive shares from common stock options, restricted common stock units, restricted common stock awards, and the convertible note were excluded from the calculation of diluted net loss per share because their effect would have been anti-dilutive for the periods presented. The Company excludes the shares issued in connection with restricted stock awards from the calculation of basic weighted average common shares outstanding until the restrictions lapse.

(14) Income Taxes

The Company incurred net operating losses and recorded a full valuation allowance against net deferred tax assets for all periods presented. Accordingly, the Company has not recorded a provision for federal or state income taxes.

(15) Segment Information

Operating segments are identified as components of an enterprise about which separate, discrete financial information is available for evaluation by the chief operating decision maker in making decisions on how to allocate resources and assess performance. The Company's chief operating decision maker is the Chief Executive Officer. The Company's chief operating decision maker reviews consolidated operating results to make decisions about allocating resources and assessing performance for the entire Company. The Company reports two segments: Energy Industrial and Thermal Barrier. We evaluate segment performance based on the segment profit (loss) before corporate expenses.

Summarized below are the Revenue and Segment Operating Profit for each reporting segment:

	Three Months Ended Revenue September 30,		Three Months Ended Segment Operating Profit (Loss) September 30,		Nine Months Ended Revenue September 30,		Nine Months Ended Segment Operating Profit (Loss) September 30,	
	2022	2021	2022	2021	2022	2021	2022	2021
	(In thousands)						(In thousands)	
Energy industrial	\$ 24,752	\$ 29,448	\$ 2,063	\$ 4,198	\$ 90,404	\$ 88,903	\$ 11,044	\$ 14,873
Thermal barrier	11,954	932	(8,422)	(1,131)	30,349	1,244	(20,402)	(3,270)
Total	<u>\$ 36,706</u>	<u>\$ 30,380</u>	<u>\$ (6,359)</u>	<u>\$ 3,067</u>	<u>\$ 120,753</u>	<u>\$ 90,147</u>	<u>\$ (9,358)</u>	<u>\$ 11,603</u>
Corporate expenses			21,950	14,565			60,221	35,890
Operating loss			(28,309)	(11,498)			(69,579)	(24,287)
Other expense, net			(1,286)	3,676			(3,550)	3,546
Net loss			<u>\$ (29,595)</u>	<u>\$ (7,822)</u>			<u>\$ (73,129)</u>	<u>\$ (20,741)</u>

(16) Subsequent Events

The Company has evaluated subsequent events through November 7, 2022, the date of issuance of the consolidated financial statements for the three and nine months ended September 30, 2022.

On November 1, 2022, the Company repaid the outstanding BASF \$5.0 million prepayment liability.

Item 2. Management’s Discussion and Analysis of Financial Condition and Results of Operations.

The following information should be read in conjunction with the unaudited financial information and the notes thereto included in this Quarterly Report on Form 10-Q and the audited financial information and the notes thereto included in the Annual Report on Form 10-K for the year ended December 31, 2021, filed with the U.S. Securities and Exchange Commission (SEC) on March 1, 2022, which we refer to as the Annual Report.

Certain matters discussed in this Quarterly Report on Form 10-Q may be deemed to be forward-looking statements that involve risks and uncertainties. We make such forward-looking statements pursuant to the safe harbor provisions of the Private Securities Litigation Reform Act of 1995 and other federal securities laws. In this Quarterly Report on Form 10-Q, words such as “may,” “will,” “anticipate,” “estimate,” “expects,” “projects,” “intends,” “plans,” “believes” and similar expressions (as well as other words or expressions referencing future events, conditions or circumstances) are intended to identify forward-looking statements.

Our actual results and the timing of certain events may differ materially from the results discussed, projected, anticipated, or indicated in any forward-looking statements. We caution you that forward-looking statements are not guarantees of future performance and that our actual results of operations, financial condition and liquidity, and the development of the industry in which we operate may differ materially from the forward-looking statements contained in this Quarterly Report on Form 10-Q. In addition, even if our results of operations, financial condition and liquidity, and the development of the industry in which we operate are consistent with the forward-looking statements contained in this Quarterly Report on Form 10-Q, they may not be predictive of results or developments in future periods.

The following information and any forward-looking statements should be considered in light of factors discussed elsewhere in this Quarterly Report on Form 10-Q and under “Risk Factors” in Item 1A of the Annual Report.

We caution readers not to place undue reliance on any forward-looking statements made by us, which speak only as of the date they are made. We disclaim any obligation, except as specifically required by law and the rules of the SEC, to publicly update or revise any such statements to reflect any change in our expectations or in events, conditions or circumstances on which any such statements may be based, or that may affect the likelihood that actual results will differ from those set forth in the forward-looking statements.

You should read the following discussion and analysis of financial condition and results of operations together with Part I Item 1 “Financial Statements,” which includes our financial statements and related notes, elsewhere in this Quarterly Report on Form 10-Q.

Investors and others should note that we routinely use the Investors section of our website to announce material information to investors and the marketplace. While not all of the information that we post on the Investors section of our website is of a material nature, some information could be deemed to be material. Accordingly, we encourage investors, the media, and others interested in us to review the information that we share on the Investors section of our website, <https://www.aerogel.com>.

Products

Our core businesses are organized into two reportable segments: Energy Industrial and Thermal Barrier. The following describes our key product offerings and new product innovations by reportable segment.

Energy Industrial

We design, develop and manufacture innovative, high-performance aerogel insulation used primarily in the energy infrastructure and sustainable building materials markets. We believe our aerogel blankets deliver the best thermal performance of any widely used insulation product available on the market today and provide a combination of performance attributes unmatched by traditional insulation materials. Our end-user customers select our products where thermal performance is critical and to save money, improve resource efficiency, enhance sustainability, preserve operating assets and protect workers. Our insulation is used by oil producers and the owners and operators of refineries, petrochemical plants, liquefied natural gas facilities, power generating assets and other energy infrastructure. Our Pyrogel and Cryogel product lines have undergone rigorous technical validation by industry leading end-users and achieved significant market adoption. Our Spaceloft building materials are increasingly used by building owners to improve the energy efficiency and to enhance fire protection in buildings ranging from historic brownstones to modern high rises.

We also derive revenue from a number of other end markets. Customers in these markets use our products for applications as diverse as military and commercial aircraft, trains, buses, appliances, apparel, footwear and outdoor gear. As we continue to enhance our aerogel technology platform, we believe we will have additional opportunities to address high value applications in the global

insulation market, the electric vehicle market and in a number of new, high-value markets, including hydrogen energy, filtration, water purification, and gas sorption.

We market and sell our products primarily through a sales force based in North America, Europe and Asia. The efforts of our sales force are supported by a small number of sales consultants with extensive knowledge of a particular market or region. Our sales force is responsible for establishing and maintaining customer and partner relationships, delivering highly technical information and ensuring high-quality customer service.

Our salespeople work directly with end-user customers and engineering firms to promote the qualification, specification and acceptance of our aerogel and thermal barrier products. We also rely on an existing and well-established channel of qualified insulation distributors and contractors in more than 50 countries around the world to ensure rapid delivery of our aerogel products and strong end-user support.

Thermal Barrier

We are actively developing a number of promising aerogel products and technologies for the electric vehicle market. We have developed and are commercializing our proprietary line of PyroThin aerogel thermal barriers for use in battery packs in electric vehicles. Our PyroThin product is an ultra-thin, lightweight and flexible thermal barrier designed with other functional layers to impede the propagation of thermal runaway across multiple lithium-ion battery system architectures. Our thermal barrier technology is designed to offer a unique combination of thermal management, mechanical performance and fire protection properties. These properties enable electric vehicle manufacturers to achieve critical battery performance and safety goals. In addition, we are seeking to leverage our patented carbon aerogel technology to develop industry-leading battery materials for use in lithium-ion battery cells. These battery materials have the potential to increase the energy density of the battery cells, thus enabling an increase in the driving range of electric vehicles.

The commercial potential for our PyroThin thermal barriers and our carbon aerogel battery materials in the electric vehicle market is significant. Accordingly, we are hiring additional personnel, incurring additional operating expenses, incurring significant capital expenditures to expand aerogel manufacturing capacity, establishing an automated thermal barrier fabrication operation, enhancing research and development resources and expanding our battery material research facilities, among other items.

We have entered into production contracts with certain major OEMs, including General Motors LLC (GM) to supply fabricated, multi-part thermal barriers for use in the battery system of its next-generation electric vehicles. Pursuant to the contracts with GM, we are obligated to supply the barriers at fixed annual prices and at volumes to be specified by the customer up to a daily maximum quantity through the term of the agreements, which expire at various times from 2026 through 2034. While GM has agreed to purchase its requirement for the barriers from us at locations to be designated from time to time, it has no obligation to purchase any minimum quantity of barriers under the contracts. In addition, GM may terminate the contracts any time and for any or no reason. All other terms of the contracts are generally consistent with GM's standard purchase terms, including quality and warranty provisions customary in the automotive industry.

Manufacturing Operations

We manufacture our products using our proprietary technology at our facility in East Providence, Rhode Island. We have operated the East Providence facility since 2008 and have increased our capacity in phases to approximately \$250.0 million in annual revenue. To meet expected growth in demand for our aerogel products in the electric vehicle market, we are in the process of expanding our aerogel blanket capacity by constructing a second manufacturing plant in Bulloch County, Georgia.

On February 17, 2022, we entered into an Inducement Agreement with the Development Authority of Bulloch County (the Development Authority), the City of Statesboro, Bulloch County, Georgia (collectively, Statesboro Entities). Pursuant to the Inducement Agreement, the Statesboro Entities will provide various incentives to induce us to invest at least \$325.0 million in constructing and equipping our second manufacturing facility in Bulloch County, Georgia and to create at least 250 full-time jobs. Separately, and concurrently, the Company entered into a Memorandum of Understanding (the MOU) with the Georgia Department of Economic Development (the GDEcD). Pursuant to both the Inducement Agreement and the MOU, the Local Governmental Entities and the GDEcD will provide various incentives to induce the Company to invest at least \$325.0 million in constructing and equipping a facility to produce aerogel-based products in Bulloch County, Georgia and to create at least 250 full-time jobs (the Project). We will also receive statutory incentives for economic development provided by the State of Georgia. Incentives afforded by the Statesboro Entities to us include, but are not limited to, property tax reductions and utility and site infrastructure improvements for the Project. Additionally, the Development Authority, with assistance from the GDEcD, will also apply for a grant, the proceeds of which shall be used by us for certain equipment in connection with the Project. The Development Authority will lease to us an approximately 90-acre property along with buildings and equipment to be built therein, for a term of five years, with an option to renew for an additional 5

years, in consideration for the payment of nominal rent, and grant to us an option to purchase the property upon the earlier of the expiration or termination of the lease at a nominal price.

In addition, we entered into a (i) PILOT Agreement with the Statesboro Entities that sets forth our rights and obligations with respect to the incentives received pursuant to the Inducement Agreement and (ii) a Performance and Accountability Agreement with other state authorities, which provides for a grant of \$1,000,000. Pursuant to these agreements, in the event that we fail to meet at least 80% of the investment and job creation goals within 36 months following the earlier to occur of (i) the completion and issuance of the certificate of occupancy with respect to the planned second manufacturing facility or (ii) December 31, 2024 (the Commencement Date), we may be required to repay portions of property tax savings, the grant to the Development Authority and other incentives. In addition, we must maintain our achievement of 80% of the investment and job creation goals for a period of 60 months thereafter.

We expect to build the second plant in two phases and have previously estimated a cost of approximately \$575.0 million for the first phase and approximately \$125.0 million for the second phase. However, as a result of cost inflation and supply chain challenges for this project, we are reviewing the plans, schedule and scope of the project in order to manage these potential cost drivers with the aim of keeping our capital expenditures on the second plant as close as possible to our prior estimates while still seeking to achieve our goal of having the first phase of the plant increase our annual revenue capacity by approximately \$650.0 million and the second phase by approximately \$700.0 million. Nonetheless, further cost inflation and/or supply chain disruptions, as well as potential changes in the scope of the facilities, could lead to increases to our prior estimates. We expect to have the first phase of the second plant operational in the first-half of 2024. In addition, we are constructing a state-of-the-art, automated thermal barrier fabrication operation in Monterrey, Mexico in order to keep pace with the significant potential demand for our PyroThin thermal barriers.

Financial Summary

On February 18, 2022, we sold and issued to an affiliate of Koch \$100.0 million in aggregate principal amount of our Convertible Senior PIK Toggle Notes due 2027 (the Notes), pursuant to a note purchase agreement, dated as of February 15, 2022, by and between us and the affiliate of Koch. The Notes bear interest at the Secured Overnight Financing Rate (SOFR) plus 5.50% per annum if interest is paid in cash (the Cash Interest), or, if interest is paid in kind (through an increase in the principal amount of the outstanding Notes or through the issuance of additional Notes), at SOFR plus 6.50% per annum (PIK Interest). Under the terms of the investment, SOFR has a floor of 1% and a cap of 3%. We can elect to make any interest payment through Cash Interest, PIK Interest or any combination thereof. Interest on the Notes is payable semi-annually in arrears on June 30 and December 30, commencing on June 30, 2022. It is expected that the Notes will mature on February 18, 2027, subject to earlier conversion, redemption or repurchase.

On March 28, 2022, we sold to an affiliate of Koch 1,791,986 shares of our common stock for aggregate gross proceeds of \$50.0 million, pursuant to a securities purchase agreement, dated as of February 15, 2022, by and between us and the affiliate of Koch.

On March 16, 2022, we entered into a sales agreement for an at-the-market (ATM) offering program with Cowen and Company, LLC as our sales agent. During the nine months ended September 30, 2022, we sold 5,241,400 shares of our common stock, through the ATM offering program and received net proceeds of \$72.7 million, after deducting commissions and estimated offering expenses payable by us.

On March 12, 2021, we entered into an Amended and Restated Loan and Security Agreement (Loan Agreement) with Silicon Valley Bank to extend the maturity date of the revolving credit facility to April 28, 2022. Pursuant to the Loan Agreement, we are permitted to borrow a maximum of \$20.0 million, subject to continued covenant compliance and borrowing base requirements. The interest rate applicable to borrowings under the revolving credit facility is based on the prime rate, subject to a minimum rate of 4.00% per annum, plus a margin. The rates applicable to borrowings vary from prime rate plus 0.75% per annum to prime rate plus 2.00% per annum. In addition, we are required to pay a monthly unused revolving line facility fee of 0.50% per annum of the average unused portion of the revolving credit facility. The credit facility has also been amended to establish minimum Adjusted EBITDA and minimum Adjusted Quick Ratio covenants, each as defined in the Loan Agreement. At various dates in 2021, and subsequently on March 31, 2022, April 28, 2022, June 23, 2022, and August 26, 2022, we entered into amendments to the Loan Agreement to revise certain financial covenants, among other things. On October 14, 2022, the Loan Agreement was amended to extend the maturity date of the revolving credit facility to December 1, 2022.

Our revenue for the nine months ended September 30, 2022 was \$120.8 million, which represented an increase of \$30.7 million, or 34%, from \$90.1 million for the nine months ended September 30, 2021. Net loss for the nine months ended September 30, 2022 was \$73.1 million and net loss per share was \$2.03. Net loss for the nine months ended September 30, 2021 was \$20.7 million and net loss per share was \$0.70.

In response to the COVID-19 pandemic, we have implemented and are following safe practices recommended by public health authorities and other government entities. We continue to focus on the safety and health of our employees, customers and vendors. In

addition, we have implemented various precautionary measures, including remote work arrangements, restricted business travel and procedures for social distancing, face coverings and safe hygiene. We continue to monitor public health guidance as it evolves and plan to adapt our practices as appropriate. Refer to “Risk Factors” in Item 1A of the Annual Report for more information concerning risks to our business associated with COVID-19.

Key Metrics and Non-GAAP Financial Measures

We regularly review a number of metrics, including the following key metrics, to evaluate our business, measure our performance, identify trends affecting our business, formulate financial projections and make strategic decisions.

Square Foot Operating Metric

We price our energy industrial product and measure our shipments in square feet. We believe the square foot operating metric allows us and our investors to measure our manufacturing capacity and energy industrial product shipments on a uniform and consistent basis. The following chart sets forth energy industrial product shipments in square feet associated with recognized revenue, including revenue recognized over time utilizing the input method, for the periods presented:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2022	2021	2022	2021
	(In thousands)			
Product shipments in square feet	6,711	8,940	24,074	27,384

Adjusted EBITDA

We use Adjusted EBITDA, a non-GAAP financial measure, as a means to assess our operating performance. We define Adjusted EBITDA as net income (loss) before interest expense, taxes, depreciation, amortization, stock-based compensation expense and other items, from time to time, which we do not believe are indicative of our core operating performance. Adjusted EBITDA is a supplemental measure of our performance that is not presented in accordance with U.S. GAAP. Adjusted EBITDA should not be considered as an alternative to net income (loss) or any other measure of financial performance calculated and presented in accordance with U.S. GAAP. In addition, our definition and presentation of Adjusted EBITDA may not be comparable to similarly titled measures presented by other companies.

We use Adjusted EBITDA:

- as a measure of operating performance because it does not include the impact of items that we do not consider indicative of our core operating performance;
- for planning purposes, including the preparation of our annual operating budget;
- to allocate resources to enhance the financial performance of our business; and
- as a performance measure used under our bonus plan.

We also believe that the presentation of Adjusted EBITDA provides useful information to investors with respect to our results of operations and in assessing the performance and value of our business. Various measures of EBITDA are widely used by investors to measure a company’s operating performance without regard to items that can vary substantially from company to company depending upon financing and accounting methods, book values of assets, capital structures and the methods by which assets were acquired.

Although measures similar to Adjusted EBITDA are frequently used by investors and securities analysts in their evaluation of companies, we understand that Adjusted EBITDA has limitations as an analytical tool, and you should not consider it in isolation or as a substitute for net income (loss), income (loss) from operations, net cash provided by (used in) operating activities or an analysis of our results of operations as reported under U.S. GAAP. Some of these limitations are:

- Adjusted EBITDA does not reflect our historical cash expenditures or future requirements for capital expenditures or other contractual commitments;
- Adjusted EBITDA does not reflect changes in, or cash requirements for, our working capital needs;
- Adjusted EBITDA does not reflect stock-based compensation expense;

- Adjusted EBITDA does not reflect our income tax expense or cash requirements to pay our income taxes;
- Adjusted EBITDA does not reflect our interest expense, or the cash requirements necessary to service interest or principal payments on our debt;
- although depreciation, amortization and impairment charges are non-cash charges, the assets being depreciated, amortized or impaired will often have to be replaced in the future, and Adjusted EBITDA does not reflect any cash requirements for these replacements; and
- other companies in our industry may calculate EBITDA or Adjusted EBITDA differently than we do, limiting their usefulness as a comparative measure.

Because of these limitations, our Adjusted EBITDA should not be considered as a measure of discretionary cash available to us to reinvest in the growth of our business or as a measure of cash available for us to meet our obligations.

To properly and prudently evaluate our business, we encourage you to review the U.S. GAAP financial statements included elsewhere in this Quarterly Report on Form 10-Q, and not to rely on any single financial measure to evaluate our business.

The following table presents a reconciliation of net loss, the most directly comparable U.S. GAAP measure, to Adjusted EBITDA for the periods presented:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2022	2021	2022	2021
	(In thousands)		(In thousands)	
Net loss	\$ (29,595)	\$ (7,822)	\$ (73,129)	\$ (20,741)
Depreciation and amortization	2,531	2,114	6,692	6,856
Stock-based compensation ⁽¹⁾	2,590	1,554	6,713	3,600
Gain on extinguishment of debt	-	(3,734)	-	(3,734)
Interest expense	1,286	58	3,550	188
Adjusted EBITDA	<u>\$ (23,188)</u>	<u>\$ (7,830)</u>	<u>\$ (56,174)</u>	<u>\$ (13,831)</u>

- (1) Represents non-cash stock-based compensation related to vesting and modifications of stock option grants, vesting of restricted stock units and vesting of restricted common stock.

Our financial performance, including such measures as net income (loss), earnings per share and Adjusted EBITDA, are affected by a number of factors including volume and mix of aerogel products sold, average selling prices, our material costs and manufacturing expenses, the costs associated with capacity expansions and start-up of additional production capacity, and the amount and timing of operating expenses. Accordingly, we expect that our net income (loss), earnings per share and Adjusted EBITDA will vary from period to period.

We expect growth in revenue during 2022 driven by a continued post-COVID recovery in the energy infrastructure market and accelerating demand in the electric vehicle market. Our expectation to maintain revenue growth is based, in part, on our original equipment manufacturer (OEM) customers' production volume forecasts and targets as well as our expectation to successfully scale our manufacturing capabilities and address any potential supply chain issues to meet this expected demand. We are also planning a significant increase in staffing and spending levels in support of our electric vehicle market opportunities during the year, including expenses associated with the start-up and operation of an automated fabrication facility in Monterrey, Mexico and the initial staffing and operational requirements of our planned second aerogel manufacturing facility in Bulloch County, Georgia. As a result, we expect to experience an increase in net loss and a decrease in Adjusted EBITDA during 2022.

We also expect to incur significant capital expenditures and increased expenses during the remainder of 2022, related to our planned second aerogel manufacturing facility to be located in Bulloch County, Georgia. We expect to have the first phase of the second plant operational in the first-half of 2024.

Components of Our Results of Operations

Revenue

We recognize revenue from the sale of our energy industrial aerogel products and thermal barriers. Revenue is recognized upon the satisfaction of contractual performance obligations.

We record deferred revenue for sales when (i) we have delivered products, but other revenue recognition criteria have not been satisfied, or (ii) payments have been received in advance of the completion of required performance obligations.

We project revenue growth during 2022 due to a continued post-COVID recovery in the energy infrastructure market and accelerating demand in the electric vehicle market for our thermal barrier product.

Cost of Revenue

Cost of product revenue consists primarily of materials and manufacturing expense. Cost of product revenue is recorded when the related product revenue is recognized.

Material is our most significant component of cost of energy industrial product revenue and includes fibrous batting, silica materials and additives. Material costs as a percentage of product revenue vary from product to product due to differences in average selling prices, material requirements, product thicknesses, and manufacturing yields. In addition, we provide warranties for our products and record the estimated cost within cost of revenue in the period that the related revenue is recorded or when we become aware that a potential warranty claim is probable and can be reasonably estimated. As a result of these factors, material costs as a percentage of product revenue will vary from period to period due to changes in the mix of aerogel products sold, the costs of our raw materials or the estimated cost of warranties. In addition, global supply chain disturbances, increased reliance on foreign materials procurement, industrial gas supply constraints, increases in the cost of our raw materials, and other factors may significantly impact our material costs and have a material impact on our operations. We have been impacted by the national carbon dioxide shortage. As a result, we have implemented various measures to ensure that we reduce the frequency and impact of further interruptions by increasing our carbon dioxide storage capacity at our manufacturing facility and arranging transportation of supply ourselves. We expect that material costs will increase in absolute dollars during 2022 due to projected growth in product shipments, but decrease as a percentage of revenue due to projected increases in average selling prices, improved manufacturing, and fabrication yields and a favorable mix of products sold.

Manufacturing expense is also a significant component of cost of revenue. Manufacturing expense includes labor, utilities, maintenance expense, and depreciation on manufacturing assets. Manufacturing expense also includes stock-based compensation for manufacturing employees and shipping costs. Manufacturing expense is our most significant component of cost of our thermal barrier product revenue. We expect that manufacturing expense will increase in absolute dollars and as a percentage of revenue during 2022 due to increased manual fabrication staffing and spending levels in support of our thermal barrier business, including the start-up and operation of a fabrication facility in Monterrey, Mexico and the initial staffing and operational requirements of our planned second aerogel manufacturing facility in Bulloch County, Georgia.

In total, we expect that cost of product revenue will increase in absolute dollars during 2022 versus 2021 and as a percentage of revenue versus 2021 driven by the costs to support our expected higher run-rate revenue in future periods.

Gross Profit

Our gross profit as a percentage of revenue is affected by a number of factors, including the volume of aerogel products produced and sold, the mix of aerogel products sold, average selling prices, our material and manufacturing costs, realized capacity utilization and the costs associated with expansions and start-up of production capacity. Accordingly, we expect our gross profit to vary significantly in absolute dollars and as a percentage of revenue from period to period.

During 2022, we expect gross profit to increase in both absolute dollars and as a percentage of total revenue due to the combination of a projected increase in total revenue combined with projected reduction in material costs as a percentage of total revenue related to our energy industrial products, offset, in part, by a projected increase in manufacturing expense as a percentage of revenue primarily related to our thermal barrier business.

Operating Expenses

Operating expenses consist of research and development, sales and marketing, and general and administrative expenses. Operating expenses include personnel costs, legal fees, professional fees, service fees, insurance premiums, travel expense, facilities related costs and other costs, expenses and fees. The largest component of our operating expenses is personnel costs, consisting of salaries, benefits, incentive compensation and stock-based compensation. In any particular period, the timing and extent of personnel additions or reductions, legal activities, including patent enforcement actions, marketing programs, research efforts and a range of similar activities or actions could materially affect our operating expenses, both in absolute dollars and as a percentage of revenue.

During 2022, we expect to continue to hire additional technical, operational and commercial personnel and incur additional operating expenses to support the anticipated multi-year growth in our PyroThin thermal barrier business. As a result, we expect that operating expenses will increase in both absolute dollars and as a percentage of revenue during the year. In the longer term, we expect that operating expenses will increase in absolute dollars, but decrease as a percentage of revenue.

Research and Development Expenses

Research and development expenses consist primarily of expenses for personnel engaged in the development of next-generation aerogel compositions, form factors and manufacturing technologies. These expenses also include testing services, prototype expenses, consulting services, trial formulations for new products, equipment depreciation, facilities costs and related overhead. We expense research and development costs as incurred. We expect to continue to devote substantial resources to the development of new aerogel technologies, including our carbon aerogel battery materials. We believe that these investments are necessary to maintain and improve our competitive position. We also expect to continue to invest in research and engineering personnel and the infrastructure required in support of their efforts. While we expect our research and development expenses will increase in absolute dollars but decrease as a percentage of revenue in the longer term, in 2022, we expect these expenses will increase in both absolute dollars and as a percentage of revenue.

Sales and Marketing Expenses

Sales and marketing expenses consist primarily of personnel costs, incentive compensation, marketing programs, travel and related costs, consulting expenses and facilities related costs. We expect that sales and marketing expenses will increase in absolute dollars and as a percentage of revenue during 2022 principally due to an increase in compensation associated with the addition of personnel in support of our PyroThin thermal barrier business. In the longer term, we expect that sales and marketing expenses will increase in absolute dollars but decrease as a percentage of revenue.

General and Administrative Expenses

General and administrative expenses consist primarily of personnel costs, legal expenses, consulting and professional services, audit fees, compliance with securities, corporate governance and related laws and regulations, investor relations expenses and insurance premiums, including director and officer insurance.

We expect our general and administrative expenses to increase as we add general and administrative personnel to support the anticipated growth of our business. We also expect that the patent enforcement actions, described in more detail under “Legal Proceedings” in Part I, Item 3 of our Annual Report on Form 10-K for the year ended December 31, 2021, if protracted, could result in significant legal expense over the medium to long-term. While we expect that our general and administrative expenses will increase in absolute dollars but decrease as a percentage of revenue in the longer term, in 2022, we expect such expenses will increase in both absolute dollars and as a percentage of revenue.

Gain on Extinguishment of Debt

On May 1, 2020, our wholly-owned subsidiary, Aspen Aerogels Rhode Island, LLC, executed a note for an unsecured Paycheck Protection Program (PPP) loan of \$3.7 million pursuant to the CARES Act. On August 24, 2021, the Small Business Association (SBA) remitted \$3.7 million in principal and accrued interest to the noteholder after approving the Borrower’s application for forgiveness of the PPP Loan. Accordingly, we recorded a total gain on the extinguishment of debt of \$3.7 million during the three months ended September 30, 2021.

Interest Expense, Net

Interest expense, net consists of interest expense on our convertible note and fees and interest expense related to our revolving credit facility.

Provision for Income Taxes

We have incurred net losses since inception and have not recorded benefit provisions for U.S. federal income taxes or state income taxes since the tax benefits of our net losses have been offset by valuation allowances due to the uncertainty associated with the utilization of net operating loss carryforwards.

Results of Operations

Three months ended September 30, 2022 compared to the three months ended September 30, 2021

The following tables set forth a comparison of the components of our results of operations for the periods presented:

Revenue

	Three Months Ended September 30,		2021		Change	
	2022		2021			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	(\$ in thousands)					
Revenue:						
Energy industrial	\$ 24,752	67%	\$ 29,448	97%	\$ (4,696)	(16)%
Thermal barrier	11,954	33%	932	3%	11,022	NM
Total revenue	<u>\$ 36,706</u>	100%	<u>\$ 30,380</u>	100%	<u>\$ 6,326</u>	21%

Total revenue increased \$6.3 million, or 21%, to \$36.7 million for the three months ended September 30, 2022 from \$30.4 million in the comparable period in 2021. The increase in total revenue was the result of an increase in thermal barrier revenue, offset by a decrease in energy industrial revenue.

The following chart sets forth energy industrial product shipments in square feet associated with recognized revenue, including revenue recognized over time utilizing the input method, for the periods presented:

	Three Months Ended September 30,		Change	
	2022	2021	Amount	Percentage
Product shipments in square feet (in thousands)	6,711	8,940	(2,229)	(25)%

Energy industrial revenue decreased by \$4.7 million, or 16%, to \$24.8 million for the three months ended September 30, 2022 from \$29.5 million in the comparable period in 2021. This decrease was driven by a lower volume of shipments in the global petrochemical and refinery markets in North America and Europe, project-based demand in the subsea market, offset, in part, by an increase in maintenance-based demand in the global petrochemical and refinery markets of Asia.

Energy industrial revenue for the three months ended September 30, 2022 included \$10.5 million to a North American distributor. Energy industrial revenue for the three months ended September 30, 2021 included \$8.1 million to a North American distributor.

The average selling price per square foot of our energy industrial products increased by \$0.40, or 12%, to \$3.69 per square foot for the three months ended September 30, 2022 from \$3.29 per square foot for the three months ended September 30, 2021. The increase in average selling price principally reflected the impact of a change in the mix of products sold. This increase in average selling price had the effect of increasing product revenue by \$2.6 million for the three months ended September 30, 2022 from the comparable period in 2021.

In volume terms, energy industrial product shipments decreased by 2.2 million square feet, or 25%, to 6.7 million square feet for the three months ended September 30, 2022, as compared to 8.9 million square feet for the three months ended September 30, 2021. The decrease in volume had the effect of decreasing product revenue by \$7.3 million for the three months ended September 30, 2022 from the comparable period in 2021.

Thermal barrier revenue was \$12.0 million for the three months ended September 30, 2022 as compared to \$0.9 million for the three months ended September 30, 2021. Thermal barrier revenue for the three months ended September 30, 2022 included \$9.2 million and \$1.4 million to two major U.S. automotive OEMs, respectively, and \$0.9 million to a major Asian automotive OEM.

Cost of Revenue

	Three Months Ended September 30,						Change	
	2022			2021				
	Amount	Percentage of Related Revenue	Percentage of Total Revenue	Amount	Percentage of Related Revenue	Percentage of Total Revenue	Amount	Percentage
Cost of revenue:								
Energy industrial	\$ 22,689	92%	62%	\$ 25,250	86%	83%	\$ (2,561)	(10)%
Thermal barrier	20,376	170%	56%	2,063	NM	7%	18,313	NM
Total cost of revenue	\$ 43,065	117%	117%	\$ 27,313	90%	90%	\$ 15,752	58%

Total cost of revenue increased \$15.7 million, or 58%, to \$43.0 million for the three months ended September 30, 2022 from \$27.3 million in the comparable period in 2021. The increase in total cost of revenue was the result of increases in thermal barrier cost of revenue, offset by a decrease in energy industrial cost of revenue.

Energy industrial cost of revenue decreased \$2.6 million, or 10%, to \$22.7 million for the three months ended September 30, 2022 from \$25.3 million in the comparable period in 2021. The \$2.6 million decrease was the result of a \$4.5 million decrease in manufacturing and other operating costs, offset by a \$1.9 million increase in material costs due to product mix from the comparable period in 2021.

Thermal barrier cost of revenue increased \$18.3 million to \$20.4 million for the three months ended September 30, 2022 as compared to \$2.1 million for the three months ended September 30, 2021. The \$18.3 million increase was the result of a \$4.6 million increase in material costs and a \$13.7 million increase in manufacturing costs. The increase in material costs was the result of the increase in revenue volume from the comparable period in 2021. The increase in manufacturing was driven by increases in compensation and related costs of \$7.8 million and other manufacturing and operating costs of \$5.9 million.

Gross Profit

	Three Months Ended September 30,				Change	
	2022		2021			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
Gross profit:						
Energy industrial	\$ 2,063	8%	\$ 4,198	14%	\$ (2,135)	(51)%
Thermal barrier	(8,422)	(70)%	(1,131)	NM	(7,291)	NM
Total gross (loss) profit	\$ (6,359)	(17)%	\$ 3,067	10%	\$ (9,426)	(307)%

Gross profit decreased by \$9.4 million, or 307%, to \$(6.3) million for the three months ended September 30, 2022 from \$3.1 million in the comparable period in 2021. The decrease in gross profit was the result of the \$15.7 million increase in total cost of revenue, offset, in part, by the \$6.3 million increase in total revenue. The decrease in gross profit reflects the increase in overhead costs and additional resources to support our expected higher run-rate revenue in future periods for both our energy industrial and thermal barrier products.

Research and Development Expenses

	Three Months Ended September 30,				Change	
	2022		2021			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	(\$ in thousands)					
Research and development expenses	\$ 4,694	13%	\$ 3,077	10%	\$ 1,617	53%

Research and development expenses increased by \$1.6 million, or 53%, to \$4.7 million for the three months ended September 30, 2022 from \$3.1 million in the comparable period in 2021. The \$1.6 million increase reflects an increase in compensation and related costs of \$0.7 million, equipment and lease expenses of \$0.3 million, patent related costs of \$0.3 million and other research and development expenses of \$0.3 million.

Research and development expenses as a percentage of total revenue increased to 13% of total revenue for three months ended September 30, 2022 from 10% in the comparable period in 2021.

Sales and Marketing Expenses

	Three Months Ended September 30,				Change	
	2022		2021			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	(\$ in thousands)					
Sales and marketing expenses	\$ 7,293	20%	\$ 4,915	16%	\$ 2,378	48%

Sales and marketing expenses increased by \$2.4 million, or 48%, to \$7.3 million for the three months ended September 30, 2022 from \$4.9 million in the comparable period in 2021. The \$2.4 million increase was principally the result of increases in compensation and related costs of \$1.4 million, operating supplies expenses of \$0.4 million, travel-related expenditures of \$0.2 million, marketing expenses of \$0.2 million and other sales and marketing expenses of \$0.2 million.

Sales and marketing expenses as a percentage of total revenue increased to 20% for the three months ended September 30, 2022 from 16% in the comparable period in 2021, due principally to the increase in compensation and related expenses associated with an increase in sales and business development personnel.

General and Administrative Expenses

	Three Months Ended September 30,				Change	
	2022		2021			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
(\$ in thousands)						
General and administrative expenses	\$ 9,963	27%	\$ 6,573	22%	\$ 3,390	52%

General and administrative expenses increased by \$3.4 million, or 52%, to \$10.0 million for the three months ended September 30, 2022 from \$6.6 million in the comparable period in 2021. The \$3.4 million increase was the result of increases in compensation and related costs of \$1.7 million, operating and lease expenses of \$1.4 million and other general and administrative expenses of \$0.3 million.

General and administrative expenses as a percentage of total revenue increased to 27% for the three months ended September 30, 2022 from 22% in the comparable period in 2021.

Gain on Extinguishment of Debt

On May 1, 2020, our wholly-owned subsidiary, Aspen Aerogels Rhode Island, LLC, executed a note for an unsecured PPP loan of \$3.7 million pursuant to the CARES Act. On August 24, 2021, the SBA remitted \$3.7 million in principal and accrued interest to the noteholder after approving the Borrower's application for forgiveness of the PPP Loan. Accordingly, we recorded a total gain on the extinguishment of debt of \$3.7 million during the three months ended September 30, 2021.

Interest Expense, net

	Three Months Ended September 30,				Change	
	2022		2021			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
Interest expense:						
Interest expense, related party	\$ (1,734)	(5)%	\$ —	—	\$ (1,734)	NM
Interest income (expense), net	448	1%	(58)	—	506	NM
Total interest expense, net	\$ (1,286)	(4)%	\$ (58)	0%	\$ (1,228)	NM

Interest expense, net increased by \$1.2 million to \$1.3 million for the three months ended September 30, 2022 from less than \$0.1 million in the comparable period in 2021. The \$1.2 million increase was the result of interest relating to our Convertible Note.

Results of Operations

Nine months ended September 30, 2022 compared to the nine months ended September 30, 2021

The following tables set forth a comparison of the components of our results of operations for the periods presented:

Revenue

	Nine Months Ended September 30,				Change	
	2022		2021			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
Revenue:						
Energy industrial	\$ 90,404	75%	\$ 88,903	99%	\$ 1,501	2%
Thermal barrier	30,349	25%	1,244	1%	29,105	NM
Total revenue	\$ 120,753	100%	\$ 90,147	100%	\$ 30,606	34%

Total revenue increased \$30.6 million, or 34%, to \$120.7 million for the three months ended September 30, 2022 from \$90.1 million in the comparable period in 2021. The increase in total revenue was the result of increases in both thermal barrier and energy industrial revenue.

The following chart sets forth energy industrial product shipments in square feet associated with recognized revenue, including revenue recognized over time utilizing the input method, for the periods presented:

	Nine Months Ended September 30,		Change	
	2022	2021	Amount	Percentage
Product shipments in square feet (in thousands)	24,074	27,384	(3,310)	(12)%

Energy industrial revenue increased by \$1.5 million, or 2%, to \$90.4 million for the nine months ended September 30, 2022 from \$88.9 million in the comparable period in 2021. This increase was driven by maintenance-based demand in the global petrochemical and refinery markets, particularly in Asia and North America, due to the continued post-COVID recovery, project-based demand in the subsea market, offset, in part, by a lower volume of shipments in the global petrochemical and refinery markets, particularly in Europe.

Energy industrial revenue for the nine months ended September 30, 2022 included \$30.7 million to a North American distributor. Energy industrial revenue for the nine months ended September 30, 2021 included \$25.0 million to a North American distributor and \$9.2 million to a European LNG project contractor.

The average selling price per square foot of our energy industrial products increased by \$0.51, or 16%, to \$3.76 per square foot for the nine months ended September 30, 2022 from \$3.25 per square foot for the nine months ended September 30, 2021. The increase in average selling price principally reflected the impact of a change in the mix of products sold. This increase in average

selling price had the effect of increasing product revenue by \$12.3 million for the nine months ended September 30, 2022 from the comparable period in 2021.

In volume terms, energy industrial product shipments decreased by 3.3 million square feet, or 12%, to 24.1 million square feet for the nine months ended September 30, 2022, as compared to 27.4 million square feet for the nine months ended September 30, 2021. The decrease in volume had the effect of decreasing product revenue by \$10.8 million the nine months ended September 30, 2022 from the comparable period in 2021.

Thermal barrier revenue was \$30.3 million for the nine months ended September 30, 2022 as compared to \$1.2 million for the nine months ended September 30, 2021. Thermal barrier revenue for the nine months ended September 30, 2022 included \$22.8 million and \$3.1 million to two major U.S. automotive OEMs, respectively, and \$4.0 million to a major Asian automotive OEM.

Cost of Revenue

	Nine Months Ended September 30,						Change	
	2022			2021				
	Amount	Percentage of Related Revenue	Percentage of Total Revenue	Amount	Percentage of Related Revenue	Percentage of Total Revenue	Amount	Percentage
(\$ in thousands)								
Cost of revenue:								
Energy industrial	\$ 79,360	88%	66%	\$ 74,030	83%	82%	\$ 5,330	7%
Thermal barrier	50,751	167%	42%	4,514	NM	5%	46,237	NM
Total cost of revenue	<u>\$ 130,111</u>	108%	108%	<u>\$ 78,544</u>	87%	87%	<u>\$ 51,567</u>	66%

Total cost of revenue increased \$51.5 million, or 66%, to \$130.1 million for the nine months ended September 30, 2022 from \$78.6 million in the comparable period in 2021. The increase in total cost of revenue was the result of increases in thermal barrier and energy industrial cost of revenue.

Energy industrial cost of revenue increased \$5.3 million, or 7%, to \$79.3 million for the nine months ended September 30, 2022 from \$74.0 million in the comparable period in 2021. The \$5.3 million increase was the result of a \$11.6 million increase in material costs from the comparable period in 2021 and a \$6.3 million decrease in manufacturing and other operating costs.

Thermal barrier cost of revenue increased \$46.2 million to \$50.7 million for the nine months ended September 30, 2022 as compared to \$4.5 million in the comparable period in 2021. The \$46.2 million increase was the result of a \$14.3 million increase in material costs and a \$31.9 million increase in manufacturing costs. The increase in material costs was the result of the increase in revenue volume from the comparable period in 2021. The increase in manufacturing costs was driven by increases in compensation and related costs of \$11.5 million and other operating and manufacturing costs of \$20.4 million.

Gross Profit

	Nine Months Ended September 30,				Change	
	2022		2021			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
(\$ in thousands)						
Gross profit:						
Energy industrial	\$ 11,044	12%	\$ 14,873	17%	\$ (3,829)	(26)%
Thermal barrier	(20,402)	(67)%	(3,270)	NM	(17,132)	NM
Total gross (loss) profit	<u>\$ (9,358)</u>	(8)%	<u>\$ 11,603</u>	13%	<u>\$ (20,961)</u>	(181)%

Gross profit decreased by \$20.9 million, or 181%, to \$(9.3) million for the nine months ended September 30, 2022 from \$11.6 million in the comparable period in 2021. The decrease in gross profit was the result of the \$51.5 million increase in total cost of revenue, offset, in part, by the \$30.6 million increase in total revenue. The decrease in gross profit reflects the increase in overhead costs and additional resources to support our expected higher run-rate revenue in future periods for both our energy industrial and thermal barrier products.

Research and Development Expenses

	Nine Months Ended September 30,				Change	
	2022		2021			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
			(\$ in thousands)			
Research and development expenses	\$ 12,733	11%	\$ 8,128	9%	\$ 4,605	57%

Research and development expenses increased by \$4.6 million, or 57%, to \$12.7 million for the nine months ended September 30, 2022 from \$8.1 million in the comparable period in 2021. The \$4.6 million increase reflects an increase in compensation and related costs of \$2.0 million, equipment and lease expenses of \$1.5 million and other research and development expenses of \$1.1 million.

Research and development expenses as a percentage of total revenue increased to 11% for the nine months ended September 30, 2022 from 9% in the comparable period in 2021.

Sales and Marketing Expenses

	Nine Months Ended September 30,				Change	
	2022		2021			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
			(\$ in thousands)			
Sales and marketing expenses	\$ 20,944	17%	\$ 11,784	13%	\$ 9,160	78%

Sales and marketing expenses increased by \$9.2 million, or 78%, to \$21.0 million for the nine months ended September 30, 2022 from \$11.8 million in the comparable period in 2021. The \$9.2 million increase was principally the result of increases in compensation and related costs of \$5.6 million, operating supplies expenses of \$1.2 million, marketing expenses of \$1.0 million, travel-related expenditures of \$0.8 million and other sales and marketing expenses of \$0.6 million.

Sales and marketing expenses as a percentage of total revenue increased to 17% for the nine months ended September 30, 2022 from 13% in the comparable period in 2021, due principally to the increase in compensation and related expenses associated with an increase in sales and business development personnel.

General and Administrative Expenses

	Nine Months Ended September 30,				Change	
	2022		2021			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
			(\$ in thousands)			
General and administrative expenses	\$ 26,544	22%	\$ 15,978	18%	\$ 10,566	66%

General and administrative expenses increased by \$10.6 million, or 66%, to \$26.6 million for the nine months ended September 30, 2022 from \$16.0 million in the comparable period in 2021. The \$10.6 million increase was the result of increases in compensation and related costs of \$5.2 million, operating and lease expenses of \$3.1 million, an increase in professional fees of \$1.0 million, an increase in legal fees of \$0.9 million and other general and administrative expenses of \$0.4 million.

General and administrative expenses as a percentage of total revenue increased to 22% for the nine months ended September 30, 2022 from 18% in the comparable period in 2021.

Gain on Extinguishment of Debt

On May 1, 2020, our wholly owned subsidiary, Aspen Aerogels Rhode Island, LLC, executed a note for an unsecured PPP loan of \$3.7 million pursuant to the CARES Act. On August 24, 2021, the SBA remitted \$3.7 million in principal and accrued interest after approving the Borrower's application for forgiveness of the PPP Loan. Accordingly, we recorded a total gain on the extinguishment of debt of \$3.7 million during the nine months ended September 30, 2021.

Interest Expense, net

	Nine Months Ended September 30,				Change	
	2022		2021		Amount	Percentage
	Amount	Percentage of Revenue	Amount	Percentage of Revenue		
	(\$ in thousands)					
Interest expense:						
Interest expense, related party	\$ (4,103)	(3)%	\$ —	\$ —	\$ (4,103)	NM
Interest income (expense), net	553	—	(188)	—	741	NM
Total interest expense, net	<u>\$ (3,550)</u>	<u>(3)%</u>	<u>\$ (188)</u>	<u>0%</u>	<u>\$ (3,362)</u>	<u>NM</u>

Interest expense, net increased by \$3.4 million to \$3.6 million for the nine months ended September 30, 2022 from \$0.2 million in the comparable period in 2021. The \$3.4 million increase was the result of interest relating to our Convertible Note.

Liquidity and Capital Resources

Overview

We have experienced significant losses and invested substantial resources since our inception to develop, commercialize and protect our aerogel technology and to build a manufacturing infrastructure capable of supplying aerogel products at the volumes and costs required by our customers. These investments have included research and development and other operating expenses, capital expenditures and investment in working capital balances.

Our long-term financial projections anticipate revenue growth, increasing levels of gross profit, and improved cash flows from operations. To meet expected growth in demand for our aerogel products in the electric vehicle market, we are planning to expand our aerogel blanket capacity by constructing a second manufacturing plant in Bulloch County, Georgia. We expect to build the second plant in two phases and have previously estimated a cost of approximately \$575.0 million for the first phase and approximately \$125.0 million for the second phase. However, as a result of cost inflation and supply chain challenges for this project, we are reviewing the plans, schedule and scope of the project in order to manage these potential cost drivers with the aim of keeping our capital expenditures on the second plant as close as possible to our prior estimates while still seeking to achieve our goal of having the first phase of the plant increase our annual revenue capacity by approximately \$650.0 million and the second phase by approximately \$700.0 million. Nonetheless, further cost inflation and/or supply chain disruptions, as well as potential changes in the scope of the facilities, could lead to increases to our prior estimates. We expect to have the first phase of the second plant operational in the first-half of 2024. In addition, we are constructing and planning to commence the operation of a state-of-the-art, thermal barrier fabrication operation in Monterrey, Mexico during 2022 in order to keep pace with the significant potential demand for our PyroThin thermal barriers.

We are also increasing our investment in the research and development of next-generation aerogel products and technologies. During 2022, we will continue to develop aerogel products and technologies for the electric vehicle market. We believe the commercial potential for our technology in the electric vehicle market is significant. To meet the anticipated revenue growth and take advantage of this market opportunity, we are adding personnel, incurring additional operating expenses, and planning to construct a carbon aerogel battery materials facility, among other items.

We have taken several actions during 2021 and 2022 to increase the financial resources available to support current operating requirements and capital expenditures. In June 2021, we sold 3,462,124 shares to an affiliate of Koch Strategic Platforms in a private placement of our common stock and received net proceeds of \$73.5 million after deducting fees and offering expenses of \$1.5 million. During 2021, we also sold shares of our common stock through our ATM offering program and received net proceeds of \$19.4 million.

In February 2022, we sold 1,791,986 shares to an affiliate of Koch Strategic Platforms in a private placement of our common stock and received net proceeds of \$49.9 million after deducting fees and offering expenses of \$0.1 million. In addition, in February 2022, we sold and issued to an affiliate of Koch \$100.0 million in aggregate principal amount of our Convertible Senior PIK Toggle Notes. During the nine months ended September 30, 2022, we sold 5,241,400 shares of our common stock through our ATM offering program and received net proceeds of \$72.7 million, after deducting commissions and estimated offering expenses payable by us.

We believe that our September 30, 2022 cash and cash equivalents balance of \$102.4 million and funds anticipated to be available under our revolving credit facility will be sufficient to support current operating requirements, current research and

development activities and the initial capital expenditures required to support the evolving commercial opportunities in the electric vehicle market and other strategic business opportunities.

However, we plan to supplement our cash balance and available credit with equity financings, debt financings, customer prepayments or technology licensing fees to provide the additional capital necessary to purchase the capital equipment, construct the new facilities and complete the aerogel capacity expansions required to support our evolving commercial opportunities and strategic business initiatives. We also intend to extend or replace our revolving credit facility with Silicon Valley Bank prior to its maturity. We believe that the consummation of equity financings could potentially result in an ownership change under Section 382 of the Internal Revenue Code. Such an ownership change would lead to the use of our net operating loss carryforwards being restricted. Our inability to use a substantial portion of our net operating loss carryforwards would result in a higher effective tax rate and adversely affect our financial condition and results of operations.

Primary Sources of Liquidity

Our principal sources of liquidity are currently our cash and cash equivalents and our revolving credit facility with Silicon Valley Bank. Cash and cash equivalents consist primarily of cash and money market accounts on deposit with banks. As of September 30, 2022, we had \$102.4 million of cash and cash equivalents.

On June 29, 2021, we sold 3,462,124 shares to an affiliate of Koch Strategic Platforms in a private placement of our common stock and received net proceeds of \$73.5 million after deducting fees and offering expenses of \$1.5 million.

In February 2022, we sold 1,791,986 shares to an affiliate of Koch Strategic Platforms in a private placement of our common stock and received net proceeds of \$49.9 million after deducting fees and offering expenses of \$0.1 million. In addition, in February 2022, we sold and issued to an affiliate of Koch \$100.0 million in aggregate principal amount of our Convertible Senior PIK Toggle Notes.

On March 16, 2022, we entered into a sales agreement for an ATM offering program with Cowen and Company, LLC and Piper Sandler & Co., as our sales agents. During the nine months ended September 30, 2022, we sold 5,241,400 shares of our common stock through the ATM offering program and received net proceeds of \$72.7 million, after deducting commissions and estimated offering expenses payable by us.

We have a prepayment balance of \$5.0 million associated with prepayments received pursuant to our supply agreement with BASF. On November 1, 2022, we repaid the outstanding BASF \$5.0 million prepayment liability.

We have maintained our revolving credit facility, as amended from time to time, with Silicon Valley Bank since March 2011. At various dates in 2021, and subsequently on March 31, 2022, April 28, 2022, June 23, 2022, and August 26, 2022, the Company entered into amendments to the Loan Agreement to revise certain financial covenants, among other things. On October 14, 2022, the Loan Agreement was amended to extend the maturity date of the revolving credit facility to December 1, 2022. We intend to extend or replace the facility prior to its maturity.

Under our revolving credit facility, we may borrow a maximum of \$20.0 million, subject to continued covenant compliance and borrowing base requirements. The interest rate applicable to borrowings under the revolving credit facility is based on the prime rate, as defined, subject to a minimum rate of 4.00% per annum. The rates applicable to borrowings vary from prime rate plus 0.75% per annum to prime rate plus 2.00% per annum. In addition, we are required to pay a monthly unused revolving line facility fee of 0.50% per annum of the average unused portion of the revolving credit facility.

As of September 30, 2022, we had no outstanding borrowings under our revolving credit facility and \$1.3 million of outstanding letters of credit secured by the revolving credit facility.

Under the revolving credit facility, we are required to comply with both non-financial and financial covenants, including minimum Adjusted EBITDA and Adjusted Quick Ratio covenants, as defined in the loan agreement. As of September 30, 2022, we were in compliance with all such covenants.

The amount available to us under the revolving credit facility as of September 30, 2022 was \$13.3 million after giving effect to the \$1.3 million of letters of credit outstanding.

Analysis of Cash Flow

Net Cash Used in Operating Activities

During the nine months ended September 30, 2022, we used \$70.3 million in net cash in operating activities, as compared to the use of \$6.6 million in net cash during the comparable period in 2021, an increase in the use of cash of \$63.7 million. This increase in use of cash was the result of increases in net loss adjusted for non-cash items of \$40.6 million and in net cash used by changes in operating assets and liabilities of \$23.1 million.

Net Cash Used in Investing Activities

Net cash used in investing activities is for capital expenditures for machinery and equipment principally to improve the throughput, efficiency and capacity of our East Providence facility and engineering designs for the planned aerogel manufacturing facility in Bulloch County, Georgia. Net cash used in investing activities for the nine months ended September 30, 2022 and 2021 was \$119.3 million and \$6.1 million, respectively.

Net Cash Provided by Financing Activities

Net cash provided by financing activities for the nine months ended September 30, 2022 totaled \$215.5 million and consisted of \$99.8 million in net proceeds from the issuance of convertible debt, \$49.9 million in net proceeds from the private placement of our common stock, \$72.7 million in net proceeds from the ATM offering program, and less than \$0.2 million in proceeds from employee stock option exercises, offset, in part, by \$4.7 million in cash used for repayments of a prepayment liability and \$2.4 million in cash used for payments made for employee tax withholdings associated with the vesting of restricted stock units.

Net cash provided by financing activities for the nine months ended September 30, 2021 totaled \$91.7 million and consisted of \$73.5 million in net proceeds from the Private Placement, \$19.4 million in net proceeds from the ATM offering program, and \$1.5 million in proceeds from employee stock option exercises, offset, in part, by \$2.7 million in cash used for payments made for employee tax withholdings associated with the vesting of restricted stock units.

Contractual Obligations and Commitments

There have been no material changes to our contractual obligations and commitments as reported in our Annual Report.

Recent Accounting Pronouncements

Information regarding new accounting pronouncements is included in note 2 to our unaudited consolidated financial statements contained in Item 1 of this Quarterly Report on Form 10-Q.

Critical Accounting Policies and Estimates

Our financial statements are prepared in accordance with U.S. GAAP. The preparation of our financial statements and related disclosures requires us to make estimates, assumptions and judgments that affect the reported amount of assets, liabilities, revenue, costs and expenses and related disclosures. We believe that the estimates, assumptions and judgments involved in these accounting policies have the greatest potential impact on our financial statements and, therefore, we consider these to be our critical accounting policies. Accordingly, we evaluate our estimates and assumptions on an ongoing basis. Our actual results may differ from these estimates under different assumptions and conditions. See our Annual Report and note 2 to our consolidated financial statements included elsewhere in this Quarterly Report on Form 10-Q for information about these critical accounting policies, as well as a description of our other significant accounting policies.

Certain Factors That May Affect Future Results of Operations

The SEC encourages companies to disclose forward-looking information so that investors can better understand a company's future prospects and make informed investment decisions. This Quarterly Report on Form 10-Q contains such "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995. These statements involve known and unknown risks, uncertainties and other important factors, which may cause our actual results, performance or achievements to be

materially different from any future results, performances or achievements expressed or implied by the forward-looking statements. Forward-looking statements include, but are not limited to, statements about: the expected future growth of the market for our aerogel products and our continued gain in market share, in particular in the electric vehicle market, the energy infrastructure insulation market, the lithium-ion battery thermal barrier markets, and other markets we target; our beliefs in the appropriateness of our assumptions, the accuracy of our estimates regarding expenses, loss contingencies, future revenues, future profits, uses of cash, available credit, capital requirements, and the need for additional financing to operate our business, including to complete the planned construction and development of our second manufacturing facility in Bulloch County, Georgia, or fabrication operations in Monterrey, Mexico, and to fund our planned strategic business initiatives; the performance of our aerogel blankets; our expectation that we will be successful in obtaining, enforcing and defending our patents against competitors and that such patents are valid and enforceable; our belief that our products possess strong competitive advantages over traditional insulation materials, including the superior thermal performance and the thin, easy-to-use and durable blanket form of our products; our expectations regarding the investment to open a second manufacturing facility in Georgia and the anticipated job creation as a result thereof; the anticipated capacity expansion as a result of the planned second manufacturing facility in Georgia and the expected commencement of production; our estimates of annual production capacity; our plans regarding the future capacity expansion, including the selection of a manufacturing site and the construction and operation of the facility; our ability to obtain approvals and terms that are acceptable to move forward with the construction of a facility in the southeastern U.S. on a timely basis, or at all; beliefs about the role of our technology and products in the electric vehicle market; beliefs about the commercial potential for our technology in the electric vehicle market; beliefs about our ability to produce and deliver products to electric vehicle customers; beliefs about Aspen's contracts with the major U.S. automotive manufacturer; beliefs about the potential for the major U.S. automotive manufacturer to become a significant customer for Aspen's products; beliefs about revenue, costs, expenses, profitability, investments or cash flow associated with the contracts with the major U.S. automotive manufacturer; our expectations about the size and timing of awarded business in the electric vehicle market, future revenues and profit margins, arising from our supply relationship and contract with automotive OEMs and our ability to win more business and increase revenue in the electric vehicle market; beliefs about the performance of our thermal barrier products in the battery systems of electric vehicles; beliefs about the potential commercial opportunity for Aspen's thermal barrier products; the current or future trends in the energy, energy infrastructure, chemical and refinery, LNG, sustainable building materials, electric vehicle thermal barrier, electric vehicle battery materials or other markets and the impact of these trends on our business; our investments in the electric vehicle market and aerogel technology platform; our beliefs about the usefulness of the square foot operating metric; our beliefs about the financial metrics that are indicative of our core performance; our beliefs about the usefulness of our presentation of Adjusted EBITDA; our expectations about the effect of manufacturing capacity on financial metrics such as Adjusted EBITDA; our expectations about future revenues, expenses, gross profit, net loss, loss per share and Adjusted EBITDA, sources and uses of cash, capital requirements and the sufficiency of our existing cash balance and available credit; our beliefs about the outcome, effects or estimated costs of current or potential litigation or their respective timing, including expected legal expense in connection with our patent enforcement actions; our plans to devote substantial resources to the development of new aerogel technology; our expectations about product mix; our expectations about future material costs and manufacturing expenses as a percentage of revenue; our expectations of future gross profit and the effect of manufacturing expenses, manufacturing capacity and productivity on gross profit; our expectations about our resources and other investments in new technology and related research and development activities and associated expenses; our expectations about short and long term (a) research and development (b) general and administrative and (c) sales and marketing expenses; our expectations of revenue growth, increased gross profit, and improving cash flows over the long term; our intentions about managing capital expenditures and working capital balances; our expectation of completing construction and commissioning of phase one of our planned second plant by the first half of 2024 and our ability to do so at a cost consistent with our prior estimates; our expectations about future product revenue and demand for our products; our expectations about the effect of stock-based compensation on various costs and expenses; our expectations about potential sources of future financing; our beliefs about the impact of accounting policies on our financial statements; our beliefs about the effect of interest rates, inflation and foreign currency fluctuations on our results of operations and financial condition; our beliefs about the expansion of our international operations, including in Mexico; our statements about the impact of major public health concerns, including the COVID-19 pandemic or other pandemics arising globally, and the future, and currently unknown extent of, the impact of the COVID-19 pandemic on our business and operations; and our statements about the sufficiency of our current and future actions to address the impact of the COVID-19 pandemic on our business and operations, including our future revenue, Adjusted EBITDA and other financial metrics.

Words such as “may,” “will,” “anticipate,” “estimate,” “expects,” “projects,” “intends,” “plans,” “believes” and words and terms of similar substance used in connection with any discussion of future operating or financial performance, identify forward-looking statements. All forward-looking statements are management's present expectations of future events and are subject to a number of risks and uncertainties that could cause actual results to differ materially and adversely from those described in the forward-looking statements. These risks include, but are not limited to, those set forth in this Quarterly Report on Form 10-Q and under the heading “Risk Factors” contained in Item 1A of our Annual Report.

In light of these assumptions, risks and uncertainties, the results and events discussed in the forward-looking statements contained in this Quarterly Report on Form 10-Q might not occur. Stockholders and other readers are cautioned not to place undue

reliance on the forward-looking statements, which speak only as of the date of this Quarterly Report on Form 10-Q. We are not under any obligation, and we expressly disclaim any obligation, to update or alter any forward-looking statements, whether as a result of new information, future events or otherwise. All subsequent forward-looking statements attributable to Aspen Aerogels, Inc. or to any person acting on its behalf are expressly qualified in their entirety by the cautionary statements contained or referred to in this section.

Item 3. Quantitative and Qualitative Disclosures About Market Risk.

Market risk represents the risk of loss that may impact our financial position due to adverse changes in financial market prices and rates. Our market risk exposure results primarily from fluctuations in interest rates as well as from inflation. In the normal course of business, we are exposed to market risks, including changes in interest rates which affect our line of credit under our revolving credit facility as well as cash flows. We may also face additional exchange rate risk in the future as we expand our business internationally.

Interest Rate Risk

We are exposed to changes in interest rates in the normal course of our business. As of September 30, 2022, we had unrestricted cash and cash equivalents of \$102.4 million. These amounts were held for working capital and capital expansion purposes and were invested primarily in deposit accounts, money market accounts, and high-quality debt securities issued by the U.S. government via cash sweep accounts at a major financial institution in North America. Due to the short-term nature of these investments, we believe that our exposure to changes in the fair value of our cash as a result of changes in interest rates is not material.

As of September 30, 2022, we had a convertible note outstanding with principal balance of \$102.9 million. Our convertible note bears interest at the Secured Overnight Financing Rate (SOFR) plus 5.50% per annum if interest is paid in cash, or, if interest is paid in-kind as an increase in the principal amount of the outstanding note, at the SOFR plus 6.50% per annum. Under the terms of the investment, SOFR has a floor of 1% and a cap of 3%. Interest is paid semi-annually in arrears on June 30 and December 30. We, at our option, are permitted to settle each semi-annual interest payment in cash, in-kind, or any combination thereof.

As of September 30, 2022, we had no borrowings outstanding on our revolving credit facility. As of September 30, 2022, we had \$1.3 million of outstanding letters of credit supported by the revolving credit facility.

Under our revolving credit facility, we are permitted to borrow a maximum of \$20.0 million, subject to continued covenant compliance and borrowing base requirements. The interest rate applicable to borrowings under the revolving credit facility is based on the prime rate, as defined, subject to a minimum rate of 4.00% per annum. The rates applicable to borrowings vary from prime rate plus 0.75% per annum to prime rate plus 2.00% per annum. In addition, we are required to pay a monthly unused revolving line of credit facility fee of 0.5% per annum of the average unused portion of the revolving credit facility. The maturity date of our revolving credit facility is December 1, 2022. We intend to extend or replace the facility prior to its maturity.

As of September 30, 2022, the amount available to us under the revolving credit facility was \$13.3 million after giving effect to the \$1.3 million of letters of credit outstanding under the facility.

Inflation Risk

Although we expect that our operating results will be influenced by general economic conditions, we do not believe that inflation has had a material effect on our results of operations during the periods presented in this report. However, our business may be affected by inflation in the future.

Foreign Currency Exchange Risk

We are subject to inherent risks attributed to operating in a global economy. Principally all our revenue, receivables, purchases and debts are denominated in U.S. dollars.

Item 4. Controls and Procedures.

(a) Evaluation of Disclosure Controls and Procedures.

We maintain disclosure controls and procedures that are designed to ensure that information required to be disclosed in the reports that we file or submit under the Securities Exchange Act of 1934, as amended (the Exchange Act), is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms and is accumulated and communicated to our management, including our principal executive officer and principal financial officer, or persons performing similar functions, as appropriate to allow timely decisions regarding required disclosure.

As of September 30, 2022, our management, with the participation of our principal executive officer and principal financial officer, evaluated the effectiveness of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act). Our management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives, and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures.

In May 2022 we began the implementation of a new enterprise resource planning ("ERP") system. As part of the implementation plan, management has considered the impact of the new ERP system on its operations and internal controls structure. During the quarter ended September 30, 2022 management performed assessments of the conversion, including an analysis to determine if the access and privileges granted to users were appropriately segregated. As a result of these assessments, we identified the following control deficiencies:

- (1) we did not design and implement effective user access controls to adequately restrict user access and the ability to modify financial data within the ERP system; and
- (2) we did not design and implement effective change management controls to monitor the appropriateness of changes made to the configurations of automated controls during the implementation period and the initial launch support.

These control deficiencies did not result in a known misstatement of the Company's interim financial statements. However, these control deficiencies could have resulted in material misstatements in our interim financial statements and disclosures which then may not have been prevented or detected. Therefore, management has concluded that these control deficiencies in aggregate constituted a material weakness in our control over financial reporting. A "material weakness" is a deficiency, or a combination of deficiencies, in internal control over financial reporting such that there is a reasonable possibility that a material misstatement of our annual or interim financial statements will not be prevented or detected on a timely basis.

In order to remediate the identified material weakness and enhance our internal controls, during the quarter ended September 30, 2022 we adjusted access and privileges to provide for appropriate segregation of duties in the performance of internal controls over financial reporting. We also designed and implemented monitoring controls to detect changes within the system which would impact financial reporting. As a result of these steps, management concluded that the material weakness was remediated as of September 30, 2022. Consequently, management, including our principal executive officer and principal financial officer, concluded that the Unaudited Consolidated Financial Statements included in this Quarterly Report on Form 10-Q were prepared in accordance with U.S. GAAP and fairly present in all material respects the Company's financial condition, results of operations and cash flow for the periods presented.

Based on such evaluation and the remediation of the material weakness, our principal executive officer and principal financial officer have concluded that, as of September 30, 2022, our disclosure controls and procedures were effective to ensure that information required to be disclosed by us in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms, and is accumulated and communicated to our management, including our principal executive officer and principal financial officer, or persons performing similar functions, as appropriate to allow timely decisions regarding required disclosure.

(b) Changes in Internal Controls.

During the nine months ended September 30, 2022, there were no changes in our internal control over financial reporting, as such term is defined in Rules 13a-15(f) and 15d-15(f) promulgated under the Exchange Act, that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting, other than those discussed in Item 4.(a).

PART II — OTHER INFORMATION

Item 1. Legal Proceedings.

We are involved in various legal claims and proceedings in the normal course of operations. We believe the outcome of these matters will not have a material adverse effect on our consolidated financial position, results of operations or liquidity, except as described in Part 1, Item 3. “Legal Proceedings” of our Annual Report on Form 10-K. Since the filing of our Form 10-K, there have been no material changes in our legal proceedings from those disclosed therein.

Item 1A. Risk Factors.

The ownership of our common stock involves a number of risks and uncertainties. When evaluating the Company and our business before making an investment decision regarding our securities, potential investors should carefully consider the risk factors and uncertainties described in Part 1, Item 1A. “Risk Factors” of our Annual Report on Form 10-K. Since the filing of our Form 10-K, there have been no material changes in our risk factors from those disclosed therein, other than in our Quarterly Report on Form 10-Q for the quarterly period ended June 30, 2022 and as provided below.

Because we are a public company, we are obligated to develop and maintain proper and effective internal control over financial reporting. If our internal controls over financial reporting are determined to be ineffective, or if our auditors are otherwise unable to attest to their effectiveness, investor confidence in our company, and our common stock price, may be adversely affected.

Pursuant to Section 404a of the Sarbanes-Oxley Act, we have furnished a report by management on the effectiveness of our internal control over financial reporting for the fiscal year ended December 31, 2021 and will continue to do so in each year thereafter. This assessment is required to include disclosure of any material weaknesses identified by our management in our internal control over financial reporting. Our independent registered public accounting firm is required to formally attest to the effectiveness of our internal control over financial reporting for the year ended December 31, 2019 and subsequent years.

We continue to assess our system of internal controls over financial reporting and successfully completed documentation necessary to perform the annual evaluation required to comply with Section 404. In future periods, we may discover, and not be able to remediate timely, significant deficiencies or material weaknesses. During the evaluation and testing process in 2021, we did not identify any material weaknesses in our internal controls over financial reporting. During the quarter ended September 30, 2022 management performed assessments of our recently implemented enterprise resource planning (“ERP”) system, including an analysis to determine if the access and privileges granted to users were appropriately segregated. As a result of these assessments, we identified the following control deficiencies: (1) we did not design and implement effective user access controls to adequately restrict user access and the ability to modify financial data within the ERP system; and (2) we did not design and implement effective change management controls to monitor the appropriateness of changes made to the configurations of automated controls during the implementation period and the initial launch support. These control deficiencies did not result in a known misstatement of the Company’s interim financial statements. However, these control deficiencies could have resulted in material misstatements in our interim financial statements and disclosures which then may not have been prevented or detected. Therefore, management has concluded that these control deficiencies in aggregate constituted a material weakness in our control over financial reporting. A “material weakness” is a deficiency, or a combination of deficiencies, in internal control over financial reporting such that there is a reasonable possibility that a material misstatement of our annual or interim financial statements will not be prevented or detected on a timely basis. In order to remediate the identified control deficiencies and enhance our internal control, during the quarter ended September 30, 2022 we adjusted accesses and privileges to provide for appropriate segregation of duties in the performance of internal controls over financial reporting. We also designed and implemented monitoring controls to detect changes within the system which would impact financial reporting. As a result of these steps, management concluded that the material weakness was remediated as of September 30, 2022.

In future periods, if we were to identify one or more material weaknesses in our internal control, we may be unable to assert that our internal controls are effective. If we are unable to assert that our internal controls over financial reporting are effective, we could lose investor confidence in the accuracy and completeness of our financial reports or it could cause us to fail to meet our reporting obligations, which could have a material adverse effect on the price of our common stock. In addition, any failure to comply with Section 404 could subject us to a variety of administrative sanctions, including SEC action, ineligibility for short form resale registration, the suspension or delisting of our common stock from The New York Stock Exchange, and the inability of registered broker-dealers to make a market in our common stock, which would further reduce our stock price and could harm our business.

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

(a) Unregistered Sales of Equity Securities.

None.

(b) Use of Proceeds from Initial Public Offering of Common Stock.

Not applicable.

(c) Purchases of Equity Securities by the Issuer and Affiliated Purchasers.

We did not repurchase any of our equity securities during the quarter ended September 30, 2022.

Item 3. Defaults Upon Senior Securities.

None.

Item 4. Mine Safety Disclosures.

Not applicable.

Item 5. Other Information.

None.

Item 6. Exhibits.

(a) Exhibits

- 10.1 [Sixth Amendment to the Second Amended and Restated Loan and Security Agreement, dated as of August 26, 2022, by and between the Registrant and Silicon Valley Bank.](#)
- 10.2 [Seventh Amendment to the Second Amended and Restated Loan and Security Agreement, dated as of October 14, 2022, by and between the Registrant and Silicon Valley Bank.](#)
- 31.1 [Certification of principal executive officer under Section 302\(a\) of the Sarbanes-Oxley Act of 2002.](#)
- 31.2 [Certification of principal financial officer under Section 302\(a\) of the Sarbanes-Oxley Act of 2002.](#)
- 32 [Certifications of the principal executive officer and the principal financial officer under Section 906 of the Sarbanes-Oxley Act of 2002.](#)
- 101.INS XBRL Instance Document - the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.
- 101.SCH Inline XBRL Taxonomy Extension Schema Document.
- 101.CAL Inline XBRL Taxonomy Extension Calculation Linkbase Document.
- 101.DEF Inline XBRL Taxonomy Extension Definition Linkbase Document.
- 101.LAB Inline XBRL Taxonomy Extension Label Linkbase Document.
- 101.PRE Inline XBRL Taxonomy Extension Presentation Linkbase Document.
- 104 Cover Page Interactive Data File (embedded within the Inline XBRL document).

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.

ASPEN AEROGELS, INC.

Date: November 7, 2022

By: /s/ Donald R. Young
Donald R. Young
President and Chief Executive Officer
(principal executive officer)

Date: November 7, 2022

By: /s/ Ricardo C. Rodriguez
Ricardo C. Rodriguez
Senior Vice President, Chief Financial Officer and Treasurer
(principal financial officer and principal accounting officer)

**SIXTH AMENDMENT
TO
SECOND AMENDED AND RESTATED LOAN AND SECURITY AGREEMENT**

This Sixth Amendment to Second Amended and Restated Loan and Security Agreement (this “**Amendment**”) is entered into this 26th day of August, 2022 by and between **SILICON VALLEY BANK** (“**Bank**”) and **ASPEN AEROGELS, INC.**, a Delaware corporation (“**Borrower**”) whose address is 30 Forbes Road, Building B, Northborough, Massachusetts 01532.

RECITALS

A. Bank and Borrower have entered into that certain Second Amended and Restated Loan and Security Agreement dated as of March 12, 2021, as amended by that certain First Amendment to Second Amended and Restated Loan and Security Agreement dated September 29, 2021, as further amended by that certain Second Amendment to Second Amended and Restated Loan and Security Agreement dated December 27, 2021, as further amended by that certain Third Amendment to Second Amended and Restated Loan and Security Agreement dated March 31, 2022, as further amended by that certain Fourth Amendment to Second Amended and Restated Loan and Security Agreement dated April 28, 2022, and as further amended by that certain Fifth Amendment to Second Amended and Restated Loan and Security Agreement dated June 23, 2022 (as the same may from time to time be further amended, restated, amended and restated, modified and/or supplemented, the “**Loan Agreement**”).

B. Bank has extended credit to Borrower for the purposes permitted in the Loan Agreement.

C. Borrower has requested that Bank amend the Loan Agreement to make certain revisions to the Loan Agreement as more fully set forth herein.

D. Bank has agreed to so amend certain provisions of the Loan Agreement, but only to the extent, in accordance with the terms, subject to the conditions and in reliance upon the representations and warranties set forth below.

AGREEMENT

NOW, THEREFORE, in consideration of the foregoing recitals and other good and valuable consideration, the receipt and adequacy of which is hereby acknowledged, and intending to be legally bound, the parties hereto agree as follows:

1. Definitions. Capitalized terms used but not defined in this Amendment shall have the meanings given to them in the Loan Agreement.

2. Amendments to Loan Agreement.

2.1 Section 6.9 (Financial Covenants). Section 6.9(a) is hereby deleted in its entirety and replaced with the following:

“(a) [Reserved].”

2.2 Section 13 (Definitions). The following terms and their respective definitions set forth in Section 13.1 are deleted in their entirety and replaced with the following:

“**“Borrowing Base”** is (a) eighty percent (80%) of Eligible Accounts, plus (b) eighty percent (80%) of Eligible Foreign Accounts (provided, however, Eligible Foreign Accounts that are billed in a Foreign Currency shall have an advance rate of seventy percent (70%)); provided, that, the availability under this subsection (b) plus the availability under subsection (c) below shall not exceed seventy-five percent (75%) of the Borrowing Base, plus (c) (i) when a Streamline Period is

not in effect, the lesser of eighty percent (80%) of Eligible Specified Accounts or One Million Dollars (\$1,000,000) and (ii) during a Streamline Period, eighty percent (80%) of Eligible Specified Accounts (and with respect to subsections (c)(i) and (c)(ii) hereof, when added to the availability under subsection (b) above, in each case subject to the overall cap set forth in subsection (b) above), as determined by Bank from Borrower's most recent Borrowing Base Report (and as may subsequently be updated by Bank in Bank's sole discretion based upon information received by Bank including, without limitation, Accounts that are paid and/or billed following the date of the Borrowing Base Report); provided, however, that Bank may decrease the foregoing amounts and percentages in its good faith business judgment based on events, conditions, contingencies, or risks which, as determined by Bank, may adversely affect the Collateral."

" **"Revolving Line Maturity Date"** is October 15, 2022."

2.3 Section 13 (Definitions). The following new defined terms are hereby inserted alphabetically in Section 13.1:

" **"Sixth Amendment Effective Date"** is August 26, 2022."

2.4 Section 13 (Definitions). The following defined terms set forth in Section 13.1 are deleted in their entirety:

" **"EBITDA"** shall mean (a) Net Income, plus (b) Interest Expense, plus (c) to the extent deducted in the calculation of Net Income, depreciation expense and amortization expense, plus (d) income tax expense, plus (e) non-cash stock compensation, plus (f) one-time non-recurring expenses approved by the Bank in its sole discretion."

" **"Interest Expense"** means for any fiscal period, interest expense (whether cash or non-cash) determined in accordance with GAAP for the relevant period ending on such date, including, in any event, interest expense with respect to any Credit Extension and other Indebtedness of Borrower and its Subsidiaries, including, without limitation or duplication, all commissions, discounts, or related amortization and other fees and charges with respect to letters of credit and bankers' acceptance financing and the net costs associated with interest rate swap, cap, and similar arrangements, and the interest portion of any deferred payment obligation (including leases of all types)."

" **"Net Income"** means, as calculated on a consolidated basis for Borrower and its Subsidiaries for any period as at any date of determination, the net profit (or loss), after provision for taxes, of Borrower and its Subsidiaries for such period taken as a single accounting period."

2.5 Exhibit B (Compliance Certificate). The Compliance Certificate attached to the Loan Agreement as Exhibit B is amended in its entirety and replaced with the Compliance Certificate in the form of Exhibit B attached hereto.

3. Limitation of Amendments.

3.1 The amendments set forth in Section 2 above are effective for the purposes set forth herein and shall be limited precisely as written and shall not be deemed to (a) be a consent to any amendment, waiver or modification of any other term or condition of any Loan Document, or (b) otherwise prejudice any right or remedy which Bank may now have or may have in the future under or in connection with any Loan Document.

3.2 This Amendment shall be construed in connection with and as part of the Loan Documents and all terms, conditions, representations, warranties, covenants and agreements set forth in the Loan Documents, except as herein amended, are hereby ratified and confirmed and shall remain in full force and effect.

4. Representations and Warranties. To induce Bank to enter into this Amendment, Borrower hereby represents and warrants to Bank as follows:

4.1 Immediately after giving effect to this Amendment (a) the representations and warranties contained in the Loan Documents are true, accurate and complete in all material respects as of the date hereof (except to the extent such representations and warranties relate to an earlier date, in which case they are true and correct as of such date), and (b) no Event of Default has occurred and is continuing;

4.2 Borrower has the power and authority to execute and deliver this Amendment and to perform its obligations under the Loan Agreement, as amended by this Amendment;

4.3 The organizational documents of Borrower delivered to Bank on the Effective Date remain true, accurate and complete and have not been amended, supplemented or restated and are and continue to be in full force and effect;

4.4 The execution and delivery by Borrower of this Amendment and the performance by Borrower of its obligations under the Loan Agreement, as amended by this Amendment, have been duly authorized;

4.5 The execution and delivery by Borrower of this Amendment and the performance by Borrower of its obligations under the Loan Agreement, as amended by this Amendment, do not and will not contravene (a) any law or regulation binding on or affecting Borrower, (b) any contractual restriction with a Person binding on Borrower, (c) any order, judgment or decree of any court or other governmental or public body or authority, or subdivision thereof, binding on Borrower, or (d) the organizational documents of Borrower;

4.6 The execution and delivery by Borrower of this Amendment and the performance by Borrower of its obligations under the Loan Agreement, as amended by this Amendment, do not require any order, consent, approval, license, authorization or validation of, or filing, recording or registration with, or exemption by any governmental or public body or authority, or subdivision thereof, binding on Borrower, except as already has been obtained or made; and

4.7 This Amendment has been duly executed and delivered by Borrower and is the binding obligation of Borrower, enforceable against Borrower in accordance with its terms, except as such enforceability may be limited by bankruptcy, insolvency, reorganization, liquidation, moratorium or other similar laws of general application and equitable principles relating to or affecting creditors' rights.

5. Ratification of Perfection Certificate. Borrower hereby ratifies, confirms and reaffirms, all and singular, in all material respects, the terms and disclosures contained in a certain Perfection Certificate dated as of March 12, 2021, and acknowledges, confirms and agrees that the disclosures and information Borrower provided to Bank in such Perfection Certificate as updated by Annex 1, have not changed, as of the date hereof.

6. No Defenses of Borrower. Borrower hereby acknowledges and agrees that Borrower has no offsets, defenses, claims, or counterclaims against Bank with respect to the Obligations, or otherwise, and that if Borrower now has, or ever did have, any offsets, defenses, claims, or counterclaims against Bank, whether known or unknown, at law or in equity, all of them are hereby expressly WAIVED and Borrower hereby RELEASES Bank from any liability thereunder.

7. Integration. This Amendment and the Loan Documents represent the entire agreement about this subject matter and supersede prior negotiations or agreements. All prior agreements, understandings, representations, warranties, and negotiations between the parties about the subject matter of this Amendment and the Loan Documents merge into this Amendment and the Loan Documents.

8. Counterparts. This Amendment may be executed in any number of counterparts and all of such counterparts taken together shall be deemed to constitute one and the same instrument. Each party hereto may execute this Amendment by electronic means and recognizes and accepts the use of electronic signatures and records by any other party hereto in connection with the execution and storage hereof.

9. Fees and Expenses. Borrower's payment of a fully-earned, non-refundable extension fee in an amount equal to Twenty-Five Thousand Dollars (\$25,000.00). Borrower agrees to promptly pay Bank, upon receipt of an invoice, Bank's legal fees and expenses incurred in connection with this Amendment.

10. Effectiveness. As a condition precedent to the effectiveness of this Amendment and the Bank's obligation to make further Advances under the Revolving Line, the Bank shall have received the following documents prior to or concurrently with this Amendment, each in form and substance reasonably satisfactory to Bank:

10.1 this Amendment duly executed on behalf of Borrower;

10.2 the Acknowledgment of Amendment and Reaffirmation of Guaranty substantially in the form attached hereto as **Schedule 1**, duly executed and delivered by Guarantor; and

10.3 such other documents as Bank may reasonably request.

[Signature page follows.]

IN WITNESS WHEREOF, the parties hereto have caused this Amendment to be duly executed and delivered as of the date first written above.

BANK		BORROWER
SILICON VALLEY BANK		ASPEN AEROGELS, INC.
By: /s/ Krista Alexon		By: /s/ Ricardo C. Rodriguez
Name: Krista Alexon		Name: Ricardo C. Rodriguez
Title: Vice President		Title: Senior Vice President, Chief Financial Officer and Treasurer

**ACKNOWLEDGMENT OF AMENDMENT
AND REAFFIRMATION OF GUARANTY AND SECURITY AGREEMENT**

Section 1. Guarantor hereby acknowledges and confirms that it has reviewed and approved the terms and conditions of the Sixth Amendment to Second Amended and Restated Loan and Security Agreement dated as of the date hereof (“the “**Amendment**”).

Section 2. Guarantor hereby consents to the Amendment and agrees that the Guaranty and Guarantor Security Agreement relating to the Obligations of Borrower under the Loan Agreement shall continue in full force and effect, shall be valid and enforceable and shall not be impaired or otherwise affected by the execution of the Amendment or any other document or instruction delivered in connection herewith.

Section 3. Guarantor represents and warrants that, after giving effect to the Amendment, all representations and warranties contained in the Guaranty are true, accurate and complete as if made the date hereof.

Dated as of August 26, 2022

[Signature Page Follows]

GUARANTOR:		ASPEN AEROGELS RHODE ISLAND, LLC
		By: /s/ Ricardo C. Rodriguez
		Name: Ricardo C. Rodriguez
		Title: Senior Vice President, Chief Financial Officer and Treasurer

EXHIBIT B**COMPLIANCE CERTIFICATE**

TO: SILICON VALLEY BANK Date:
 FROM: ASPEN AEROGELS, INC.

The undersigned authorized officer of Aspen Aerogels, Inc. ("**Borrower**") certifies that under the terms and conditions of the Amended and Restated Loan and Security Agreement between Borrower and Bank (as amended and in effect, the "**Agreement**"), (1) Borrower is in complete compliance for the period ending _____ with all required covenants except as noted below, (2) there are no Events of Default, (3) all representations and warranties in the Agreement are true and correct in all material respects on this date except as noted below; provided, however, that such materiality qualifier shall not be applicable to any representations and warranties that already are qualified or modified by materiality in the text thereof; and provided, further that those representations and warranties expressly referring to a specific date shall be true, accurate and complete in all material respects as of such date, (4) Borrower, and each of its Subsidiaries, has timely filed all required tax returns and reports, and Borrower has timely paid all foreign, federal, state and local taxes, assessments, deposits and contributions owed by Borrower except as otherwise permitted pursuant to the terms of Section 5.9 of the Agreement, and (5) no Liens have been levied or claims made against Borrower or any of its Subsidiaries, if any, relating to unpaid employee payroll or benefits of which Borrower has not previously provided written notification to Bank. Attached are the required documents supporting the certification. The undersigned certifies that these are prepared in accordance with GAAP consistently applied from one period to the next except as explained in an accompanying letter or footnotes. The undersigned acknowledges that no borrowings may be requested at any time or date of determination that Borrower is not in compliance with any of the terms of the Agreement, and that compliance is determined not just at the date this certificate is delivered. Capitalized terms used but not otherwise defined herein shall have the meanings given them in the Agreement.

e indicate compliance status by circling Yes/No under "Complies" column.

<u>Reporting Covenant</u>	<u>Required</u>	<u>Complies</u>
Monthly financial statements with Compliance Certificate	Monthly within 30 days	Yes No
Quarterly financial statements with Compliance Certificate	Quarterly within 45 days	Yes No
Annual financial statement (CPA Audited)	FYE within 150 days	Yes No
SEC 10-K and 8-K	Within 5 days after filing with SEC	Yes No
Operating & A/P Agings, and Deferred Revenue reports	Monthly within 20 days	Yes No
Operating Base Reports	15 th and last Business Day of each month (monthly within 20 days when a Streamline Period is in effect) and with each request for a Credit Extension;	Yes No
Other actions	FYE within 30 days	Yes No

<u>Financial Covenant</u>	<u>Required</u>	<u>Actual</u>	<u>Complies</u>
Maintain as indicated:			
Minimum Adjusted Quick Ratio	1.20 to 1.00	to 1.00	Yes No

*See Section 6.9

<u>Performance Pricing</u>	<u>Applies</u>
Adjusted Quick Ratio at least 1.50:1.00	Prime + 0.75% (Eligible Accounts) or Prime + 1.25% (Eligible Foreign Accounts);

asted Quick Ratio less than 1.50:1.00	Prime + 1.50% (Eligible Accounts); Prime + 2.00% (Eligible Foreign Accounts)	Yes No
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The following financial covenant analyses and information set forth in Schedule 1 attached hereto are true and accurate as of the date of this Certificate.

The following are the exceptions with respect to the certification above: (If no exceptions exist, state “No exceptions to note.”)

ASPEN AEROGELS, INC.

BANK USE ONLY

By:
Name:
Title:

Received by: _____
AUTHORIZED SIGNER
Date: _____
Verified: _____
AUTHORIZED SIGNER
Date: _____
Compliance Status: Yes No

Schedule 1 to Compliance Certificate

Financial Covenants of Borrower

In the event of a conflict between this Schedule and the Loan Agreement, the terms of the Loan Agreement shall govern.

I. Adjusted Quick Ratio (Section 6.9(b))

Required: Borrower shall maintain at all times, to be tested as of the last day of each month,
an Adjusted Quick Ratio of at least 1.20 to 1.00.

Actual:

A.	Unrestricted cash maintained with Bank	\$
B.	Accounts receivable net of allowance for doubtful accounts	\$
C.	Quick Assets (line II.A. plus line II.B.)	\$
D.	All Obligations and liabilities of Borrower owed to Bank	\$
E.	Without duplication of line II.D., the aggregate amount of Borrower's Total Liabilities that mature within one (1) year	\$
F.	Current Liabilities (line II.D. plus line II.E.)	\$
G.	Current portion of Deferred Revenue	\$
H.	Current portion of the PPP Forgivable Amount	\$
I.	Current portion of any Pre-Payment Balance or any other prepayment amount under the Supply Agreement	\$
J.	Dollar Equivalent amount of all outstanding Letters of Credit	\$
K.	Amount of any Pre-Payment Balance or any other prepayment amount due to BASF following a BASF Request	\$
L.	Line II.F minus line II.G minus II.H minus line II.I minus line II.J plus line II.K	\$
M.	Adjusted Quick Ratio (line II.C divided by line II.L)	:1.00

Is line M equal to or greater than 1.20:1.00?

No, not in compliance

Yes, in compliance

Annex 1

Section 2 of the Perfection Certificate is hereby updated to refer to the following filed reports:

Public Disclosures By Borrower Since March 2021

Date	Filing Type
March 15, 2021	S-3
March 23, 2021	Press Release – Water Tower Fireside Chat Series
April 7, 2021	Press Release – Q1 2021 Earnings Release and Conference Call Date
April 19, 2021	DEFA 14A
April 23, 2021	Effectiveness Order
April 29, 2021	8-K - Press Release Q1 2021 Financial Results
April 29, 2021	Press Release – Q1 2021 Financial Results
May 4, 2021	10-Q (Q1 2021)
May 6, 2021	Press Release – Italian Building Materials Lawsuit
May 6, 2021	8-K – Press Release Patent Infringement Action
May 17, 2021	Press Release – Water Tower Fireside Chat Series
May 18, 2021	Press Release – Needham Technology & Media Conference
June 1, 2021	8-K – Annual Meeting Voting Results
June 1, 2021	Press Release – Fireside Chat at Cowen Technology
June 3, 2021	Form 4 – Non-Employee Director Stock Award
June 3, 2021	Form 4 – Non-Employee Director Stock Award
June 3, 2021	Form 4 – Non-Employee Director Stock Award
June 3, 2021	Form 4 – Non-Employee Director Stock Award
June 3, 2021	Form 4 – Non-Employee Director Stock Award
June 3, 2021	Form 4 – Non-Employee Director Stock Award
June 8, 2021	Press Release - Water Tower Fireside Chat Series
June 29, 2021	Press Release\$75 Million Private Placement with Koch Strategic Platforms
June 30, 2021	8-K – Securities Purchase Agreement
July 1, 2021	D – Small Company Offereing and Sale of Securities Without Registration
July 1, 2021	Form 4 – Employee Director Stock Award
July 8, 2021	Press Release – Q2 2021 Earnings Release and Conference Call Date
July 29, 2021	8-K – Press Release Q1 2021 Financial Results
July 29, 2021	Press Release – Q2 2021 Financial Results
August 4, 2021	Form 4 – Whitaker exercise/sale
August 4, 2021	Form 4 – Landes sale
August 4, 2021	10-Q (Q2 2021)
August 5, 2021	Fireside Chat at Canaccord Genuity 41 st Annual Growth Conference
August 27, 2021	Form 4 – Conte exercise/sale
September 1, 2021	Fireside Chat at Cowen 14 th Annual Global Transportation & Sustainable Mobility Conference
September 10, 2021	S-3
September 20, 2021	Effectiveness Order

September 24, 2021	424B3 - Prospectus
October 1, 2021	Current report filing
October 28, 2021	Current report filing
November 3, 2021	Form 4 – Young sale
November 4, 2021	8-K - Press Release Q3 2021 Financial Results
November 10, 2021	Form 4 – Whitaker exercise/sale
November 29, 2021	Form 4 – Gervis exercise
December 1, 2021	Form 4 – Conte exercise/sale
December 20, 2021	Form 4 – Noetzel exercise
December 27, 2021	Current report filing
January 3, 2022	Current report filing
January 4, 2022	Current report filing
January 13, 2022	Current report filing
January 28, 2022	Schedule 13G/A filing
January 31, 2022	Form 3 filing
February 9, 2022	Schedule 13G/A filing
February 11, 2022	Form 5 filing
February 17, 2022	Current report filing
February 17, 2022	Current report filing
February 18, 2022	Current report filing
February 22, 2022	Schedule 13G/A filing
February 23, 2022	Form 4 – Spring Creek Capital LLC
February 25, 2022	Form 4 - Fairbanks
February 25, 2022	Form 4 - Young
February 25, 2022	Form 4 - Conte
February 25, 2022	Form 4 - Schilling
February 25, 2022	Form 4 - Gould
February 25, 2022	Form 4 - Whitaker
February 25, 2022	Form 4 - Landes
March 1, 2022	S-8 registration Statement
March 1, 2022	Form 10-K Annual Report
March 1, 2022	Form 4 - Young
March 1, 2022	Form 4 - Whitaker
March 1, 2022	Form 4 - Fairbanks
March 1, 2022	Form 4 - Conte
March 1, 2022	Form 4 - Landes
March 3, 2022	Form D
March 16, 2022	S-3 Registration Statement
March 16, 2022	Current report filing
March 23, 2022	Form 4 – Gervis
March 29, 2022	Current report filing
March 30, 2022	Form 3 – Wood River Capital LLC
March 30, 2022	Form 4 – Koch Industries, Inc.
April 1, 2022	Current report filing
April 1, 2022	Form 3 - Rodriguez
April 5, 2022	Schedule 13D
April 6, 2022	Form D
April 11, 2022	Form 4 – Noetzel Exercise
April 21, 2022	Proxy Statement (definitive)

April 21, 2022	Additional Proxy Soliciting Materials (definitive)
April 27, 2022	Current report filing
April 29, 2022	Current report filing
April 29, 2022	Additional Proxy Soliciting Materials (definitive)
May 3, 2022	SC 13D/A Amended Statement of Beneficial Ownership
May 3, 2022	Form 4
May 3, 2022	Form 4
May 4, 2022	S-3 Registration Statement
May 10, 2022	10-Q Quarterly Report
May 12, 2022	Form 4
May 13, 2022	Effectiveness Order
May 19, 2022	Current report filing
May 24, 2022	Form 3
June 3, 2022	Current report filing
June 6, 2022	Current report filing
June 6, 2022	Current report filing
June 6, 2022	A total of 13 - Form 4/4A filings

OFFICERS OF THE COMPANY AND ITS SUBSIDIARIES

The following are the names and titles of the officers of the Company and its subsidiaries.

<u>Name of Officer</u>	<u>Office/Title</u>	<u>Name of Company/Subsidiary</u>
Donald R. Young	President and Chief Executive Officer	Aspen Aerogels, Inc. and Rhode Island, German and Georgia Subsidiaries
Ricardo C. Rodriguez	Senior Vice President, Chief Financial Officer and Treasurer	Aspen Aerogels, Inc. and Rhode Island, German and Georgia Subsidiaries.
Corby Whitaker	Senior Vice President Sales & Marketing	Aspen Aerogels, Inc.
Keith L. Schilling	Senior Vice President, Technology	Aspen Aerogels, Inc.
Kelley Conte	Senior Vice President, Human Resources	Aspen Aerogels, Inc. and Rhode Island and Georgia Subsidiaries.
Gregg Landes	Senior Vice President, Operations and Strategic Development	Aspen Aerogels, Inc. and Rhode Island and Georgia Subsidiaries.
Virginia H. Johnson	Chief Legal Officer, General Counsel and Corporate Secretary	Aspen Aerogels, Inc. and Rhode Island and Georgia Subsidiaries.
Poongunran Muthukumaran	Assistant Secretary	Aspen Aerogels, Inc. and Rhode Island and Georgia Subsidiaries.

**SEVENTH AMENDMENT
TO
SECOND AMENDED AND RESTATED LOAN AND SECURITY AGREEMENT**

This Seventh Amendment to Second Amended and Restated Loan and Security Agreement (this “**Amendment**”) is entered into this 14th day of October, 2022 by and between **SILICON VALLEY BANK** (“**Bank**”) and **ASPEN AEROGELS, INC.**, a Delaware corporation (“**Borrower**”) whose address is 30 Forbes Road, Building B, Northborough, Massachusetts 01532.

RECITALS

A. Bank and Borrower have entered into that certain Second Amended and Restated Loan and Security Agreement dated as of March 12, 2021, as amended by that certain First Amendment to Second Amended and Restated Loan and Security Agreement dated September 29, 2021, as further amended by that certain Second Amendment to Second Amended and Restated Loan and Security Agreement dated December 27, 2021, as further amended by that certain Third Amendment to Second Amended and Restated Loan and Security Agreement dated March 31, 2022, as further amended by that certain Fourth Amendment to Second Amended and Restated Loan and Security Agreement dated April 28, 2022, as amended by that certain Fifth Amendment to Second Amended and Restated Loan and Security Agreement dated June 23, 2022, and as further amended by that certain Sixth Amendment to Second Amended and Restated Loan and Security Agreement dated August 26, 2022 (as the same may from time to time be further amended, restated, amended and restated, modified and/or supplemented, the “**Loan Agreement**”).

B. Bank has extended credit to Borrower for the purposes permitted in the Loan Agreement.

C. Borrower has requested that Bank amend the Loan Agreement to make certain revisions to the Loan Agreement as more fully set forth herein.

D. Bank has agreed to so amend certain provisions of the Loan Agreement, but only to the extent, in accordance with the terms, subject to the conditions and in reliance upon the representations and warranties set forth below.

AGREEMENT

NOW, THEREFORE, in consideration of the foregoing recitals and other good and valuable consideration, the receipt and adequacy of which is hereby acknowledged, and intending to be legally bound, the parties hereto agree as follows:

1. Definitions. Capitalized terms used but not defined in this Amendment shall have the meanings given to them in the Loan Agreement.

2. Amendments to Loan Agreement.

2.1 Section 13 (Definitions). The following terms and their respective definitions set forth in Section 13.1 are deleted in their entirety and replaced with the following:

“**Revolving Line Maturity Date**” is December 1, 2022.”

3. Limitation of Amendments.

3.1 The amendments set forth in Section 2 above are effective for the purposes set forth herein and shall be limited precisely as written and shall not be deemed to (a) be a consent to any amendment, waiver or modification of any other term or condition of any Loan Document, or (b) otherwise prejudice any right or remedy which Bank may now have or may have in the future under or in connection with any Loan Document.

3.2 This Amendment shall be construed in connection with and as part of the Loan Documents and all terms, conditions, representations, warranties, covenants and agreements set forth in the Loan Documents, except as herein amended, are hereby ratified and confirmed and shall remain in full force and effect.

4. Representations and Warranties. To induce Bank to enter into this Amendment, Borrower hereby represents and warrants to Bank as follows:

4.1 Immediately after giving effect to this Amendment (a) the representations and warranties contained in the Loan Documents are true, accurate and complete in all material respects as of the date hereof (except to the extent such representations and warranties relate to an earlier date, in which case they are true and correct as of such date), and (b) no Event of Default has occurred and is continuing;

4.2 Borrower has the power and authority to execute and deliver this Amendment and to perform its obligations under the Loan Agreement, as amended by this Amendment;

4.3 The organizational documents of Borrower delivered to Bank on the Effective Date remain true, accurate and complete and have not been amended, supplemented or restated and are and continue to be in full force and effect;

4.4 The execution and delivery by Borrower of this Amendment and the performance by Borrower of its obligations under the Loan Agreement, as amended by this Amendment, have been duly authorized;

4.5 The execution and delivery by Borrower of this Amendment and the performance by Borrower of its obligations under the Loan Agreement, as amended by this Amendment, do not and will not contravene (a) any law or regulation binding on or affecting Borrower, (b) any contractual restriction with a Person binding on Borrower, (c) any order, judgment or decree of any court or other governmental or public body or authority, or subdivision thereof, binding on Borrower, or (d) the organizational documents of Borrower;

4.6 The execution and delivery by Borrower of this Amendment and the performance by Borrower of its obligations under the Loan Agreement, as amended by this Amendment, do not require any order, consent, approval, license, authorization or validation of, or filing, recording or registration with, or exemption by any governmental or public body or authority, or subdivision thereof, binding on Borrower, except as already has been obtained or made; and

4.7 This Amendment has been duly executed and delivered by Borrower and is the binding obligation of Borrower, enforceable against Borrower in accordance with its terms, except as such enforceability may be limited by bankruptcy, insolvency, reorganization, liquidation, moratorium or other similar laws of general application and equitable principles relating to or affecting creditors' rights.

5. Ratification of Perfection Certificate. Borrower hereby ratifies, confirms and reaffirms, all and singular, in all material respects, the terms and disclosures contained in a certain Perfection Certificate dated as of March 12, 2021, and acknowledges, confirms and agrees that the disclosures and information Borrower provided to Bank in such Perfection Certificate as updated by Annex 1, have not changed, as of the date hereof.

6. No Defenses of Borrower. Borrower hereby acknowledges and agrees that Borrower has no offsets, defenses, claims, or counterclaims against Bank with respect to the Obligations, or otherwise, and that if Borrower now has, or ever did have, any offsets, defenses, claims, or counterclaims against Bank, whether known or unknown, at law or in equity, all of them are hereby expressly WAIVED and Borrower hereby RELEASES Bank from any liability thereunder.

7. Integration. This Amendment and the Loan Documents represent the entire agreement about this subject matter and supersede prior negotiations or agreements. All prior agreements, understandings,

representations, warranties, and negotiations between the parties about the subject matter of this Amendment and the Loan Documents merge into this Amendment and the Loan Documents.

8. Counterparts. This Amendment may be executed in any number of counterparts and all of such counterparts taken together shall be deemed to constitute one and the same instrument. Each party hereto may execute this Amendment by electronic means and recognizes and accepts the use of electronic signatures and records by any other party hereto in connection with the execution and storage hereof.

9. Fees and Expenses. Borrower's payment of a fully-earned, non-refundable extension fee in an amount equal to Five Thousand Dollars (\$5,000.00). Borrower agrees to promptly pay Bank, upon receipt of an invoice, Bank's legal fees and expenses incurred in connection with this Amendment.

10. Effectiveness. As a condition precedent to the effectiveness of this Amendment and the Bank's obligation to make further Advances under the Revolving Line, the Bank shall have received the following documents prior to or concurrently with this Amendment, each in form and substance reasonably satisfactory to Bank:

10.1 this Amendment duly executed on behalf of Borrower;

10.2 the Acknowledgment of Amendment and Reaffirmation of Guaranty substantially in the form attached hereto as **Schedule 1**, duly executed and delivered by Guarantor; and

10.3 such other documents as Bank may reasonably request.

[Signature page follows.]

IN WITNESS WHEREOF, the parties hereto have caused this Amendment to be duly executed and delivered as of the date first written above.

BANK		BORROWER
SILICON VALLEY BANK		ASPEN AEROGELS, INC.
By: /s/ Krista Alexon		By: /s/ Ricardo C. Rodriguez
Name: Krista Alexon		Name: Ricardo C. Rodriguez
Title: Vice President		Title: Senior Vice President, Chief Financial Officer and Treasurer

**ACKNOWLEDGMENT OF AMENDMENT
AND REAFFIRMATION OF GUARANTY AND SECURITY AGREEMENT**

Section 1. Guarantor hereby acknowledges and confirms that it has reviewed and approved the terms and conditions of the Sixth Amendment to Second Amended and Restated Loan and Security Agreement dated as of the date hereof (“the “**Amendment**”).

Section 2. Guarantor hereby consents to the Amendment and agrees that the Guaranty and Guarantor Security Agreement relating to the Obligations of Borrower under the Loan Agreement shall continue in full force and effect, shall be valid and enforceable and shall not be impaired or otherwise affected by the execution of the Amendment or any other document or instruction delivered in connection herewith.

Section 3. Guarantor represents and warrants that, after giving effect to the Amendment, all representations and warranties contained in the Guaranty are true, accurate and complete as if made the date hereof.

Dated as of October 14, 2022

[Signature Page Follows]

GUARANTOR:		ASPEN AEROGELS RHODE ISLAND, LLC
		By: /s/ Ricardo C. Rodriguez
		Name: Ricardo C. Rodriguez
		Title: Senior Vice President, Chief Financial Officer and Treasurer

Annex 1

Section 2 of the Perfection Certificate is hereby updated to refer to the following filed reports:

Public Disclosures By Borrower Since March 2021

Date	Filing Type
March 15, 2021	S-3
March 23, 2021	Press Release – Water Tower Fireside Chat Series
April 7, 2021	Press Release – Q1 2021 Earnings Release and Conference Call Date
April 19, 2021	DEFA 14A
April 23, 2021	Effectiveness Order
April 29, 2021	8-K - Press Release Q1 2021 Financial Results
April 29, 2021	Press Release – Q1 2021 Financial Results
May 4, 2021	10-Q (Q1 2021)
May 6, 2021	Press Release – Italian Building Materials Lawsuit
May 6, 2021	8-K – Press Release Patent Infringement Action
May 17, 2021	Press Release – Water Tower Fireside Chat Series
May 18, 2021	Press Release – Needham Technology & Media Conference
June 1, 2021	8-K – Annual Meeting Voting Results
June 1, 2021	Press Release – Fireside Chat at Cowen Technology
June 3, 2021	Form 4 – Non-Employee Director Stock Award
June 3, 2021	Form 4 – Non-Employee Director Stock Award
June 3, 2021	Form 4 – Non-Employee Director Stock Award
June 3, 2021	Form 4 – Non-Employee Director Stock Award
June 3, 2021	Form 4 – Non-Employee Director Stock Award
June 3, 2021	Form 4 – Non-Employee Director Stock Award
June 8, 2021	Press Release - Water Tower Fireside Chat Series
June 29, 2021	Press Release\$75 Million Private Placement with Koch Strategic Platforms
June 30, 2021	8-K – Securities Purchase Agreement
July 1, 2021	D – Small Company Offereing and Sale of Securities Without Registration
July 1, 2021	Form 4 – Employee Director Stock Award
July 8, 2021	Press Release – Q2 2021 Earnings Release and Conference Call Date
July 29, 2021	8-K – Press Release Q1 2021 Financial Results
July 29, 2021	Press Release – Q2 2021 Financial Results
August 4, 2021	Form 4 – Whitaker exercise/sale
August 4, 2021	Form 4 – Landes sale
August 4, 2021	10-Q (Q2 2021)
August 5, 2021	Fireside Chat at Canaccord Genuity 41 st Annual Growth Conference
August 27, 2021	Form 4 – Conte exercise/sale
September 1, 2021	Fireside Chat at Cowen 14 th Annual Global Transportation & Sustainable Mobility Conference
September 10, 2021	S-3
September 20, 2021	Effectiveness Order

September 24, 2021	424B3 - Prospectus
October 1, 2021	Current report filing
October 28, 2021	Current report filing
November 3, 2021	Form 4 – Young sale
November 4, 2021	8-K - Press Release Q3 2021 Financial Results
November 10, 2021	Form 4 – Whitaker exercise/sale
November 29, 2021	Form 4 – Gervis exercise
December 1, 2021	Form 4 – Conte exercise/sale
December 20, 2021	Form 4 – Noetzel exercise
December 27, 2021	Current report filing
January 3, 2022	Current report filing
January 4, 2022	Current report filing
January 13, 2022	Current report filing
January 28, 2022	Schedule 13G/A filing
January 31, 2022	Form 3 filing
February 9, 2022	Schedule 13G/A filing
February 11, 2022	Form 5 filing
February 17, 2022	Current report filing
February 17, 2022	Current report filing
February 18, 2022	Current report filing
February 22, 2022	Schedule 13G/A filing
February 23, 2022	Form 4 – Spring Creek Capital LLC
February 25, 2022	Form 4 - Fairbanks
February 25, 2022	Form 4 - Young
February 25, 2022	Form 4 - Conte
February 25, 2022	Form 4 - Schilling
February 25, 2022	Form 4 - Gould
February 25, 2022	Form 4 - Whitaker
February 25, 2022	Form 4 - Landes
March 1, 2022	S-8 registration Statement
March 1, 2022	Form 10-K Annual Report
March 1, 2022	Form 4 - Young
March 1, 2022	Form 4 - Whitaker
March 1, 2022	Form 4 - Fairbanks
March 1, 2022	Form 4 - Conte
March 1, 2022	Form 4 - Landes
March 3, 2022	Form D
March 16, 2022	S-3 Registration Statement
March 16, 2022	Current report filing
March 23, 2022	Form 4 – Gervis
March 29, 2022	Current report filing
March 30, 2022	Form 3 – Wood River Capital LLC
March 30, 2022	Form 4 – Koch Industries, Inc.
April 1, 2022	Current report filing
April 1, 2022	Form 3 - Rodriguez
April 5, 2022	Schedule 13D
April 6, 2022	Form D
April 11, 2022	Form 4 – Noetzel Exercise
April 21, 2022	Proxy Statement (definitive)

April 21, 2022	Additional Proxy Soliciting Materials (definitive)
April 27, 2022	Current report filing
April 29, 2022	Current report filing
April 29, 2022	Additional Proxy Soliciting Materials (definitive)
May 3, 2022	SC 13D/A Amended Statement of Beneficial Ownership
May 3, 2022	Form 4
May 3, 2022	Form 4
May 4, 2022	S-3 Registration Statement
May 10, 2022	10-Q Quarterly Report
May 12, 2022	Form 4
May 13, 2022	Effectiveness Order
May 19, 2022	Current report filing
May 24, 2022	Form 3
June 3, 2022	Current report filing
June 6, 2022	Current report filing
June 6, 2022	Current report filing
June 6, 2022	A total of 13 - Form 4/4A filings
June 24, 2022	Current report filing
June 28, 2022	Prospectus filed pursuant to Rule 424(b)(5)
June 29, 2022	Prospectus filed pursuant to Rule 424(b)(5)
June 29, 2022	Initial Statement of Trust Indenture
June 30, 2022	Current report filing
July 8, 2022	SC 13G Statement of Ownership
July 27, 2022	Current report filing
July 29, 2022	Current report filing
August 2, 2022	Current report filing
August 3, 2022	Form 3 and Form 4
August 4, 2022	Quarterly Report

OFFICERS OF THE COMPANY AND ITS SUBSIDIARIES

The following are the names and titles of the officers of the Company and its subsidiaries.

<u>Name of Officer</u>	<u>Office/Title</u>	<u>Name of Company/Subsidiary</u>
Donald R. Young	President and Chief Executive Officer	Aspen Aerogels, Inc. and Rhode Island, German and Georgia Subsidiaries
Ricardo C. Rodriguez	Senior Vice President, Chief Financial Officer and Treasurer	Aspen Aerogels, Inc. and Rhode Island, German and Georgia Subsidiaries.
Corby Whitaker	Senior Vice President Sales & Marketing	Aspen Aerogels, Inc.
Keith L. Schilling	Senior Vice President, Technology	Aspen Aerogels, Inc.
Kelley Conte	Senior Vice President, Human Resources	Aspen Aerogels, Inc. and Rhode Island and Georgia Subsidiaries.

Gregg Landes	Senior Vice President, Operations and Strategic Development	Aspen Aerogels, Inc. and Rhode Island and Georgia Subsidiaries.
Virginia H. Johnson	Chief Legal Officer, General Counsel and Corporate Secretary	Aspen Aerogels, Inc. and Rhode Island and Georgia Subsidiaries.
Poongunran Muthukumaran	Assistant Secretary	Aspen Aerogels, Inc. and Rhode Island and Georgia Subsidiaries.

CERTIFICATIONS UNDER SECTION 302

I, Donald R. Young, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Aspen Aerogels, 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.

Date: November 7, 2022

/s/ Donald R. Young

Donald R. Young
President and Chief Executive Officer
(principal executive officer)

CERTIFICATIONS UNDER SECTION 302

I, Ricardo C. Rodriguez, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Aspen Aerogels, 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.

Date: November 7, 2022

/s/ Ricardo C. Rodriguez

Ricardo C. Rodriguez

Senior Vice President, Chief Financial Officer and Treasurer (principal financial officer and principal accounting officer)

CERTIFICATIONS UNDER SECTION 906

Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 (subsections (a) and (b) of section 1350, chapter 63 of title 18, United States Code), each of the undersigned officers of Aspen Aerogels, Inc., a Delaware corporation (the “Company”), does hereby certify, to such officer’s knowledge, that:

The Quarterly Report on Form 10-Q for the quarter ended September 30, 2022 (the “Form 10-Q”) of the Company fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, and the information contained in the Form 10-Q fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated: November 7, 2022

/s/ Donald R. Young

Donald R. Young
President and Chief Executive Officer
(principal executive officer)

Dated: November 7, 2022

/s/ Ricardo C. Rodriguez

Ricardo C. Rodriguez
Senior Vice President, Chief Financial Officer and Treasurer
(principal financial officer and principal accounting officer)

A signed original of this written statement required by Section 906 has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.