

**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, 2021

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, 2021, the registrant had 33,079,299 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, 2021	December 31, 2020
	(In thousands, except share and per share data)	
Assets		
Current assets:		
Cash and cash equivalents	\$ 95,531	\$ 16,496
Accounts receivable, net of allowances of \$141 and \$442	18,723	15,698
Inventories	9,712	13,099
Prepaid expenses and other current assets	3,167	1,830
Total current assets	127,133	47,123
Property, plant and equipment, net	46,706	46,739
Operating lease right-of-use assets	12,522	3,478
Other long-term assets	1,311	84
Total assets	\$ 187,672	\$ 97,424
Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable	\$ 9,820	\$ 5,351
Accrued expenses	9,791	3,884
Current portion of long-term debt	—	1,609
Current portion of prepayment liability	4,615	—
Deferred revenue	1,722	2,037
Operating lease liabilities	2,324	1,046
Total current liabilities	28,272	13,927
Prepayment liability	5,000	9,555
Long-term debt	—	2,059
Operating lease liabilities long-term	11,508	3,597
Other long-term liabilities	434	434
Total liabilities	45,214	29,572
Commitments and contingencies (Note 9)		
Stockholders' equity:		
Preferred stock, \$0.00001 par value; 5,000,000 shares authorized, no shares issued and outstanding at September 30, 2021 and December 31, 2020	—	—
Common stock, \$0.00001 par value; 125,000,000 shares authorized, 33,077,894 and 27,821,685 shares issued and outstanding at September 30, 2021 and December 31, 2020, respectively	—	—
Additional paid-in capital	671,158	575,811
Accumulated deficit	(528,700)	(507,959)
Total stockholders' equity	142,458	67,852
Total liabilities and stockholders' equity	\$ 187,672	\$ 97,424

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,	
	2021	2020	2021	2020
	(In thousands, except share and per share data)			
Revenue:				
Product	\$ 30,263	\$ 23,939	\$ 89,809	\$ 76,772
Research services	117	256	338	483
Total revenue	30,380	24,195	90,147	77,255
Cost of revenue:				
Product	27,279	22,243	78,459	66,403
Research services	34	52	85	121
Gross profit	3,067	1,900	11,603	10,731
Operating expenses:				
Research and development	3,077	2,088	8,128	6,436
Sales and marketing	4,915	2,755	11,784	9,051
General and administrative	6,573	3,761	15,978	10,682
Total operating expenses	14,565	8,604	35,890	26,169
Loss from operations	(11,498)	(6,704)	(24,287)	(15,438)
Interest expense, net	(58)	(49)	(188)	(182)
Gain on extinguishment of debt	3,734	—	3,734	—
Total other income (expense)	3,676	(49)	3,546	(182)
Net loss	\$ (7,822)	\$ (6,753)	\$ (20,741)	\$ (15,620)
Net loss per share:				
Basic and diluted	\$ (0.24)	\$ (0.25)	\$ (0.70)	\$ (0.60)
Weighted-average common shares outstanding:				
Basic and diluted	32,523,405	26,728,205	29,685,936	26,150,236

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, 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 of common stock , 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

	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, 2019	—	\$ —	24,302,504	\$ —	\$ 545,140	\$ (486,150)	\$ 58,990
Net loss	—	—	—	—	—	(3,169)	(3,169)
Stock compensation expense	—	—	—	—	992	—	992
Vesting of restricted stock units	—	—	336,951	—	(1,195)	—	(1,195)
Proceeds from underwritten public offering, net of underwriting discounts and commissions of \$1,093 and issuance costs of \$285	—	—	1,955,000	—	14,751	—	14,751
Balance at March 31, 2020	—	\$ —	26,594,455	\$ —	\$ 559,688	\$ (489,319)	\$ 70,369
Net loss	—	—	—	—	—	(5,698)	(5,698)
Stock compensation expense	—	—	—	—	1,007	—	1,007
Issuance of restricted stock	—	—	45,066	—	—	—	—
Vesting of restricted stock units	—	—	5,629	—	(16)	—	(16)
Proceeds from employee stock option exercises	—	—	200,159	—	869	—	869
Balance at June 30, 2020	—	\$ —	26,845,309	\$ —	\$ 561,548	\$ (495,017)	\$ 66,531
Net loss	—	—	—	—	—	(6,753)	(6,753)
Stock compensation expense	—	—	—	—	991	—	991
Proceeds from employee stock option exercises	—	—	20,000	—	118	—	118
Balance at September 30, 2020	—	\$ —	26,865,309	\$ —	\$ 562,657	\$ (501,770)	\$ 60,887

See accompanying notes to unaudited consolidated financial statements.

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

	Nine Months Ended September 30,	
	2021	2020
	(In thousands)	
Cash flows from operating activities:		
Net loss	\$ (20,741)	\$ (15,620)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation	6,856	7,670
Gain on extinguishment of debt	(3,734)	—
Amortization of debt issuance costs	18	6
Provision for bad debt	(97)	171
Stock-compensation expense	3,600	2,990
Reduction in the carrying amount of operating lease right-of-use assets	1,057	719
Changes in operating assets and liabilities:		
Accounts receivable	(2,928)	12,011
Inventories	3,387	(659)
Prepaid expenses and other assets	(2,545)	(485)
Accounts payable	3,770	(3,794)
Accrued expenses	5,955	(3,976)
Deferred revenue	(255)	(3,563)
Operating lease liabilities	(922)	(818)
Other liabilities	—	566
Net cash used in operating activities	(6,579)	(4,782)
Cash flows from investing activities:		
Capital expenditures	(6,133)	(2,600)
Net cash used in investing activities	(6,133)	(2,600)
Cash flows from financing activities:		
Proceeds from underwritten public offering, net of underwriting discounts and commissions of \$1,093	—	15,036
Issuance costs from underwritten public offering	—	(285)
Proceeds from issuance of long-term debt	—	3,686
Issuance costs from long-term debt	—	(27)
Repayments of borrowings under line of credit, net	—	(3,123)
Proceeds from employee stock option exercises	1,529	987
Payments made for employee restricted stock tax withholdings	(2,677)	(1,211)
Proceeds from at-the-market offering, net of commissions and fees of \$601	19,420	—
Issuance costs from at-the-market offering	(43)	—
Proceeds from private placement of common stock	75,000	—
Fees and issuance costs from private placement of common stock	(1,482)	—
Net cash provided by financing activities	91,747	15,063
Net increase in cash	79,035	7,681
Cash and cash equivalents at beginning of period	16,496	3,633
Cash and cash equivalents at end of period	\$ 95,531	\$ 11,314
Supplemental disclosures of cash flow information:		
Interest paid	\$ 168	\$ 168
Income taxes paid	\$ —	\$ —
Supplemental disclosures of non-cash activities:		
Right-of-use assets obtained in exchange for new operating lease liabilities	\$ 10,111	\$ 389
Changes in accrued capital expenditures	\$ 690	\$ (448)

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 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 has also conducted research related to aerogel technology supported by funding from several agencies of the U.S. government and other institutions in the form of research contracts. The Company has decided to cease efforts to secure additional funded research contracts and to wind down existing contract research activities.

The Company maintains its corporate offices in 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, 2021, the Company incurred a net loss of \$20.7 million, used \$6.6 million of cash in operations, used \$6.1 million of cash for capital expenditures, received net proceeds of \$19.4 million through an at-the-market (ATM) offering of the Company's common stock and received net proceeds of \$73.5 million through a private placement of the Company's common stock. As of September 30, 2021, the Company had cash and cash equivalents of \$95.5 million, a \$4.6 million current prepayment liability (see note 9) 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 as of September 30, 2021 under the revolving line of credit was \$9.5 million. The existing revolving line of credit matures on April 28, 2022.

On May 1, 2020, Aspen Aerogels Rhode Island, LLC (Borrower) executed a promissory note (Note) in favor of Northeast Bank to receive an unsecured loan in the principal amount of \$3.7 million (the PPP Loan) pursuant to the Paycheck Protection Program (PPP) established by the CARES Act, as amended by the Paycheck Protection Program Flexibility Act (Flexibility Act), and administered by the Small Business Administration (SBA). The PPP Loan was subsequently sold by Northeast Bank to The Loan Source, Inc. (PPP Investor), a secondary market investor.

On August 24, 2021, the SBA remitted \$3.7 million in principal and less than \$0.1 million in accrued interest to the PPP Investor after approving the Borrower's application for forgiveness of the PPP Loan under the provisions of the CARES Act. Accordingly, the Company recorded a total gain on the extinguishment of debt of \$3.7 million during the quarter ended September 30, 2021.

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 technology in the electric vehicle market is significant. Accordingly, the Company is currently 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 to purchase the capital equipment, construct the new facilities or 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, 2020 (the Annual Report), filed with the U.S. Securities and Exchange Commission on March 12, 2021.

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, 2021 and the results of its operations and stockholders' equity for the three and nine months ended September 30, 2021 and 2020 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, 2021 are not necessarily indicative of the results to be expected for the year ending December 31, 2021 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, 2021 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, 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. 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 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, 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. During the nine months ended September 30, 2020, the Company recorded a charge for uncollectible accounts receivable of \$0.2 million.

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 10 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, 2021, the Company granted 63,947 restricted common stock units (RSUs) with a grant date fair value of \$1.6 million and non-qualified stock options (NSOs) to purchase 203,962 shares of common stock with a grant date fair value of \$2.7 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, 2021, the Company also granted 14,934 shares of restricted common stock with a grant date fair value of \$0.3 million and NSOs to purchase 18,528 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 or the day prior to the Company's annual meeting of stockholders to be held in 2022.

On June 29, 2021, the Company also awarded 461,616 shares of restricted common stock to its Chief Executive Officer. The shares will vest subject to achievement of certain volume weighted average common stock price targets, over a three-to-five-year period. The Company used a Monte-Carlo simulation model to estimate the grant date fair value of the award. The award had an aggregate grant date fair value of \$6.5 million.

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

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2021	2020	2021	2020
	(In thousands)			
Cost of product revenue	\$ 132	\$ 98	\$ 373	\$ 544
Research and development expenses	186	169	564	482
Sales and marketing expenses	213	179	587	524
General and administrative expenses	1,023	545	2,076	1,440
Total stock-based compensation	<u>\$ 1,554</u>	<u>\$ 991</u>	<u>\$ 3,600</u>	<u>\$ 2,990</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 556,433 shares to 8,531,413 shares effective January 1, 2021.

As of September 30, 2021, 3,963,342 shares of common stock were reserved for issuance upon the exercise or vesting of outstanding stock-based awards granted under the 2014 Equity Plan. In addition, as of September 30, 2021, 79,960 shares of common

stock were reserved for issuance upon the exercise of outstanding stock options granted under the Company's 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, 2021, the Company has either reserved in connection with statutory tax withholdings or issued a total of 3,773,717 shares under the 2014 Equity Plan. As of September 30, 2021, there were 714,394 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.

Segments

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 presently views its operations and manages its business as one operating segment.

Information about the Company's total revenues, based on shipment destination or services location, is presented in the following table:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2021	2020	2021	2020
	(In thousands)			
Revenue:				
U.S.	\$ 16,734	\$ 9,736	\$ 45,033	\$ 31,501
International	13,646	14,459	45,114	45,754
Total	<u>\$ 30,380</u>	<u>\$ 24,195</u>	<u>\$ 90,147</u>	<u>\$ 77,255</u>

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 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 did not record any warranty expense during the nine months ended September 30, 2021 and 2020.

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, 2020

The Company has not implemented any accounting standards that had a material impact on its consolidated financial statements during the nine months ended September 30, 2021.

Standards to be Implemented

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, 2020 and did not enter into any contracts during the nine months ended September 30, 2021 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.

Product Revenue

The Company generally enters into contracts containing one type of performance obligation. The Company recognizes product 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 product 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 product sales that may be returned by its customers and records this estimate as a reduction of revenue in the period the related product revenue is recognized. The Company currently estimates product 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, 2021 and December 31, 2020.

Subsea Projects

The Company manufactures and sells subsea products that are used in pipe-in-pipe applications in subsea 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, 2021 and 2020, the Company recognized revenue of \$3.7 million and \$8.3 million, respectively, in connection with subsea projects.

Research Services

The Company performs research services under contracts with various government agencies and other institutions. These contracts generally have one type of performance obligation associated with the provision of research services including certain licenses to any resulting intellectual property. The Company records revenue using the percentage-of-completion method in two ways: (1) for firm-fixed-price contracts, the Company accrues that portion of the total contract price that is allocable on the basis of the Company's estimates of costs incurred to date to total contract costs; and (2) for cost-plus-fixed-fee contracts, the Company records revenue that is equal to total payroll cost incurred times a stated factor plus reimbursable expenses, to a stated upper limit. The primary cost under the Company's research service contracts is the labor effort expended in completing the research. Typically, the only deliverable, other than the labor hours expended, is reporting research results to the customer or delivery of research grade aerogel products. Because the input measure of labor hours expended is also reflective of the output measure, it is a reliable means to measure the extent of progress toward completion. Revisions in cost estimates and fees during the course of the contract are reflected in the accounting period in which the facts that require the revisions become known. Contract costs and rates used to allocate overhead to contracts are subject to audit by the respective contracting government agency. Adjustments to revenue as a result of audit are recorded within the period they become known. To date, adjustments to revenue as a result of contracting agency audits have been insignificant.

Disaggregation of Revenue

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

	Three Months Ended September 30,					
	2021			2020		
	U.S.	International	Total	U.S.	International	Total
(In thousands)						
Geographical region						
Asia	\$ —	\$ 5,283	\$ 5,283	\$ —	\$ 9,617	\$ 9,617
Canada	—	256	256	—	25	25
Europe	—	7,553	7,553	—	4,635	4,635
Latin America	—	554	554	—	182	182
U.S.	16,734	—	16,734	9,736	—	9,736
Total revenue	<u>\$ 16,734</u>	<u>\$ 13,646</u>	<u>\$ 30,380</u>	<u>\$ 9,736</u>	<u>\$ 14,459</u>	<u>\$ 24,195</u>
Source of revenue						
Product revenue	\$ 16,617	\$ 11,033	\$ 27,650	\$ 8,612	\$ 12,307	\$ 20,919
Subsea projects	—	2,613	2,613	868	2,152	3,020
Research services	117	—	117	256	—	256
Total revenue	<u>\$ 16,734</u>	<u>\$ 13,646</u>	<u>\$ 30,380</u>	<u>\$ 9,736</u>	<u>\$ 14,459</u>	<u>\$ 24,195</u>

	Nine Months Ended September 30,					
	2021			2020		
	U.S.	International	Total	U.S.	International	Total
(In thousands)						
Geographical region						
Asia	\$ —	\$ 15,424	\$ 15,424	\$ —	\$ 33,373	\$ 33,373
Canada	—	2,211	2,211	—	715	715
Europe	—	24,234	24,234	—	9,590	9,590
Latin America	—	3,245	3,245	—	2,076	2,076
U.S.	45,033	—	45,033	31,501	—	31,501
Total revenue	<u>\$ 45,033</u>	<u>\$ 45,114</u>	<u>\$ 90,147</u>	<u>\$ 31,501</u>	<u>\$ 45,754</u>	<u>\$ 77,255</u>
Source of revenue						
Product revenue	\$ 44,695	\$ 41,427	\$ 86,122	\$ 29,039	\$ 39,394	\$ 68,433
Subsea projects	—	3,687	3,687	1,979	6,360	8,339
Research services	338	—	338	483	—	483
Total revenue	<u>\$ 45,033</u>	<u>\$ 45,114</u>	<u>\$ 90,147</u>	<u>\$ 31,501</u>	<u>\$ 45,754</u>	<u>\$ 77,255</u>

Contract Balances

The following table presents changes in the Company's contract assets and contract liabilities during the nine months ended September 30, 2021:

	Balance at December 31, 2020	Additions	Deductions	Balance at September 30, 2021
(In thousands)				
Contract assets				
Subsea projects	\$ 1,370	\$ 3,661	\$ (2,753)	\$ 2,278
Product revenue	—	111	(30)	81
Research services	67	338	(349)	56
Total contract assets	<u>\$ 1,437</u>	<u>\$ 4,110</u>	<u>\$ (3,132)</u>	<u>\$ 2,415</u>
Contract liabilities				
Deferred revenue				
Product revenue	\$ 1,859	\$ 3,347	\$ (3,636)	\$ 1,570
Subsea projects	178	\$ 1,626	\$ (1,652)	152
Prepayment liability	9,555	—	60	9,615
Total contract liabilities	<u>\$ 11,592</u>	<u>\$ 4,973</u>	<u>\$ (5,228)</u>	<u>\$ 11,337</u>

During the nine months ended September 30, 2021, the Company recognized \$1.7 million of revenue that was included in deferred revenue as of December 31, 2020.

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, 2021	December 31, 2020
(In thousands)		
Raw materials	\$ 5,724	\$ 4,068
Finished goods	3,988	9,031
Total	<u>\$ 9,712</u>	<u>\$ 13,099</u>

(5) Property, Plant and Equipment, Net

Property, plant and equipment consist of the following:

	September 30, 2021	December 31, 2020	Useful life
	(In thousands)		
Construction in progress	\$ 3,699	\$ 1,906	—
Buildings	24,016	24,016	30 years
Machinery and equipment	128,771	124,807	3-10 years
Computer equipment and software	9,387	8,850	3 years
Total	165,873	159,579	
Accumulated depreciation	(119,167)	(112,840)	
Property, plant and equipment, net	\$ 46,706	\$ 46,739	

Depreciation expense was \$6.9 million and \$7.7 million for the nine months ended September 30, 2021 and 2020, respectively.

Construction in progress totaled \$3.7 million and \$1.9 million at September 30, 2021 and December 31, 2020, respectively, principally associated with capital projects in the Company's East Providence, Rhode Island manufacturing facility.

(6) Accrued Expenses

Accrued expenses consist of the following:

	September 30, 2021	December 31, 2020
	(In thousands)	
Employee compensation	\$ 8,227	\$ 2,587
Other accrued expenses	1,564	1,297
Total	\$ 9,791	\$ 3,884

(7) Revolving Line of Credit

The Company is party to an 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. On September 29, 2021, the Company entered into an amendment to the Loan Agreement to revise certain financial covenants, among other things.

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, 2021, 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, 2021 and December 31, 2020, 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 and \$1.4 million at September 30, 2021 and December 31, 2020, respectively, which reduce the funds otherwise available to the Company under the facility.

As of September 30, 2021, the amount available to the Company under the revolving credit facility was \$9.5 million after giving effect to the \$1.3 million of outstanding letters of credit.

(8) Debt

On May 1, 2020, Aspen Aerogels Rhode Island, LLC (Borrower) executed a promissory note (Note) in favor of Northeast Bank to receive an unsecured loan in the principal amount of \$3.7 million (the PPP Loan) pursuant to the Paycheck Protection Program (PPP) established by the CARES Act, as amended by the Paycheck Protection Program Flexibility Act (Flexibility Act), and administered by the Small Business Administration (SBA). The PPP Loan was subsequently sold by Northeast Bank to The Loan Source, Inc. (PPP Investor), a secondary market investor.

On August 24, 2021, the SBA remitted \$3.7 million in principal and less than \$0.1 million in accrued interest to the PPP Investor after approving the Borrower's application for forgiveness of the PPP Loan under the provisions of the CARES Act. Accordingly, the Company recorded a total gain on the extinguishment of debt of \$3.7 million during the quarter ended September 30, 2021.

As of September 30, 2021, the Company has no required principal or interest payments remaining related to the PPP Loan.

As of December 31, 2020, long-term debt consisted of the following:

	December 31, 2020
Long-term debt, principal	\$ 3,686
Current portion of long-term debt	(1,609)
Debt issuance costs, net of accumulated amortization	(18)
Long-term debt	<u>\$ 2,059</u>

(9) 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. The agreement has a three-year term beginning on January 15, 2021. During the nine months ended September 30, 2021, the Company capitalized \$0.7 million of costs related to implementation of the agreement that will begin to amortize during 2022. The capitalized implementation costs are included within other long-term assets on the consolidated balance sheets.

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 is 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 will sell exclusively to BASF certain of the Company's products at annual volumes to be specified by BASF, subject to certain volume limits. However, BASF has no obligation to purchase products under the Supply Agreement. The Supply Agreement will terminate on December 31, 2027 with respect to the Company's Spaceloft A2 product and December 31, 2028 with respect to a new product developed under the JDA. Upon the expiration of the Supply Agreement with respect to each product, the Company will be subject to a post-termination supply commitment for an additional two years. The JDA is designed to facilitate collaboration by the parties on the development and commercialization of new products.

In addition, BASF, in its sole discretion, may make prepayments to the Company in the aggregate amount of up to \$22.0 million during the term of the Supply Agreement. These prepayment obligations are secured by a security interest in real estate, plant and equipment at the Company's Rhode Island facility and a license to certain intellectual property. BASF made a prepayment in the amount of \$5.0 million to the Company in 2018 (the 2018 Prepayment). As of January 1, 2019, 25.3% of any amounts that the Company invoices for Spaceloft A2 sold to BASF are credited against the outstanding balance of the 2018 prepayment. If any of the 2018 Prepayment remains uncredited as of December 31, 2021, BASF may require that the Company repay the uncredited amount to BASF beginning in 2022.

Pursuant to the first addendum to the Supply Agreement, on January 30, 2019, BASF made an additional prepayment in the amount of \$5.0 million to the Company (the 2019 Prepayment). As of January 1, 2020, 50.0% of any amounts that the Company invoices for the newly developed product sold to BASF are credited against the outstanding balance of the 2019 Prepayment. After December 31, 2022, BASF may require that the Company credit an additional 24.7% of any amounts invoiced by the Company for Spaceloft A2 product sold to BASF against the outstanding balance of the 2019 Prepayment, if any, or may require that the Company repay the uncredited amount of the 2019 Prepayment to BASF in full.

As of September 30, 2021, the Company had received \$10.0 million in prepayments from BASF and applied approximately \$0.3 million of credits against amounts invoiced.

The prepayment liability consists of the following:

	September 30, 2021	December 31, 2020
	(In thousands)	
Prepayment liability	\$ 9,733	\$ 9,845
Current portion of prepayment liability	(4,615)	—
Prepayment liability included within deferred revenue	(118)	(290)
Prepayment liability, long-term	<u>\$ 5,000</u>	<u>\$ 9,555</u>

The amounts and terms of additional prepayment installments, if any, are subject to negotiation between the Company and BASF.

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.

(10) Leases

The Company leases office, laboratory, warehouse and fabrication space in Massachusetts and Rhode Island 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 2031.

The Company determines if an arrangement is a lease at inception. 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, 2021 are as follows:

Year	Operating Leases (In thousands)
2021 (excluding the nine months ended September 30, 2021)	\$ 778
2022	3,086
2023	2,639
2024	2,048
2025	1,813
Thereafter	6,856
Total lease payments	17,220
Less imputed interest	(3,388)
Total lease liabilities	<u>\$ 13,832</u>

The Company incurred operating lease costs of \$1.5 million and \$1.1 million during the nine months ended September 30, 2021 and 2020, respectively. Cash payments related to operating lease liabilities were \$1.3 million and \$1.1 million during the nine months ended September 30, 2021 and 2020, respectively.

As of September 30, 2021, the weighted average remaining lease term for operating leases was 7.5 years. As of September 30, 2021, the weighted average discount rate for operating leases was 6.1%.

As of September 30, 2021, the Company has an additional operating equipment lease that will commence during 2021 with total lease payments of less than \$0.1 million and a lease term of 4.0 years.

(11) 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 is 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.

Other long-term liabilities consist of the following:

	September 30, 2021	December 31, 2020
	(In thousands)	
Deferred employer payroll tax obligation	\$ 870	\$ 870
Current portion of deferred payroll tax obligation	(436)	(436)
Other long-term liabilities	\$ 434	\$ 434

(12) Net Loss Per Share

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

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2021	2020	2021	2020
	(In thousands, except share and per share data)			
Numerator:				
Net loss	\$ (7,822)	\$ (6,753)	\$ (20,741)	\$ (15,620)
Denominator:				
Weighted average shares outstanding, basic and diluted	32,523,405	26,728,205	29,685,936	26,150,236
Net loss per share, basic and diluted	\$ (0.24)	\$ (0.25)	\$ (0.70)	\$ (0.60)

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,	
	2021	2020
Common stock options	3,694,679	3,918,669
Restricted common stock units	348,624	699,559
Restricted common stock awards	476,550	123,191
Total	4,519,853	4,741,419

In the table above, anti-dilutive shares consist of those common stock equivalents that have (i) an exercise price above the average stock price for the period or (ii) related average unrecognized stock compensation expense sufficient to buy back the entire amount of shares. 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.

(13) 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.

(14) Subsequent Events

The Company has evaluated subsequent events through November 4, 2021, the date of issuance of the consolidated financial statements for the three and nine months ended September 30, 2021.

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, 2020, filed with the U.S. Securities and Exchange Commission (SEC) on March 12, 2021, 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>.

Overview

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-use 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.

We are also 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 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 that 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 manufacturing capacity, build an automated thermal barrier fabrication operation, enhance research and development resources and construct a battery materials facility, among other items.

We also derive product revenue from a number of other end markets, including the sustainable building materials market. Customers in these markets use our products for applications as diverse as wall systems, 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.

We generate product revenue through the sale of our line of aerogel blankets and thermal barriers. 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-use customers and engineering firms to promote the qualification, specification and acceptance of our 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 products and strong end-user support.

We also perform research services under contracts with various agencies of the U.S. government, including the Department of Defense and the Department of Energy, and other institutions. We have decided to cease efforts to secure additional funded research contracts and to wind down our existing contract research activities. This decision reflected our desire to focus our research and development resources on initiatives to improve the profitability of our existing business and on efforts to develop new products and next-generation technologies with application in new, potentially high-value markets.

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 annual capacity in phases to approximately 55 million square feet of aerogel blankets. To meet expected growth in demand for our aerogel products in the energy, sustainable building and electric vehicle markets, we are planning to expand our aerogel blanket capacity by constructing a second manufacturing plant at a site in the southeastern U.S. Subject to board approval, finalization of zoning approvals and other arrangements, we expect to have the second aerogel plant operational during the second half of 2023. In addition, we are planning to construct a state-of-the-art, automated thermal barrier fabrication operation and to hire dedicated thermal barrier fabrication employees in Mexico in order to keep pace with the significant potential demand for our PyroThin thermal barriers.

We have entered into production contracts with a major U.S. automotive original equipment manufacturer to supply fabricated, multi-part thermal barriers for use in the battery system of its next-generation electric vehicles. Pursuant to the contracts, 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 the customer 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, the customer may terminate the contracts any time and for any or no reason. All other terms of the contracts are generally consistent with the customer's standard purchase terms, including quality and warranty provisions customary in the automotive industry.

We have been engaged in a strategic partnership with BASF to develop and commercialize products for the sustainable building materials and other markets. The strategic partnership includes a supply agreement governing the exclusive sale of specified products to BASF and a joint development agreement targeting innovative products and technologies. BASF has no obligation to purchase any products under the supply agreement. Pursuant to the supply agreement, BASF may, in its sole discretion, make prepayments to us in the aggregate amount of up to \$22.0 million during the term of the agreement. We may repay the prepayments to BASF at any time in whole or in part for any reason.

BASF made a prepayment to us of \$5.0 million during 2018. As of January 1, 2019, 25.3% of any amounts that we invoice for Spaceloft A2 sold to BASF will be credited against the outstanding balance of the 2018 prepayment. If any amount of the 2018 prepayment remains uncredited at December 31, 2021, BASF may require that we repay the uncredited amount following a six-week notice period. In January 2019, BASF made an additional prepayment to us of \$5.0 million. As of January 1, 2020, 50% of any

amounts that we invoice for a newly developed product sold to BASF will be credited against the outstanding balance of the 2019 prepayment. After December 31, 2022, BASF may require that we credit 24.7% of any amounts we invoice for Spaceloft A2 sold to BASF against the outstanding balance of the 2019 prepayment or may require that we repay the uncredited amount following a six-week notice period.

In October 2021, we announced with BASF that BASF will discontinue further marketing of Spaceloft A2 effective November 15, 2021. After this date, BASF customers will be able to purchase Spaceloft A2 directly from us. We are currently working with BASF to terminate certain provisions of the supply and joint development agreements other than those governing the prepayments. Subject to finalization, approval and execution of pertinent amendments to the agreements, we expect we will be solely responsible for future development and commercialization of the specified products in the sustainable building materials and other markets. In addition, we expect the uncredited prepayment balances at the time of the execution of the amendments would remain outstanding and subject to repayment upon BASF's request and following the requisite six-week notice periods after December 31, 2021 and December 31, 2022, respectively.

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, 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. 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. On September 29, 2021, the Company entered into an amendment to the Loan Agreement to revise certain financial covenants, among other things.

On May 1, 2020, our wholly owned subsidiary, Aspen Aerogels Rhode Island, LLC (Borrower), executed a note for an unsecured loan of \$3.7 million pursuant to the Paycheck Protection Program (PPP Loan) under the Coronavirus Aid, Relief, and Economic Security Act (CARES Act), as amended, and administered by the U.S. Small Business Administration (SBA). The Borrower conferred with representatives of the SBA prior to finalizing the PPP Loan. The loan was unsecured, contained customary events of default, carried an interest rate of 1% per year, and matured on May 1, 2022. The Borrower had the right to repay the loan at any time without penalty. In addition, the Borrower was permitted at any time to submit an application to extend the maturity of the loan to May 1, 2025.

On August 24, 2021, the SBA remitted \$3.7 million in principal and less than \$0.1 million in accrued interest after approving the Borrower's application for forgiveness of the PPP Loan under the provisions of the CARES Act. Accordingly, we recorded a total gain on the extinguishment of debt of \$3.7 million during the quarter ended September 30, 2021.

On February 3, 2021, we entered into a supply agreement (Supply Agreement) with Silbond Corporation (Silbond), for the purchase of certain silanes (Product). Pursuant to the Supply Agreement, we agreed to purchase, and Silbond agreed to supply, all of our requirements for the Product at our East Providence facility through the term of the Supply Agreement, which term ends on September 30, 2023, unless either party terminates the agreement early pursuant to the terms of the Supply Agreement.

On June 29, 2021, we entered into a securities purchase agreement (Purchase Agreement) with an affiliate of Koch Strategic Platforms (Purchaser). Pursuant to the terms of the Purchase Agreement, we sold to the Purchaser an aggregate of 3,462,124 shares of our common stock at a purchase price equal to \$21.663 per share, for aggregate gross proceeds of approximately \$75.0 million (the Private Placement).

Our revenue for the nine months ended September 30, 2021 was \$90.1 million, which represented an increase of \$12.8 million, or 17%, from \$77.3 million for the nine months ended September 30, 2020. Net loss for the nine months ended September 30, 2021 was \$20.7 million and net loss per share was \$0.70. Net loss for the nine months ended September 30, 2020 was \$15.6 million and net loss per share was \$0.60.

At present, we are not certain of the extent of the impact that the COVID-19 pandemic will continue to have on our business. Our manufacturing facility remains operational and we have not encountered any significant disruption to our supply chain or our ability to deliver to our customers.

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 product and measure our product shipments in square feet. We estimate our annual capacity was approximately 55 million square feet of aerogel blankets at September 30, 2021. We believe the square foot operating metric allows us and our investors to measure our manufacturing capacity and product shipments on a uniform and consistent basis. The following chart sets forth 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,	
	2021	2020	2021	2020
	(In thousands)			
Product shipments in square feet	9,012	6,825	27,526	22,307

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,	
	2021	2020	2021	2020
	(In thousands)			
Net loss	\$ (7,822)	\$ (6,753)	\$ (20,741)	\$ (15,620)
Depreciation and amortization	2,114	2,545	6,856	7,670
Stock-based compensation ⁽¹⁾	1,554	991	3,600	2,990
Gain on extinguishment of debt	(3,734)	—	(3,734)	—
Interest expense	58	49	188	182
Adjusted EBITDA	<u>\$ (7,830)</u>	<u>\$ (3,168)</u>	<u>\$ (13,831)</u>	<u>\$ (4,778)</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.

During 2021, we are projecting growth in total revenue principally due to an anticipated increase in maintenance-based demand in the refinery and chemical market, growth in the European sustainable building materials market and initial thermal barrier revenue in the electric vehicle market. We have also increased prices to offset an increase in raw material costs during 2021 that will contribute to revenue growth.

However, we intend to increase our investment in the electric vehicle market and our aerogel technology platform in 2021. We will use this investment to accelerate thermal barrier business development, to establish industry-leading thermal barrier fabrication capability, to progress from the development phase to the commercialization phase of our silicon-rich carbon aerogel battery materials, and to identify additional high-value markets for our aerogel technology, among other items. As a result, we expect to experience a decrease in Adjusted EBITDA and an increase in net loss in 2021 versus 2020.

Components of Our Results of Operations

Revenue

We recognize product revenue from the sale of our line of aerogel products and research services revenue from the provision of services under contracts with various agencies of the U.S. government and other institutions. Product and research services revenue is recognized upon the satisfaction of contractual performance obligations.

We record deferred revenue for product 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.

During 2021, we are projecting growth in total revenue principally due to an anticipated increase in maintenance-based demand in the refinery and chemical market, growth in the European sustainable building materials market and initial thermal barrier revenue in the electric vehicle market. We have also announced a price increase to offset an increase in raw material costs during 2021 that will contribute to revenue growth.

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 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 expect that material costs will increase both in absolute dollars and as a percentage of revenue during 2021 due to (i) projected growth in product shipments, (ii) the impact of projected growth in PyroThin thermal barrier revenue, and (iii) recent increases in the costs of our raw materials.

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. We expect that manufacturing expense will increase in absolute dollars and as a percentage of revenue during 2021, principally due to our plan to hire additional personnel and incur additional manufacturing expenses to establish fabrication operations in support of projected growth in PyroThin thermal barrier demand.

In total, we expect that cost of product revenue will increase in absolute dollars during 2021 versus 2020 and as a percentage of revenue versus 2020.

Cost of research services revenue consists of direct labor costs of research personnel engaged in the contract research, third-party consulting and subcontractor expense, and associated direct material costs. This cost of revenue also includes overhead expenses associated with project resources, development tools and supplies. Cost of research services revenue is recorded when the related research services revenue is recognized. In 2021, we expect cost of research services revenue will continue to decline as we wind down our existing contract research activities.

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 in absolute dollars and as a percentage of revenue to vary significantly from period to period.

During 2021, we project that gross profit will grow in absolute dollars versus 2020 due to projected growth in total revenue, offset, in part, by increases in manufacturing expense and material costs. We expect that gross profit as a percentage of revenue will decrease modestly during 2021 due to the projected increase in material costs and manufacturing expense in support of projected growth in PyroThin thermal barrier revenue.

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 2021, we are hiring additional personnel and incurring additional operating expenses to support the anticipated multi-year growth in our PyroThin thermal barrier business. In addition, we have recently encountered worker shortages and experienced increased wages within the labor market for our production personnel. Accordingly, (i) personnel-related expenses may exceed our expectations and (ii) labor shortages may have a material impact on our operations. As a result, we expect that operating expenses will continue to 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, we expect these expenses will increase in both absolute dollars and as a percentage of revenue in 2021.

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 2021, 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 and tax consulting costs, and expenses for our executive, finance, legal, human resources and information technology organizations. General and administrative expenses have increased as we have incurred additional costs related to operating as a publicly-traded company, which include costs of compliance with securities, corporate governance and related laws and regulations, investor relations expenses, increased insurance premiums, including director and officer insurance, and increased audit and legal fees.

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 II, Item 1 of this Quarterly Report on Form 10-Q, 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, we expect such expenses will increase in both absolute dollars and as a percentage of revenue 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

Interest expense, net consists primarily of 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, 2021 compared to the three months ended September 30, 2020

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,				Change	
	2021		2020			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
(\$ in thousands)						
Revenue:						
Product	\$ 30,263	100%	\$ 23,939	99%	\$ 6,324	26%
Research services	117	0%	256	1%	(139)	(54)%
Total revenue	<u>\$ 30,380</u>	100%	<u>\$ 24,195</u>	100%	<u>\$ 6,185</u>	26%

The following chart sets forth 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	
	2021	2020	Amount	Percentage
Product shipments in square feet (in thousands)	9,012	6,825	2,187	32%

Total revenue increased \$6.2 million, or 26%, to \$30.4 million for the three months ended September 30, 2021 from \$24.2 million in the comparable period in 2020. The increase in total revenue was the result of an increase in product revenue.

Product revenue increased by \$6.4 million, or 26%, to \$30.3 million for the three months ended September 30, 2021 from \$23.9 million in the comparable period in 2020. This increase was principally driven by growth in the refinery and chemical markets, particularly in the United States and Europe, offset, in part, by a decrease in project-based demand in the liquefied natural gas (LNG) market.

Product revenue for the three months ended September 30, 2021 included \$8.1 million to a North American distributor. Product revenue for the three months ended September 30, 2020 included \$5.2 million to an Asian LNG project contractor, \$4.2 million to a North American distributor and \$3.0 million to a subsea contractor.

The average selling price per square foot of our products decreased by \$0.15, or 4%, to \$3.36 per square foot for the three months ended September 30, 2021 from \$3.51 per square foot for the three months ended September 30, 2020. The decrease in average selling price principally reflected the impact of a change in the mix of products sold. This decrease in average selling price had the effect of decreasing product revenue by \$1.3 million for the three months ended September 30, 2021 from the comparable period in 2020.

In volume terms, product shipments increased by 2.2 million square feet, or 32%, to 9.0 million square feet of aerogel products for the three months ended September 30, 2021, as compared to 6.8 million square feet for the three months ended September 30, 2020. The increase in product volume had the effect of increasing product revenue by \$7.7 million for the three months ended September 30, 2021 from the comparable period in 2020.

Research services revenue was \$0.1 million for the three months ended September 30, 2021 and \$0.3 million in the comparable period in 2020. The decline in research services revenue reflected our decision to wind down our existing contract research activities.

Cost of Revenue

	Three Months Ended September 30,						Change	
	2021			2020				
	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:								
Product	\$ 27,279	90%	90%	\$ 22,243	93%	92%	\$ 5,036	23%
Research services	34	29%	0%	52	20%	0%	(18)	(35)%
Total cost of revenue	\$ 27,313	90%	90%	\$ 22,295	92%	92%	\$ 5,018	23%

Total cost of revenue increased \$5.0 million, or 23%, to \$27.3 million for the three months ended September 30, 2021 from \$22.3 million in the comparable period in 2020. The increase in total cost of revenue was the result of an increase in product cost of revenue.

Product cost of revenue increased by \$5.1 million, or 23%, to \$27.3 million for the three months ended September 30, 2021 from \$22.2 million in the comparable period in 2020. The \$5.1 million increase was the result of a \$1.9 million increase in material costs and a \$3.2 million increase in manufacturing expense. The increase in material costs was principally the result of the 2.2 million square feet, or 32%, increase in total product shipments. The increase in manufacturing expense was the result of increases in compensation and related expenses of \$2.5 million, operating supplies of \$0.4 million, professional services of \$0.2 million and other manufacturing expenses of \$0.1 million.

Product cost of revenue as a percentage of product revenue decreased to 90% during the three months ended September 30, 2021 from 93% during the three months ended September 30, 2020. This decrease was principally the result of the decrease in material costs as a percentage of revenue during the three months ended September 30, 2021.

Research services cost of revenue was less than \$0.1 million for both the three months ended September 30, 2021 and 2020.

Gross Profit

	Three Months Ended September 30,				Change	
	2021		2020			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	(\$ in thousands)					
Gross profit	\$ 3,067	10%	\$ 1,900	8%	\$ 1,167	61%

Gross profit increased by \$1.2 million, or 61%, to \$3.1 million for the three months ended September 30, 2021 from \$1.9 million in the comparable period in 2020. The increase in gross profit was the result of the \$6.2 million increase in total revenue, offset, in part, by the \$5.0 million increase in total cost of revenue. The increase in revenue was principally driven by growth in the refinery and chemical markets, particularly in the United States and Europe, offset, in part, by a decrease in project-based demand in the LNG market. The increase in total cost of revenue was the result of the \$1.9 million increase in material costs associated with the 2.2 million square feet, or 32%, increase in total product shipments and the \$3.2 million increase in manufacturing expense during 2021.

Gross profit as a percentage of total revenue increased to 10% of total revenue for the three months ended September 30, 2021 from 8% in the comparable period in 2020.

Research and Development Expenses

	Three Months Ended September 30,					
	2021		2020		Change	
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	(\$ in thousands)					
Research and development expenses	\$ 3,077	10%	\$ 2,088	9%	\$ 989	47%

Research and development expenses increased by \$1.0 million, or 47%, to \$3.1 million for the three months ended September 30, 2021 from \$2.1 million in the comparable period in 2020. The \$1.0 million increase reflects an increase in compensation and related costs of \$0.7 million and other research and development expenses of \$0.3 million.

Research and development expenses as a percentage of total revenue increased to 10% for the three months ended September 30, 2021 from 9% in the comparable period in 2020 due principally to increases in personnel and expenditures to support our carbon aerogel battery materials initiative.

Sales and Marketing Expenses

	Three Months Ended September 30,				Change	
	2021		2020			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	(\$ in thousands)					
Sales and marketing expenses	\$ 4,915	16%	\$ 2,755	11%	\$ 2,160	78%

Sales and marketing expenses increased by \$2.1 million, or 78%, to \$4.9 million for the three months ended September 30, 2021 from \$2.8 million in the comparable period in 2020. The \$2.1 million increase was principally the result of increases in compensation and related costs of \$2.0 million and travel-related and other expenditures of \$0.3 million, offset, in part, by a decrease in sales consultant expenses of \$0.2 million.

Sales and marketing expenses as a percentage of total revenue increased to 16% for the three months ended September 30, 2021 from 11% in the comparable period in 2020, 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	
	2021		2020			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	(\$ in thousands)					
General and administrative expenses	\$ 6,573	22%	\$ 3,761	16%	\$ 2,812	75%

General and administrative expenses increased by \$2.8 million, or 75%, to \$6.6 million for the three months ended September 30, 2021 from \$3.8 million in the comparable period in 2020. The \$2.8 million increase was the result of increases in compensation and related costs of \$1.8 million, recruiting and professional services of \$0.6 million, and other general and administrative expenses of \$0.6 million, offset, in part, by a decrease in the provision for uncollectible accounts of \$0.2 million.

General and administrative expenses as a percentage of total revenue increased to 22% for the three months ended September 30, 2021 from 16% in the comparable period in 2020.

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	
	2021		2020			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	(\$ in thousands)					
Interest expense, net	\$ (58)	(0)%	\$ (49)	(0)%	\$ (9)	18%

Interest expense, net, consists primarily of fees and interest expense associated with our revolving credit agreement and was less than \$0.1 million for both the three months ended September 30, 2021 and 2020.

Nine months ended September 30, 2021 compared to the nine months ended September 30, 2020

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	
	2021		2020			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	(\$ in thousands)					
Revenue:						
Product	\$ 89,809	100%	\$ 76,772	99%	\$ 13,037	17%
Research services	338	0%	483	1%	(145)	(30)%
Total revenue	<u>\$ 90,147</u>	<u>100%</u>	<u>\$ 77,255</u>	<u>100%</u>	<u>\$ 12,892</u>	<u>17%</u>

The following chart sets forth product shipments in square feet for the periods presented:

	Nine Months Ended September 30,		Change	
	2021	2020	Amount	Percentage
Product shipments in square feet (in thousands)	27,526	22,307	5,219	23%

Total revenue increased \$12.8 million, or 17%, to \$90.1 million for the nine months ended September 30, 2021 from \$77.3 million in the comparable period in 2020. The increase in total revenue was the result of an increase in product revenue.

Product revenue increased by \$13.0 million, or 17%, to \$89.8 million for the nine months ended September 30, 2021 from \$76.8 million in the comparable period in 2020. This increase was principally driven by growth in the global refinery and chemical markets, particularly in the United States and Europe, offset, in part, by decreases in project-based revenue in the LNG market.

Product 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. Product revenue for the nine months ended September 30, 2020 included \$15.3 million to an Asian LNG project contractor and \$13.6 million to a North American distributor.

The average selling price per square foot of our products decreased by \$0.18, or 5%, to \$3.26 per square foot for the nine months ended September 30, 2021 from \$3.44 per square foot for the nine months ended September 30, 2020. The decrease in average selling price principally reflected the impact of a change in the mix of products sold for the nine months ended September 30, 2021 from the comparable period in 2020. This decrease in average selling price had the effect of decreasing product revenue by \$5.0 million for the nine months ended September 30, 2021 from the comparable period in 2020.

In volume terms, product shipments increased by 5.2 million square feet, or 23%, to 27.5 million square feet of aerogel products for the nine months ended September 30, 2021, as compared to 22.3 million square feet for the nine months ended September 30, 2020. The increase in product volume had the effect of increasing product revenue by \$18.0 million for the nine months ended September 30, 2021 from the comparable period in 2020.

Research services revenue was \$0.3 million and \$0.5 million for the nine months ended September 30, 2021 and September 30, 2020, respectively. The decline in research services revenue reflected our decision to wind down our existing contract research activities.

Cost of Revenue

	Nine Months Ended September 30,						Change	
	2021			2020				
	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:								
Product	\$ 78,459	87%	87%	\$ 66,403	86%	86%	\$ 12,056	18%
Research services	85	25%	0%	121	25%	0%	(36)	(30)%
Total cost of revenue	\$ 78,544	87%	87%	\$ 66,524	86%	86%	\$ 12,020	18%

Total cost of revenue increased \$12.0 million, or 18%, to \$78.5 million for the nine months ended September 30, 2021 from \$66.5 million in the comparable period in 2020. The increase in total cost of revenue was principally the result of an increase in product cost of revenue.

Product cost of revenue increased \$12.1 million, or 18%, to \$78.5 million for the nine months ended September 30, 2021 from \$66.4 million in the comparable period in 2020. The \$12.1 million increase was the result of a \$6.3 million increase in material costs and a \$5.8 million increase in manufacturing expense. The increase in material costs was driven principally by the 5.2 million square feet, or 23%, increase in product shipments. The increase in manufacturing expense was the result of increases in compensation and related expenses of \$4.0 million, operating supplies of \$1.0 million, maintenance costs of \$0.5 million and other expenses of \$0.3 million.

Product cost of revenue as a percentage of product revenue increased to 87% during the nine months ended September 30, 2021 from 86% during the nine months ended September 30, 2020. This increase was the result of the increase in both material costs and manufacturing expense as a percentage of revenue during the nine months ended September 30, 2021.

Research services cost of revenue was approximately \$0.1 million for both the nine months ended September 30, 2021 and 2020.

Gross Profit

	Nine Months Ended September 30,				Change	
	2021		2020			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	(\$ in thousands)					
Gross profit	\$ 11,603	13%	\$ 10,731	14%	\$ 872	8%

Gross profit increased \$0.8 million, or 8%, to \$11.6 million for the nine months ended September 30, 2021 from \$10.7 million in the comparable period in 2020. The increase in gross profit was the result of the \$12.8 million increase in total revenue, offset, in part, by the \$12.0 million increase in total cost of revenue. The increase in revenue was driven principally by the 23% increase in product shipments. The increase in total cost of revenue was driven by the \$6.3 million increase in material costs and the \$5.8 million increase in manufacturing expense.

Gross profit as a percentage of total revenue decreased to 13% of total revenue for the nine months ended September 30, 2021 from 14% in the comparable period in 2020.

Research and Development Expenses

	Nine Months Ended September 30,				Change	
	2021		2020			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	(\$ in thousands)					
Research and development expenses	\$ 8,128	9%	\$ 6,436	8%	\$ 1,692	26%

Research and development expenses increased \$1.7 million, or 26%, to \$8.1 million for the nine months ended September 30, 2021 from \$6.4 million in the comparable period in 2020. The \$1.7 million increase was the result of increases in compensation and related costs of \$1.3 million and other research and development expenses of \$0.4 million.

Research and development expenses as a percentage of total revenue was 9% for the nine months ended September 30, 2021 from 8% in the comparable period in 2020.

Sales and Marketing Expenses

	Nine Months Ended September 30,				Change	
	2021		2020			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	(\$ in thousands)					
Sales and marketing expenses	\$ 11,784	13%	\$ 9,051	12%	\$ 2,733	30%

Sales and marketing expenses increased by \$2.7 million, or 30%, to \$11.8 million for the nine months ended September 30, 2021 from \$9.1 million in the comparable period in 2020. The \$2.7 million increase was the result of increases in compensation and related expenses of \$3.2 million and other sales related expenses of \$0.3 million, offset, in part, by decreases in sales consultant costs of \$0.7 million and travel related expenses of \$0.1 million.

Sales and marketing expenses as a percentage of total revenue was 13% for the nine months ended September 30, 2021 versus 12% in the comparable period in 2020.

General and Administrative Expenses

	Nine Months Ended September 30,				Change	
	2021		2020			
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	(\$ in thousands)					
General and administrative expenses	\$ 15,978	18%	\$ 10,682	14%	\$ 5,296	50%

General and administrative expenses increased by \$5.3 million, or 50%, to \$16.0 million during the nine months ended September 30, 2021 from \$10.7 million in the comparable period in 2020. The \$5.3 million increase was the result of an increase in compensation and related expenses of \$2.9 million, recruiting and professional services of \$1.9 million, and other general and administrative expenses of \$1.0 million, offset, in part, by a decrease in the provision for uncollectible accounts of \$0.5 million.

General and administrative expenses as a percentage of total revenue increased to 18% of total revenue for the nine months ended September 30, 2021 from 14% during the comparable period in 2020.

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,					
	2021		2020		Change	
	Amount	Percentage of Revenue	Amount	Percentage of Revenue	Amount	Percentage
	(\$ in thousands)					
Interest expense, net	\$ (188)	(0)%	\$ (182)	(0)%	\$ (6)	3%

Interest expense, net, consists primarily of fees and interest expense associated with our revolving credit agreement and was approximately \$0.2 million during both the nine months ended September 30, 2021 and 2020.

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.

Through 2015, we experienced revenue growth and gained share in our target markets. Despite a decline in revenue in 2016, 2017 and 2018, our financial projections anticipated long-term revenue growth, increasing levels of gross profit and improved cash flow from operations. To support this growth, we increased the capacity of our East Providence, Rhode Island manufacturing facility in phases to approximately 55 million square feet of aerogel blankets.

To meet expected demand growth for our aerogel products in the energy, sustainable building and electric vehicle markets, we are planning to expand our aerogel blanket capacity by constructing a second manufacturing plant at a site in the southeastern U.S. Subject to board approval, finalization of zoning approvals and other arrangements, we expect to have the second aerogel plant operational during the second half of 2023. In addition, we are planning to construct a state-of-the-art, automated thermal barrier fabrication operation and to hire dedicated thermal barrier fabrication employees at potential sites in Mexico 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 2021, 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. Accordingly, we are hiring additional personnel, incurring additional operating expenses, and plan to construct a carbon aerogel battery materials facility, among other items.

We took several actions during 2020 to increase the financial resources available to support current operating requirements and capital expenditures. In February 2020, we completed an underwritten public offering of our common stock and received net proceeds of \$14.8 million. In March 2020, we extended the maturity of our revolving credit facility with Silicon Valley Bank to April 28, 2021. In May 2020, our wholly owned subsidiary, Aspen Aerogels Rhode Island, LLC, received PPP Loan proceeds of \$3.7 million under

the CARES Act. During November and December 2020, we also sold shares of our common stock through our at-the-market offering program and received net proceeds of \$9.5 million.

During the nine months ended September 30, 2021, we sold shares of our common stock through our at-the-market offering program and received net proceeds of \$19.4 million. 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. In addition, during September 2021, the SBA remitted \$3.7 million in principal and accrued interest after approving Aspen Aerogels Rhode Island, LLC's application for forgiveness of the PPP Loan under the provisions of the CARES Act.

We believe that our existing cash balance of \$95.5 million and funds 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.

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, 2021, we had \$95.5 million of cash and cash equivalents.

On February 18, 2020, we completed an underwritten public offering of 1,955,000 shares of our common stock at an offering price of \$8.25 per share. We received net proceeds of \$14.8 million after deducting underwriting discounts and commissions of \$1.1 million and offering expenses of approximately \$0.3 million.

On November 5, 2020, we entered into a sales agreement for an ATM offering program under which we could sell up to \$33,871,250 of our common stock through B. Riley Securities as our sales agent. We were not obligated to sell any stock under the sales agreement. We agreed to pay B. Riley Securities a commission of 3.0% of the gross sales proceeds of shares sold under the agreement. During 2020, we sold 714,357 shares of our common stock through the ATM offering program and received net proceeds of \$9.5 million. During the nine months ended September 30, 2021, we sold an additional 929,981 shares of our common stock through the ATM offering program and received net proceeds of \$19.4 million.

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.

On May 1, 2020, our wholly-owned subsidiary, Aspen Aerogels Rhode Island, LLC (Borrower) executed a note for a loan of \$3.7 million pursuant to the PPP under the CARES Act, as amended, and administered by the SBA. On August 24, 2021, the SBA remitted \$3.7 million in principal and accrued interest pursuant to the Borrower's application for forgiveness of the PPP Loan under the provisions of the CARES Act.

We have a prepayment balance of \$9.7 million associated with prepayments received pursuant to our supply agreement with BASF.

We have maintained our revolving credit facility, as amended from time to time, with Silicon Valley Bank since March 2011. On March 12, 2021, we amended and restated our revolving credit facility with Silicon Valley Bank to extend the maturity date of the revolving credit facility to April 28, 2022 and to establish certain minimum Adjusted EBITDA and minimum Adjusted Quick Ratio covenants. 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, 2021, 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, 2021, we were in compliance with all such covenants.

The amount available to us under the revolving credit facility as of September 30, 2021 was \$9.5 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, 2021, we used \$6.6 million in net cash in operating activities, as compared to the use of \$4.8 million in net cash during the comparable period in 2020, an increase in the use of cash of \$1.8 million. This increase in use of cash was the result of an increase in net loss adjusted for non-cash items of \$9.0 million, offset, in part, by an increase in net cash provided by changes in operating assets and liabilities of \$7.2 million.

Net Cash Used in Investing Activities

Net cash used in investing activities is primarily related to capital expenditures to support our growth. Net cash used in investing activities for the nine months ended September 30, 2021 and 2020 was \$6.1 million and \$2.6 million, respectively, for capital expenditures primarily for machinery and equipment to improve the capacity, throughput, efficiency and reliability of our East Providence manufacturing facility.

Net Cash Provided by Financing Activities

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 of our common stock, \$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.

Net cash provided by financing activities for the nine months ended September 30, 2020 totaled \$15.1 million and consisted of \$19.4 million in borrowings under our line of credit, \$14.8 million in net proceeds from an underwritten public offering of our common stock, \$3.7 million in net proceeds from the issuance of long-term debt, and \$1.0 million in proceeds from employee stock option exercises, offset, in part, by \$22.6 million of repayments under our line of credit and \$1.2 million in cash used for payments made for employee tax withholdings associated with the vesting of restricted stock units.

Off Balance Sheet Arrangements

Since inception, we have not engaged in any off balance sheet activities as defined in Item 303(a)(4) of Regulation S-K.

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: 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 capacity expansion of our East Providence manufacturing facility, 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 plans to expand capacity in our East Providence, Rhode Island manufacturing facility; 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; 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; 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 expectations about incurring significant capital expenditures in the future; our expectations about the expansion of our workforce and resources and its effect on sales and marketing, general and administrative, and related expenses; 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; 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, 2021, we had unrestricted cash and cash equivalents of \$95.5 million. These amounts were held for working capital and capital expansion purposes and were invested primarily in deposit and money market accounts at major financial institutions 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, 2021, we had no borrowings outstanding on our revolving credit facility. As of September 30, 2021, 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 April 28, 2022. We intend to extend or replace the facility prior to its maturity.

As of September 30, 2021, the amount available to us under the revolving credit facility was \$9.5 million after giving effect to the \$1.3 million of letters of credit outstanding under the facility.

Inflation Risk

We do not believe that inflation has had a material effect on our business, results of operations, or financial condition. Nonetheless, if our costs were to become subject to significant inflationary pressures, we may not be able to fully offset such higher costs. Our inability or failure to do so could harm our business, results of operations, or financial condition.

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, 2021, 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. Based on such evaluation, our principal executive officer and principal financial officer have concluded that, as of September 30, 2021, 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. In addition, our principal executive officer and principal financial officer have concluded that the impact of the COVID-19 pandemic did not impact our ability to maintain our internal controls over financial reporting and disclosure controls and procedures.

(b) Changes in Internal Controls.

During the nine months ended September 30, 2021, there were no changes in our internal control over financial reporting, as such term is defined in Rules 13a-15(f) and 15(d)-15(f) promulgated under the Exchange Act, that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

PART II — OTHER INFORMATION

Item 1. Legal Proceedings.

Patent Enforcement Actions

In May 2016, we filed a complaint for patent infringement against Nano Tech Co., Ltd. (Nano), and Guangdong Alison Hi Tech., Ltd. (Alison) in the International Trade Commission, or ITC. In February 2018, the ITC issued its final determination that Nano and Alison had infringed asserted Aspen patents and that they have not proven the patents are invalid except with respect to one dependent product claim, which the ITC found was not infringed. The ITC affirmed that Alison and Nano each violated Section 337 of the Tariff Act and issued a limited exclusion order prohibiting importation of infringing aerogel insulation products manufactured by Alison and Nano. Alison's appeal with respect to a product patent to the United States Court of Appeals for the Federal Circuit (CAFC) was rejected and resulted in CAFC affirming the validity of our patent. The exclusion order, which is enforced by the United States Customs and Border Protection, is currently in effect.

Additionally, the USPTO denied Alison's requests to invalidate the claims of four of our patents in Inter-Partes Review. Alison also filed multiple similar requests with the Chinese Patent Office (SIPO), seeking to invalidate our Chinese manufacturing process patents and two of our Chinese product patents. With respect to one of those requests, not withdrawn previously by Alison, the Patent Review Board of SIPO (PRB), issued a decision upholding the validity of Aspen's issued patent as amended in the proceedings. Alison has appealed the PRB's decision to the Beijing IP court. On July 25, 2020, the Beijing IP court dismissed Alison's appeal and upheld the validity of Aspen's patent, and we received this decision on September 15, 2020. Nano has also filed a request seeking invalidation of a product patent at SIPO. After the oral hearing at PRB, Nano withdrew its invalidation request. On September 23, 2019, Alison filed yet another request to invalidate the same patent, whose validity was previously confirmed by PRB. On January 23, 2020 PRB denied Alison's latest invalidation request.

In April 2016, we also filed a patent infringement suit at the District Court in Mannheim, Germany (Mannheim court), against Nano, Alison and two European resellers asserting their infringement of one of our German patents. We subsequently asserted infringement of another three patents against Nano, Alison and a European reseller of Alison's products at the Mannheim court. We have since settled with one European reseller in exchange for a commitment not to procure infringing products and cooperation with our case.

- In January 2018, the court issued a series of judgments by acknowledgement (German, Anerkenntnisurteil) finding the second reseller, Hiltex, liable for infringement and also issued injunctions against Hiltex. The judgments resulted from a settlement agreement in which Hiltex agreed not to resell the infringing products in Europe where at least one of the asserted patents are active.
- On March 8, 2019, the Mannheim court issued two separate judgments in cases against Nano and Alison, respectively. The Mannheim court determined that both Nano and Alison are infringing on Aspen's EP1638750 (750 Patent) in connection with their respective products. The court also issued injunctions prohibiting the offer, putting on the market, using, importing or possessing the infringing products. The court found the defendants liable to us for damages since September 22, 2012. The court also ordered the defendants to provide information on the scope of the acts of infringement committed since August 22, 2012, and a recall of infringing products. The court ordered Nano and Alison to bear the costs of the legal proceedings and reimburse statutory attorneys' costs and expenses to us, that exact amount of which is yet to be determined. Nano and Alison have appealed the judgments of the Mannheim court. Nano subsequently withdrew the appeal while Alison's appeal is currently pending.
- The Mannheim court issued two decisions on December 23, 2019 finding that Alison infringed the 577 Patent and the 950 Patent and also issued injunctions prohibiting Alison from continuing infringement in connection with any aerogel sheets. The December 2019 decisions against Alison have now become final and binding.
- The Mannheim court issued two decisions on July 31, 2020 finding that Nano infringed each of the 577 Patent and the 950 Patent. In addition to granting other remedies, the court also issued injunctions prohibiting the offer, putting on the market, using, importing or possessing any aerogel sheets. After the passing of the deadline to file appeals, these decisions have now become final.
- Nano and Alison also initiated nullity actions in German Federal Patent Court in Munich against our asserted German patents. On September 25, 2018, the Federal Patent Court in Munich dismissed the challenge to the validity of 750 Patent which has subsequently become final. Nano and Alison also filed an opposition to one of the asserted patents at the EPO. In December

2018, the opposition division of EPO determined the patent, EP2813338 (338 Patent), was invalid on formality grounds and decided to revoke it, which determination is currently under appeal at the EPO Board of appeals.

- On March 19 and 20, 2019 the German Federal Patent Court in Munich (FPC) conducted oral proceedings and voided four claims in EP2415577 (577 Patent) and confirmed the validity of challenged claims in EP2422950 (950 Patent) within the scope of silica gels. These FPC judgments are now final and binding on the parties. Nano had filed another nullity action seeking to invalidate the remaining claims in the 577 Patent which action Nano subsequently failed to pursue. On June 17, 2020, Nano also filed an opposition to a recently issued Aspen Patent EP3120983B1, titled “Continuous Sheet of Gel Materials and Continuous sheet of Aerogel.”
- On January 28, 2021, a search order was executed and relevant evidence secured at the principal places of business of AMA S.p.A. and AMA Composites S.r.l. (collectively, AMA) in San Martino in Rio and Campogalliano, respectively, based on an ex-parte search order issued by the Court of Genoa, Italy at our request in connection with alleged infringement of the Italian part of our patents previously asserted successfully against Nano and Alison in Germany. The Court of Genoa subsequently held a hearing and confirmed the validity of the search order and its execution. While the search proceedings do not take a position on the infringement issues, we may use any evidence collected during the search proceedings to prove infringement. As a result, on May 3, 2021, we filed an infringement complaint, a writ of summons, as known in Italy, at the Court of Genoa alleging that AMA has infringed the Italian part of three European patents (same patents asserted in the German litigation) and a patent on composition of aerogel-based composites in connection with AMA’s resale of aerogel products supplied by Chinese companies and sale of any products derived therefrom. We are seeking monetary damages and preliminary injunction of AMA’s alleged infringing activities. We expect the Court of Genoa to assess our claims and AMA’s defense through appointment of an expert after the submission of relevant writs and evidence. We issued a press release on May 6, 2021 describing the patent enforcement action of May 3, 2021 (Press Release). On June 7, 2021, AMA served us a copy of a request it previously filed with the Court of Genoa seeking an ex-parte preliminary injunction (PI) against us alleging the Press Release constituted anti-competitive conduct and that it infringed AMA’s trademark rights. The service of the request followed the court’s prior denial of the ex-parte order and an order requiring AMA to serve the request on us. The court subsequently conducted an oral hearing on June 15, 2021. On June 24, 2021, the court denied AMA’s request for a PI, reasoning that Aspen’s Press Release was factually accurate, was not misleading, distinguished facts from opinions and that it was neither anti-competitive nor did it infringe trademark rights of AMA. The Court also ordered AMA to pay certain of our legal fees. On July 5, 2021, AMA informed us that it has decided not to appeal the denial of June 24, 2021. We subsequently learned that AMA had also made a criminal complaint against our chief executive officer for defamation in connection with the Press Release. In response to our infringement complaint, AMA has also added as a counter-claim in connection with its claims regarding the Press Release, those same claims that it previously sought a preliminary injunction which was denied by the court. The patent infringement proceedings are ongoing.

Additionally, a reseller of Nano’s products in Taiwan challenged the validity of one of our patents in Taiwan in 2018. After careful review of our written response, the Taiwanese patent office has determined the patent as valid and dismissed the challenge in December 2018. In 2018, LG Chem Ltd. challenged the validity of one of our patents in Korea at the IPTAB of the Korean Intellectual Property Office. After conducting an oral hearing, the IPTAB issued a decision on November 30, 2019 upholding claims related to aerogel sheets incorporating fibers. On January 14, 2021 the Korean Patent Court confirmed the validity of the claims related to aerogel sheets incorporating fibers.

Due to their nature, it is difficult to predict the outcome or the costs involved in any litigation or administrative proceedings, including any appeals process. Furthermore, the counter parties in these proceedings may have significant resources and interest to litigate and therefore, these litigation matters could be protracted and may ultimately involve significant legal expenses. In addition to the foregoing, we have been and may be from time to time a party to other legal proceedings that arise in the ordinary course of business and to other patent enforcement actions to assert our patent rights.

Item 1A. Risk Factors.

There have been no material changes to the risk factors included in our Annual Report.

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, 2021.

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	<u>First Amendment to the Second Amended and Restated Loan and Security Agreement, dated as of September 29, 2021, by and between the Registrant and Silicon Valley Bank.</u>
31.1	<u>Certification of principal executive officer under Section 302(a) of the Sarbanes-Oxley Act of 2002.</u>
31.2	<u>Certification of principal financial officer under Section 302(a) of the Sarbanes-Oxley Act of 2002.</u>
32	<u>Certifications of the principal executive officer and the principal financial officer under Section 906 of the Sarbanes-Oxley Act of 2002.</u>
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 4, 2021

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

Date: November 4, 2021

By: /s/ John F. Fairbanks
John F. Fairbanks
Vice President, Chief Financial Officer and Treasurer
(principal financial officer and principal accounting officer)

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

This First Amendment to Second Amended and Restated Loan and Security Agreement (this “**Amendment**”) is entered into this 29th day of September, 2021 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 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). Clause (a) of Section 6.9 is deleted in its entirety and replaced with the following:

“(a) EBITDA. Borrower shall achieve, measured as of the end of each fiscal quarter during the following periods, EBITDA of at least (loss not worse than) the following for the following periods:

Period	Minimum EBITDA (maximum loss)
Trailing nine (9) month period ending September 30, 2021	(\$16,000,000)
Trailing twelve (12) month period ending December 31, 2021	(\$22,000,000)

For the quarterly periods ending after December 31, 2021, the minimum EBITDA financial covenant thresholds shall be determined by Bank in its sole discretion on or before February 28, 2022 based on the Board-approved projections delivered to Bank pursuant to Section 6.2(f) hereof; provided further, that failure to timely deliver such Board-approved projections in accordance with

Section 6.2(f) shall result in an immediate Event of Default for which no cure or grace period shall apply.”

2.2 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, 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.

9. Fees and Expenses. 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 long form good standing certificates of Borrower and Guarantor, certified by their respective jurisdictions of formation, dated as of a date no earlier than thirty (30) days prior to the date hereof;

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

10.4 such other documents as Bank may reasonably request.

11. Post-Closing Requirement. Within thirty (30) days after the date of this Amendment, Borrower shall deliver to Bank evidence satisfactory to Bank that the insurance policies and endorsements required by Section 6.7 of the Loan Agreement are in full force and effect. Failure to comply with the foregoing requirement within the time period noted, or such longer period as Bank may agree in its sole discretion, shall constitute an Event of Default for which no grace or cure period shall apply.

[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

SILICON VALLEY BANK

By: /s/ C.J. Bradford

Name: C.J. Bradford

Title: Vice President

BORROWER

ASPEN AEROGELS, INC.

By: /s/ John Fairbanks

Name: John Fairbanks

Title: Chief Financial Officer

**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 First 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 September 29, 2021

[Signature Page Follows]

GUARANTOR:

ASPEN AEROGELS RHODE ISLAND, LLC

By: /s/ John Fairbanks

Name: John Fairbanks

Title: Chief Financial Officer

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
2, 10-K and 8-K	Within 5 days after filing with SEC	Yes No
& A/P Agings, and Deferred Revenue reports	Monthly within 20 days	Yes No
Borrowing 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
Projections	FYE within 30 days	Yes No

<u>Financial Covenant</u>	<u>Required</u>	<u>Actual</u>	<u>Complies</u>
Minimum EBITDA	*	\$	Yes No
Minimum Adjusted Quick Ratio	1.20 to 1.00	to 1.00	Yes No

*See Section 6.9

Performance Pricing		Applies
asted Quick Ratio at least 1.50:1.00	Prime + 0.75% (Eligible Accounts) or Prime + 1.25% (Eligible Foreign Accounts);	Yes No
asted Quick Ratio less than 1.50:1.00	Prime + 1.50% (Eligible Accounts); Prime + 2.00% (Eligible Foreign Accounts)	Yes No

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. EBITDA (Section 6.9(a))

Required: Borrower shall achieve, measured as of the end of each fiscal quarter during the following periods, EBITDA of at least (loss not worse than) the following for the following periods:

Period	Minimum EBITDA (maximum loss)
Trailing nine (9) month period ending September 30, 2021	(\$16,000,000)
Trailing twelve (12) month period ending December 31, 2021	(\$22,000,000)

For the quarterly periods ending after December 31, 2021, the minimum EBITDA financial covenant thresholds shall be determined by Bank in its sole discretion on or before February 28, 2022 based on the Board-approved projections delivered to Bank pursuant to Section 6.2(f) hereof; provided further, ~~that~~ failure to timely deliver such Board-approved projections in accordance with Section 6.2(f) shall result in an immediate Event of Default for which no cure or grace period shall apply.

Actual:

- A. Net Income
- B. To the extent included in the determination of Net Income
- 1.The provision for income taxes
 - 2.Depreciation expense
 - 3.Amortization expense
 - 4.Net Interest Expense
 - 5.Non-cash stock compensation expense
 6. One-time non-recurring expenses approved by the Bank in its sole discretion
 - 7.The sum of lines 1 through 6
- C. EBITDA (line I.A plus line I.B.7)

Is line I.C equal to or greater than \$_____?

No, not in compliance

Yes, in compliance

II. 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 Offering 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

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 4, 2021

/s/ Donald R. Young

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

CERTIFICATIONS UNDER SECTION 302

I, John F. Fairbanks, 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 4, 2021

/s/ John F. Fairbanks

John F. Fairbanks

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, 2021 (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 4, 2021

/s/ Donald R. Young

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

Dated: November 4, 2021

/s/ John F. Fairbanks

John F. Fairbanks
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.