

Risk Factors Comparison 2025-03-18 to 2024-02-29 Form: 10-K

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Investing in our common stock is risky. In addition to the other information contained in this Annual Report on Form 10-K, you should consider carefully the following risk factors in evaluating our business and us. If any of the following events actually occur, our business, operating results, prospects or financial condition could be materially and adversely affected. This could cause the trading price of our common stock to decline and you may lose all or part of your investment. The risks described below are not the only ones that we face. Additional risks not presently known to us or that we currently deem immaterial may also significantly impair our business operations and could result in a complete loss of your investment. We have incurred substantial operating losses since our inception and will continue to incur substantial operating losses for the foreseeable future. Since our inception, we have been engaged primarily in the research and development of our electro-optic polymer materials technologies and products. As a result of these activities, we incurred significant losses and experienced negative cash flow since our inception. We incurred a net loss of \$ ~~21-22, 038-535, 032-041~~ for the year ended December 31, ~~2023-2024~~ and \$ ~~17-21, 230-038, 480-032~~ for the year ended December 31, ~~2022-2023~~, and \$ ~~18, 631, 381~~ for the year ended December 31, ~~2021~~. We anticipate that we will continue to incur operating losses through at least ~~2024-2025~~. We may not be able to generate significant revenue either through customer contracts for our existing or future products or technologies or through development contracts from the U. S. government or government subcontractors. We expect to continue to make significant operating and capital expenditures for research and development and to improve and expand production, sales, marketing and administrative systems and processes. As a result, we will need to generate significant revenue to achieve profitability. We cannot assure you that we will ever achieve profitability. We are subject to the risks frequently experienced by early-stage companies. The likelihood of our success must be considered in light of the risks frequently encountered by early-stage companies, especially those formed to develop and market new technologies. These risks include our potential inability to: · Establish significant product sales and marketing capabilities; · Establish and maintain significant markets for our products and future products; · Identify, attract, retain and motivate qualified personnel; · Continue to develop and upgrade our technologies to keep pace with changes in technology and the growth of markets using polymer-based materials; · Develop expanded product production facilities, along with silicon-based foundry and other outside contractor relationships; and · Maintain our reputation and build trust with customers; ~~· Scale up from small pilot or prototype quantities to large quantities of product on a consistent basis; · Contract for or develop the internal skills needed to master large volume production of our products; and · Fund the capital expenditures required to develop volume production due to the limits of our available financial resources.~~ **Our failure** If we fail to effectively manage our growth, and effectively transition from our focus on research and development activities to commercially ~~commercially~~ **commercial** successful products, **operations could harm** our business ~~could suffer~~. Failure to manage growth of operations could harm our business. To date, a large number of our activities and resources have been directed at the research and development of our technologies and development of potential related products including work in association with external partners. The transition from a focus on research and development to being a vendor of products requires effective planning and management. Additionally, growth arising from expected synergies from any future acquisitions will require effective planning and management. Future expansion will be expensive and will likely strain management and other resources. In order to effectively manage growth, we must: · Continue to develop an effective planning and management process to implement our business strategy; · Hire, train and integrate new personnel in all areas of our business; · Expand our facilities and increase capital investments; and · Continue to successfully partner with silicon-based foundries. We cannot assure you that we will be able to accomplish these tasks effectively or otherwise effectively manage our growth. ~~36-13~~ We will require additional capital to continue to fund our operations and if we do not obtain additional capital, we may be required to substantially limit our operations. Our business does not presently generate the cash needed to finance our current and anticipated operations. Based on our current operating plan and budgeted cash requirements, we believe that we have sufficient funds to finance our operations through ~~July-April 2025-2026~~; however, we will need to obtain additional future financing after that time to finance our operations until such time that we can conduct profitable revenue-generating activities. We expect that we will need to seek additional funding through public or private financings, including equity financings, and through other arrangements, including collaborative arrangements. Poor financial results, unanticipated expenses or unanticipated opportunities could require additional financing sooner than we expect. Other than with respect to (i) the purchase agreement for up to \$ 30 million we entered into with Lincoln Park on February 28, 2023 (the “2023 Purchase Agreement”); and (ii) **the purchase agreement for up to \$ 30 million we entered into with Lincoln Park on March 17, 2025 (the “2025 Purchase Agreement”); and (iii)** the sales agreement for up to \$ 35 million we entered into with Roth Capital Partners, LLC (“Roth Capital”) on December 9, 2022 (the “Roth Sales Agreement”); we have no plans or arrangements with respect to the possible acquisition of additional financing, and such financing may be unavailable when we need it or may not be available on acceptable terms. We currently have a remaining amount of \$ ~~0-10.5-million~~ **and \$ 30 million** that is available to our Company pursuant to the **2023 Purchase Agreement and 2025** Purchase Agreement with Lincoln Park, **subject to the conditions set forth therein, respectively,** and \$ ~~33-31, 4-5~~ million that is available to our Company pursuant to the Roth Sales Agreement with Roth Capital. Our forecast of the period of time through which our financial resources will be adequate to support our operations is a forward-looking statement and involves risks and uncertainties, and actual results could vary as a result of a number of factors, including the factors discussed elsewhere in this Annual Report on Form 10-K. We have based this estimate on assumptions that may prove to be wrong, and we could use our available capital resources sooner than we currently expect. Additional financing may not be

available to us, due to, among other things, our Company not having a sufficient credit history, income stream, profit level, asset base eligible to be collateralized, or market for its securities. If we raise additional funds by issuing equity or convertible debt securities, the percentage ownership of our existing shareholders may be reduced, and these securities may have rights superior to those of our common stock. If adequate funds are not available to satisfy our long- term capital requirements, or if planned revenues are not generated, we may be required to substantially limit our operations. We are entering new markets, and if we fail to accurately predict growth in these new markets, we may suffer substantial losses. We are **initially targeting** ~~devoting significant resources to develop next generation proprietary photonic devices that are based on our advanced electro- optical polymer material systems for future~~ **fiber optic** data communications and telecommunications markets, **in particular ultra- high bandwidth optical connections deployed inside and between datacenters and / or AI clusters. In addition,** we are exploring other applications that include automotive / LIDAR, sensing, displays, **storage, aerospace and defense, satellites, quantum computing** etc., **for our polymer technology platform**. We expect to continue to develop products for these markets and to seek to identify new markets. These markets change rapidly, and we cannot assure you that they will grow or that we will be able to accurately forecast market demand, or lack thereof, in time to respond appropriately. Our investment of resources to develop products for these markets may either be insufficient to meet actual demand or result in expenses that are excessive in light of actual sales volumes. Failure to predict growth and demand accurately in new markets may cause us to suffer substantial losses. In addition, as we enter new markets, there is a significant risk that: · The market may not accept the price and / or performance of our products; · There may be issued patents we are not aware of that could block our entry into the market or could result in excessive litigation; and · The time required for us to achieve market acceptance of our products may exceed our capital resources that would require additional investment. Our plan to develop relationships with strategic partners may not be successful. Part of our business strategy is to maintain and develop strategic relationships with private firms, such as packaging companies and silicone- based foundries, and to a lesser extent, government agencies and academic institutions, to conduct research and development and testing of our products and technologies. For these efforts to be successful, we must identify partners whose competencies complement ours. We must also successfully enter into agreements with them on terms attractive to us, and integrate and coordinate their resources and capabilities with our own. We may be unsuccessful in entering into agreements with acceptable partners or negotiating favorable terms in these agreements. Also, we may be unsuccessful in integrating the resources or capabilities of these partners. In addition, our strategic partners may prove difficult to work with or less skilled than we originally expected. If we are unsuccessful in our collaborative efforts, our ability to develop and market products could be severely limited. **37-14** The failure to establish and maintain collaborative relationships may have a materially adverse affect on our business. We are initially targeting applications in **fiber optic** data communications and telecommunications markets, **in particular ultra- high bandwidth optical connections deployed inside and between datacenters and / or AI clusters. In addition, we** are exploring other applications that include automotive / LIDAR, sensing, displays, **storage, aerospace and defense, satellites, quantum computing** etc., **for our polymer technology platform**. Our ability to generate significant revenues depends significantly on the extent to which potential customers and other potential industry partners develop, promote and sell systems that incorporate our products, which, of course, we cannot control. Any failure by potential customers and other potential industry partners to successfully develop and market systems that incorporate our products could adversely affect our sales. The extent to which potential customers and other industry partners develop, promote and sell systems incorporating our products is based on a number of factors that are largely beyond our ability to control. We may participate in joint ventures that expose us to operational and financial risk. We may participate in one or more joint ventures for the purpose of assisting us in carrying out our business expansion, especially with respect to new product and / or market development. We may experience with our joint venture partner (s) issues relating to disparate communication, culture, strategy, and resources. Further, our joint venture partner (s) may have economic or business interests or goals that are inconsistent with ours, exercise their rights in a way that prohibits us from acting in a manner which we would like, or they may be unable or unwilling to fulfill their obligations under the joint venture or other agreements. We cannot assure you that the actions or decisions of our joint venture partners will not affect our operations in a way that hinders our corporate objectives or reduces any anticipated cost savings or revenue enhancement resulting from these ventures. If we fail to develop and introduce new or enhanced products on a timely basis, our ability to attract and retain customers could be impaired and our competitive position could be harmed. We plan to operate in a dynamic environment characterized by rapidly changing technologies and industry standards and technological obsolescence. To compete successfully, we must design, develop, market and sell products that provide increasingly higher levels of performance and reliability and meet the cost expectations of our customers. The introduction of new products by our competitors, the market acceptance of products based on new or alternative technologies, or the emergence of new industry standards could render our anticipated products obsolete. Our failure to anticipate or timely develop products or technologies in response to technological shifts could adversely affect our operations. In particular, we may experience difficulties with product design, manufacturing, marketing or certification that could delay or prevent our development, introduction or marketing of products. If we fail to introduce products that meet the needs of our customers or penetrate new markets in a timely fashion our Company will be adversely affected. Our future growth will suffer if we do not achieve sufficient market acceptance of our organic nonlinear optical ~~material materials~~ **products** or our ~~proprietary photonic devices~~. We expect our patented and patent- pending optical materials along with trade secrets and licensed materials, to be the core of and the enabling technology for future generations of optical devices, modules, sub- systems and systems that we will develop or ~~potentially~~ out- license to electro- optic device manufacturers. Most of our ~~products materials~~ are still in the development stage, and we do not know when a market for ~~these products~~ **our materials** will develop, if at all. Our success depends, in part, upon our ability to gain market acceptance of our ~~products~~ **organic nonlinear optical materials**. To be accepted, our ~~products materials~~ must meet the technical and performance requirements of our potential customers. OEMs, suppliers or government agencies may not accept polymer- based ~~products~~ **materials**. In addition, even if we achieve some

degree of market acceptance for our **products materials** in one industry, we may not achieve market acceptance in other industries **that for which** we are developing products. Achieving widespread market acceptance for our products will require marketing **targeting** efforts and the expenditure of financial and other resources to create product awareness and demand by customers. We may be unable to offer products that compete effectively due to our limited resources and operating history. Also, certain large corporations may be predisposed against doing business with a company of our limited size and operating history. **15 Failure to achieve broad acceptance of our products by customers and to compete effectively would harm our operating results.** **38** Our potential customers require our products to undergo a lengthy and expensive qualification process, which does not assure product sales. Prior to purchasing our products, our potential customers will require that our products undergo extensive qualification processes. These qualification processes may continue for several months or more. However, qualification of a product by a customer does not assure any sales of the product to that customer. Even after successful qualification and sales of a product to a customer, a subsequent revision to the product, changes in our customer's manufacturing process or our selection of a new supplier may require a new qualification process, which may result in additional delays. Also, once one of our products is qualified, it could take several additional months or more before a customer commences volume production of components or devices that incorporate our products. Despite these uncertainties, we are devoting substantial resources, including design, engineering, sales, marketing and management efforts, to qualifying our products with customers in anticipation of sales. If we are unsuccessful or delayed in qualifying any of our products with a customer, sales of our products to a customer may be precluded or delayed, which may impede our growth and cause our business to suffer. Obtaining a sales contract with a potential customer does not guarantee that a potential customer will not decide to cancel or change its product plans, which could cause us to generate no revenue from a product and adversely affect our results of operations. Even after we secure a sales contract with a potential customer, we may experience delays in generating revenue from our products as a result of a lengthy development cycle that may be required. Potential customers will likely take a considerable amount of time to evaluate our products; it could take 12 to 24 months from early engagement by our sales team to actual product sales. The delays inherent in these lengthy sales cycles increase the risk that a customer will decide to cancel, curtail, reduce or delay its product plans, causing us to lose anticipated sales. In addition, any delay or cancellation of a customer's plans could materially and adversely affect our financial results, as we may have incurred significant expense and generated no revenue. Finally, our customers' failure to successfully market and sell their products could reduce demand for our products and materially and adversely affect our business, financial condition and results of operations. If we were unable to generate revenue after incurring substantial expenses to develop any of our products, our business would suffer. Many of our products will have long sales cycles, which may cause us to expend resources without an acceptable financial return and which makes it difficult to plan our expenses and forecast our revenue. Many of our products will have long sales cycles that involve numerous steps, including initial customer contacts, specification writing, engineering design, prototype fabrication, pilot testing, regulatory approvals (if needed), sales and marketing and commercial manufacture. During this time, we may expend substantial financial resources and management time and effort without any assurance that product sales will result. The anticipated long sales cycle for some of our products makes it difficult to predict the quarter in which sales may occur. Delays in sales may cause us to expend resources without an acceptable financial return and make it difficult to plan expenses and forecast revenues. Successful commercialization of our current and future products will require us to maintain a high level of technical expertise. Technology in our target markets is undergoing rapid change. To succeed in our target markets, we will have to establish and maintain a leadership position in the technology supporting those markets. Accordingly, our success will depend on our ability to:

- Accurately predict the needs of our target customers and develop, in a timely manner, the technology required to support those needs;
- Provide products that are not only technologically sophisticated but are also available at a price acceptable to customers and competitive with comparable products;
- Establish and effectively defend our intellectual property; and
- Enter into relationships with other companies that have developed complementary technology into which our products may be integrated.

We cannot assure you that we will be able to achieve any of these objectives. **39-16** One of our significant target markets is the telecommunications market, which historically has not accepted polymer modulators. One of our significant target markets is the telecommunications market, which demands high reliability optical components. Historically, polymer modulators have not been accepted into this market even though polymer modulators have achieved Telcordia™ based specifications. It is clear that the telecommunications market is demanding higher and higher data rates for its optical components, and may again decide that polymer based modulators are not suitable even if higher data rates, high reliability, and low power consumption are demonstrated. Another of our significant target markets is the data communications (datacenter and / or high performance computing) market, which may be subject to heavy competition from other PIC based technologies such as silicon photonics and Indium Phosphide. Another of our significant target markets is the **fiber optic** data communications (**market, in particular ultra- high bandwidth optical connections deployed inside and between datacenter datacenters** and / or **AI clusters** high performance computing) market, which may be subject to heavy competition from other PIC based technologies such as silicon photonics and Indium Phosphide. As the demands for high performance, low cost (\$ / Gbps) is implemented into next generation architectures, polymer modulators and polymer based PIC products may be subject to significant competition. Furthermore, there is a potential that technologies such as silicon photonics and Indium Phosphide might reach the metric of \$ 1 / Gbps at **400Gbps-800Gbps** before ours. Customers may then be less willing to purchase new technology such as ours or invest in new technology development such as ours for next generation systems. Our inability to successfully acquire and integrate other businesses, assets, products or technologies could harm our business and cause us to fail at achieving our anticipated growth. We may grow our business through strategic acquisitions and investments, and we are actively evaluating acquisitions and strategic investments in businesses, products or technologies that we believe could complement or expand our product offering, create and / or expand a client base, enhance our technical capabilities or otherwise offer growth or cost- saving opportunities. From time to time, we may enter into letters of intent with companies with which we

are negotiating potential acquisitions or investments or as to which we are conducting due diligence. Although we are currently not a party to any binding material definitive agreement with respect to potential investments in, or acquisitions of, complementary businesses, products or technologies, we may enter into these types of arrangements in the future, which could materially decrease the amount of our available cash or require us to seek additional equity or debt financing. We have limited experience in successfully acquiring and integrating businesses, products and technologies. We may not be successful in negotiating the terms of any potential acquisition, conducting thorough due diligence, financing the acquisition or effectively integrating the acquired business, product or technology into our existing business and operations. Our due diligence may fail to identify all of the problems, liabilities or other shortcomings or challenges of an acquired business, product or technology, including issues related to intellectual property, product quality or product architecture, regulatory compliance practices, revenue recognition or other accounting practices, or employee or customer issues. Additionally, in connection with any acquisitions we complete, we may not achieve the synergies or other benefits we expected to achieve, and we may incur write-downs, impairment charges or unforeseen liabilities that could negatively affect our operating results or financial position or could otherwise harm our business. If we finance acquisitions using existing cash, the reduction of our available cash could cause us to face liquidity issues or cause other unanticipated problems in the future. If we finance acquisitions by issuing convertible debt or equity securities, the ownership interest of our existing stockholders may be diluted, which could adversely affect the market price of our stock. Further, contemplating or completing an acquisition and integrating an acquired business, product or technology could divert management and employee time and resources from other matters, which could harm our business, financial condition and operating results.

~~40 Public health emergencies or outbreaks of epidemics, pandemics, or contagious diseases have disrupted, and could in the future disrupt, our operations and materially and adversely affect our business, financial condition, and results of operations. Widespread public health emergencies or outbreaks of epidemics, pandemics, or contagious diseases, such as the COVID-19 pandemic, have had, and could in the future have, a material adverse effect on our business, financial condition, and results of operations. The full extent to which a global health crisis may impact our business and operating results would depend on future developments that are highly uncertain and cannot be accurately predicted, including new medical and other information that may emerge as a result and the actions by governmental entities or others to contain it or treat its impact. The impacts of a severe health crisis could pose the risk that we or our employees, suppliers, customers and others may be restricted or prevented from conducting, or adversely modify, our business activities for indefinite or intermittent periods of time, including as a result of employee health and safety concerns, shutdowns, shelter in place orders, travel restrictions and other actions and restrictions that may be prudent or required by governmental authorities. A global health crisis could also impact our customers' purchasing behavior or decisions, including reduced demand for our products that could continue for an extended period of time. Any or all of the foregoing in jurisdictions where we or our customers, suppliers, or operations are located have had and could in the future have a material adverse effect on our business, results of operations, cash flows, and financial condition. In addition, fluctuations in demand and other implications associated with public health emergencies have resulted in, and could in the future result in, certain supply chain constraints and challenges. We may incur debt in the future that might be secured with our intellectual property as collateral, which could subject our Company to the risk of loss of all of our intellectual property. We currently have no debt to service. If we incur debt in the future, we may be required to secure the debt with our intellectual property, including all of our patents and patents pending. In the event we default on the debt, we could incur the loss of all of our intellectual property, which would materially and adversely affect our Company and cause you to lose your entire investment in our Company.~~

~~17~~ Our failure to compete successfully could harm our business. The markets that we are targeting for our proprietary electro-optic polymer systems and photonic devices are intensely competitive. Most of our present and potential competitors have or may have substantially greater research and product development capabilities, financial, scientific, marketing, manufacturing and human resources, name recognition and experience than we have. As a result, these competitors may:

- succeed in developing **materials and products** ~~product integration expertise~~ that ~~are is~~ equal to or superior to our **offerings** ~~products and future products~~ or that will achieve greater market acceptance than our ~~products~~ **offerings** and future ~~products~~ **offerings**;
- devote greater resources to developing, marketing or selling their products;
- respond more quickly to new or emerging technologies or scientific advances and changes in customer requirements, which could render our technologies ~~or products~~ obsolete;
- introduce products that make the continued development of our ~~products~~ **materials** and future ~~products~~ **materials** uneconomical;
- obtain patents that block or otherwise inhibit our ability to develop and commercialize our ~~products~~ **materials** and future ~~products~~ **materials**;
- withstand price competition more successfully than we can;
- establish cooperative relationships among themselves or with third parties that enhance their ability to address the needs of our prospective customers.

Our failure to compete successfully against these existing or future competitors could harm our business.

~~41~~ We may be unable to obtain effective intellectual property protection for our products and technology. Our intellectual property, or any intellectual property that we have or may acquire, license or develop in the future, may not provide meaningful competitive advantages. Our patents and patent applications, including those we license, may be challenged by competitors, and the rights granted under such patents or patent applications may not provide meaningful proprietary protection. For example, numerous patents held by third parties relate to polymer materials and electro-optic devices. These patents could be used as a basis to challenge the validity or limit the scope of our patents or patent applications. A successful challenge to the validity or limitation of the scope of our patents or patent applications could limit our ability to commercialize our polymer materials technology and, consequently, reduce our revenues. Moreover, competitors may infringe our patents or those that we license, or successfully avoid these patents through design innovation. To combat infringement or unauthorized use, we may need to resort to litigation, which can be expensive and time-consuming and may not succeed in protecting our proprietary rights. In addition, in an infringement proceeding a court may decide that our patents or other intellectual property rights are not valid or are unenforceable, or may refuse to stop the other party from using the intellectual property at issue on the ground that it is non-infringing. Policing unauthorized use of our intellectual property is

difficult and expensive, and we may not be able to, or have the resources to, prevent misappropriation of our proprietary rights, particularly in countries where the laws may not protect these rights as fully as the laws of the United States. We also rely on the law of trade secrets to protect unpatented technology and know-how. We try to protect this technology and know-how by limiting access to those employees, contractors and strategic partners with a need to know this information and by entering into confidentiality agreements with these parties. Any of these parties could breach the agreements and disclose our trade secrets or confidential information to our competitors, or these competitors might learn of the information in other ways. Disclosure of any trade secret not protected by a patent could materially harm our business. **18** We may be subject to patent infringement claims, which could result in substantial costs and liability and prevent us from selling our products. Third parties may claim that our products or related technologies infringe their patents. Any patent infringement claims brought against us may cause us to incur significant expenses, divert the attention of our management and key personnel from other business concerns and, if successfully asserted against us, require us to pay substantial damages. In addition, as a result of a patent infringement suit, we may be forced to stop or delay developing, manufacturing or selling products that are claimed to infringe a patent covering a third party's intellectual property unless that party grants us rights to use its intellectual property. We may be unable to obtain these rights on terms acceptable to us, if at all. Even if we are able to obtain rights to a third party's patented intellectual property, these rights may be non-exclusive, and therefore our competitors may obtain access to the same intellectual property. Ultimately, we may be unable to sell our products or may have to cease some of our business operations as a result of patent infringement claims, which could severely harm our business. If our products infringe the intellectual property rights of others, we may be required to indemnify customers for any damages they suffer. Third parties may assert infringement claims against our current or potential customers. These claims may require us to initiate or defend protracted and costly litigation on behalf of customers, regardless of the merits of these claims. If any of these claims succeed, we may be forced to pay damages on behalf of these customers or may be required to obtain licenses for the products they use. If we cannot obtain all necessary licenses on commercially reasonable terms, we may be unable to continue selling such products. Our technology may be subject to government rights. We may have obligations to government agencies in connection with the technology that we have developed, including the right to require that a compulsory license be granted to one or more third parties selected by certain government agencies. It may be difficult to monitor whether these third parties will limit their use of our technology to these licensed uses, and we could incur substantial expenses to enforce our rights to our licensed technology in the event of misuse. **42** The loss of certain of our key personnel, or any inability to attract and retain additional personnel, could impair our ability to attain our business objectives. Our future success depends to a significant extent on the continued service of our key management personnel, particularly **Yves LeMaitre**, **Dr. Michael Leiby**, our Chief Executive Officer, **Thomas E. Zelibor**, our President and James S. Marcelli our ~~President~~ **Chief Financial Officer**, Chief Operating Officer, and Secretary and ~~Principal Financial Officer~~. Accordingly, the loss of the services of either any of these persons would adversely affect our business and our ability to continue to commercialize our products, and impede the attainment of our business objectives. Our future success will also depend on our ability to attract, retain and motivate highly skilled personnel to assist us with product development and commercialization. Competition for highly educated qualified personnel in the polymer industry is intense. If we fail to hire and retain a sufficient number of qualified management, engineering, sales and technical personnel, we will not be able to attain our business objectives. If we fail to develop and maintain the quality of our manufacturing **integration and design** processes, our operating results would be harmed. The manufacture **and integration** of our **products-materials for devices** is a multi-stage process that requires the use of high-quality materials and advanced manufacturing technologies **and design**. Also, polymer-related device development and manufacturing, **whether performed by a silicon photonics design house or elsewhere**, must occur in a highly controlled, clean environment to minimize particles and other yield and quality-limiting contaminants. In spite of stringent quality controls, weaknesses in process control or minute impurities in materials may cause a substantial percentage of a product in a lot to be defective. If we are not able to develop and continue to improve ~~on~~ our manufacturing **design** processes, **if or to maintain** stringent quality controls **are not maintained**, or if contamination problems arise, our operating results would be harmed. The complexity of our **products-organic nonlinear optical materials** may lead to errors, defects and bugs, which could result in the necessity to redesign **products-materials** and could negatively impact our reputation with customers. ~~Products~~ **Organic nonlinear optical materials** as complex as those we market and intend to market might contain errors, defects and bugs when first introduced or as new versions are released. Delivery **and integration** of **products-materials** with production defects or reliability, quality or compatibility problems could significantly delay or hinder market acceptance of our **products-materials** or result in a costly recall and could damage our reputation and adversely affect our ability to sell our **products-materials**. If our **products-organic nonlinear optical materials** experience defects, we may need to undertake a **redesign-redevelopment** of the **product-materials**, a process that may result in significant additional expenses. We may also be required to make significant expenditures of capital and resources to resolve such problems. There is no assurance that problems will not be found in new products after commencement of commercial production, despite testing by our suppliers, our customers and us. **19** If we decide to make commercial quantities of products at our facilities, we will be required to make significant capital expenditures to increase capacity. We lack the internal ability to manufacture products at a level beyond the stage of early commercial introduction. To the extent we do not have an outside vendor to manufacture our products, we will have to increase our internal production capacity and we will be required to expand our existing facilities or to lease new facilities or to acquire entities with additional production capacities. These activities would require us to make significant capital investments and may require us to seek additional equity or debt financing. We cannot assure you that such financing would be available to us when needed on acceptable terms, or at all. Further, we cannot assure you that any increased demand for our products would continue for a sufficient period of time to recoup our capital investments associated with increasing our internal production capacity. In addition, we do not have experience manufacturing our products in large quantities. In the event of significant demand for our products, large-scale production might prove more difficult or costly than we anticipate and lead to

quality control issues and production delays. We may not be able to manufacture products at competitive prices. To date, we have produced limited quantities of materials for license and sale and materials and devices for research, development, demonstration and prototype purposes. The cost per unit for these products currently exceeds the price at which we could expect to profitably sell them. If we cannot substantially lower our cost of production as we move into sales of products in significant commercial quantities, our financial results will be harmed. ~~43~~ We may be unable to export our products or technology to other countries, convey information about our technology to citizens of other countries or sell certain products commercially, if the products or technology are subject to United States export or other regulations. We develop certain polymer-based products that we believe the United States government and other governments may be interested in using for military and information gathering or antiterrorism activities. United States government export regulations may restrict us from selling or exporting certain products into other countries, exporting our technology to those countries, conveying information about our technology to citizens of other countries or selling certain products to commercial customers. We may be unable to obtain export licenses for products or technology, if they become necessary. We currently cannot assess whether national security concerns would affect our future products and, if so, what procedures and policies we would have to adopt to comply with applicable existing or future regulations. We are subject to regulatory compliance related to our operations. We are subject to various U. S. governmental regulations related to occupational safety and health, labor and business practices. Failure to comply with current or future regulations could result in the imposition of substantial fines, suspension of production, alterations of our production processes, cessation of operations, or other actions, which could harm our business. We may incur liability arising from the use of hazardous materials. Our business and our facilities are subject to a number of federal, state and local laws and regulations relating to the generation, handling, treatment, storage and disposal of certain toxic or hazardous materials and waste products that we use or generate in our operations. Many of these environmental laws and regulations subject current or previous owners or occupiers of land to liability for the costs of investigation, removal or remediation of hazardous materials. In addition, these laws and regulations typically impose liability regardless of whether the owner or occupier knew of, or was responsible for, the presence of any hazardous materials and regardless of whether the actions that led to the presence were taken in compliance with the law. In our business, we use hazardous materials that are stored on site. We use various chemicals in our manufacturing process that may be toxic and covered by various environmental controls. An unaffiliated waste hauler transports the waste created by use of these materials off-site. Many environmental laws and regulations require generators of waste to take remedial actions at an off-site disposal location even if the disposal was conducted lawfully. The requirements of these laws and regulations are complex, change frequently and could become more stringent in the future. Failure to comply with current or future environmental laws and regulations could result in the imposition of substantial fines, suspension of production, alteration of our production processes, cessation of operations or other actions, which could severely harm our business. **20** Our data and information systems and network infrastructure may be subject to hacking or other cybersecurity threats. If our security measures are breached and an unauthorized party obtains access to our proprietary business information, our information systems may be perceived as being insecure, which could harm our business and reputation, and our proprietary business information could be misappropriated which could have an adverse effect on our business and results of operations. Our Company stores and transmits its proprietary information on its computer systems. Despite our security measures, our information systems and network infrastructure may be vulnerable to cyber-attacks or could be breached due to an employee error or other disruption that could result in unauthorized disclosure of sensitive information that has the potential to significantly interfere with our business operations. Breaches of our security measures could expose us to a risk of loss or misuse of this information, litigation and potential liability. Since techniques used to obtain unauthorized access or to sabotage information systems change frequently and generally are not recognized until launched against a target, we may be unable to anticipate these techniques or to implement adequate preventive measures in advance of such an attack on our systems. In addition, we use third party vendors to store our proprietary information who use cyber or “Cloud” storage of information as part of their service or product offerings, and despite our attempts to validate the security of such services, our proprietary information may be misappropriated by other parties. In the event of an actual or perceived breach of our security, or the security of one of our vendors, the market perception of the effectiveness of our security measures could be harmed and we could suffer damage to our reputation or our business. Additionally, misappropriation of our proprietary business information could prove competitively harmful to our business. ~~44~~ We conduct significantly all of our research and development activities at our Englewood, CO facility, and circumstances beyond our control may result in considerable business interruptions. We conduct significantly all of our research and development activities at our Englewood, CO facility. Our operations are vulnerable to interruption by fire, earthquake, floods or other natural disaster, quarantines or other disruptions associated with infectious diseases, national catastrophe, terrorist activities, war, disruptions in our computing and communications infrastructure due to power loss, telecommunications failure, human error, physical or electronic security breaches and computer viruses, and other events beyond our control. We do not have a detailed disaster recovery plan. We could be negatively affected as a result of a proxy contest and the actions of activist stockholders. A proxy contest with respect to election of our directors, or other activist stockholder activities, could adversely affect our business because: (1) responding to a proxy contest and other actions by activist stockholders can be costly and time-consuming, disruptive to our operations and divert the attention of management and our employees; (2) perceived uncertainties as to our future direction caused by activist activities may result in the loss of potential business opportunities, and may make it more difficult to attract and retain qualified personnel and business partners; and (3) if individuals are elected to our Board of Directors with a specific agenda, it may adversely affect our ability to effectively and timely implement our strategic plans. The requirements of being a public company are a strain on our systems and resources, are a diversion to management’s attention and are costly. As a public company, we are subject to the reporting requirements of the Securities Exchange Act of 1934 (“Exchange Act”) the Sarbanes-Oxley Act of 2002 (“Sarbanes-Oxley Act”), the Dodd-Frank Wall Street Reform and Consumer Protection Act (“Dodd-Frank Act”), and the rules and regulations

of The NASDAQ Stock Market. The requirements of these rules and regulations increase our legal, accounting and financial compliance costs, make some activities more difficult, time-consuming and costly and may also place undue strain on our personnel, systems and resources. **21** The Exchange Act requires, among other things, that we file annual, quarterly and current reports with respect to our business and operating results. The Sarbanes- Oxley Act requires, among other things, that we maintain effective disclosure controls and procedures and internal control over financial reporting. We are continuing the costly process of implementing and testing our systems to report our results as a public company, to continue to manage our growth and to implement internal controls. We are and will continue to be required to implement and maintain various other control and business systems related to our equity, finance, treasury, information technology, other recordkeeping systems and other operations. As a result of this implementation and maintenance, management' s attention may be diverted from other business concerns, which could adversely affect our business. Furthermore, we rely on third- party software and system providers for ensuring our reporting obligations and effective internal controls, and to the extent these third parties fail to provide adequate service including as a result of any inability to scale to handle our growth and the imposition of these increased reporting and internal controls and procedures, we could incur material costs for upgrading or switching systems and our business could be materially affected. In addition, changing laws, regulations and standards relating to corporate governance and public disclosure are creating uncertainty for public companies, increasing legal and financial compliance costs and making some activities more time consuming. These laws, regulations and standards are subject to varying interpretations, in many cases due to their lack of specificity, and, as a result, their application in practice may evolve over time as new guidance is provided by regulatory and governing bodies. This could result in continuing uncertainty regarding compliance matters and higher costs necessitated by ongoing revisions to disclosure and governance practices. We intend to invest resources to comply with evolving laws, regulations and standards, and this investment may result in increased general and administrative expenses and a diversion of management' s time and attention from revenue- generating activities to compliance activities. If our efforts to comply with new laws, regulations and standards differ from the activities intended by regulatory or governing bodies due to ambiguities related to their application and practice, regulatory authorities may initiate legal proceedings against us and our business may be adversely affected. **45** In addition, we expect these laws, rules and regulations to make it more difficult and more expensive for us to obtain director and officer liability insurance, and we may be required to incur substantial costs to maintain appropriate levels of coverage. These factors could also make it more difficult for us to attract and retain qualified members of our board of directors, particularly to serve on our audit committee, and qualified executive officers. As a result of being a public company, our business and financial condition are more visible, which we believe may result in threatened or actual litigation, including by competitors and other third parties. If such claims are successful, our business and operating results could be adversely affected, and even if the claims do not result in litigation or are resolved in our favor, these claims, and the time and resources necessary to resolve them, could divert the time and resources of our management and adversely affect our business and operating results. If we fail to maintain an effective system of disclosure controls and internal control over financial reporting, our ability to produce timely and accurate financial statements or comply with applicable regulations could be impaired. As a public company, we are subject to the reporting requirements of the Securities Exchange Act of 1934 (Exchange Act) the Sarbanes- Oxley Act of 2002 (Sarbanes- Oxley Act), the Dodd- Frank Wall Street Reform and Consumer Protection Act (Dodd- Frank Act), and the rules and regulations of The NASDAQ Stock Market. We expect that compliance with these rules and regulations will continue to increase our legal, accounting and financial compliance costs, make some activities more difficult, time - consuming and costly, and place significant strain on our personnel, systems and resources. The Sarbanes- Oxley Act requires, among other things, that we assess the effectiveness of our internal control over financial reporting annually and the effectiveness of our disclosure controls and procedures quarterly. In particular, Section 404 of the Sarbanes- Oxley Act, (Section 404), requires us to perform system and process evaluation and testing of our internal control over financial reporting to allow management to report on, and our independent registered public accounting firm to attest to, the effectiveness of our internal control over financial reporting. Our compliance with applicable provisions of Section 404 requires that we incur substantial accounting expense and expend significant management time on compliance- related issues as we implement additional corporate governance practices and comply with reporting requirements. Moreover, if we are not able to comply with the requirements of Section 404 applicable to us in a timely manner, or if we or our independent registered public accounting firm identifies deficiencies in our internal control over financial reporting that are deemed to be material weaknesses, the market price of our stock could decline and we could be subject to sanctions or investigations by the SEC or other regulatory authorities, stockholder or other third- party litigation, all of which would require additional financial and management resources. Furthermore, investor perceptions of our Company may suffer if deficiencies are found, and this could cause a decline in the market price of our stock or hinder our ability to raise capital. Irrespective of compliance with Section 404, any failure of our internal control over financial reporting could have a material adverse effect on our stated operating results and harm our reputation. If we are unable to continue to implement and maintain these requirements effectively or efficiently, it could harm our operations, financial reporting, or financial results and could result in an adverse opinion on our internal controls from our independent registered public accounting firm. **22** The exercise of options and warrants and other issuances of shares of common stock or securities convertible into common stock will dilute your interest. Our Board may determine from time to time that it needs to raise additional capital by issuing additional shares of our common stock or other securities and we are not restricted from issuing additional common stock, including securities that are convertible into or exchangeable for, or that represent the right to receive, shares of our common stock. Because our decision to issue securities in any future offering will depend on market conditions and other factors beyond our control, we cannot predict or estimate the amount, timing, or nature of any future offerings, or the prices at which such offerings may be affected. Additional equity offerings may dilute the holdings of existing stockholders or reduce the market price of our common stock. **46** As of December 31, **2023-2024**, we have outstanding options and warrants to purchase an aggregate of **78,967-848,605-908** shares of our common stock at exercise

prices ranging from \$ 0. 51 to 16. 81 per share with a weighted average exercise price of \$ 2-3. 49-00 per share. The exercise of options and warrants at prices below the market price of our common stock could adversely affect the price of shares of our common stock. Additional dilution may result from the issuance of shares of our capital stock in connection with any collaboration (although none are contemplated at this time) or in connection with other financing efforts, including pursuant to the 2023-2025 Purchase Agreement with Lincoln Park, and the Roth Sales Agreement with Roth Capital. Any issuance of our common stock that is not made solely to then- existing stockholders proportionate to their interests, such as in the case of a stock dividend or stock split, will result in dilution to each stockholder by reducing his, her or its percentage ownership of the total outstanding shares. Moreover, if we issue options or warrants to purchase our common stock in the future and those options or warrants are exercised or we issue restricted stock, stockholders may experience further dilution. Holders of shares of our common stock have no preemptive rights that entitle them to purchase their pro rata share of any offering of shares of any class or series. The trading price of our common stock has been, and may continue to be, volatile, and the value of our common stock may decline. This volatility, as well as general market conditions, may cause our stock price to fluctuate greatly and even potentially expose us to litigation. Our common stock may be subject to continued volatility. During the past 52 weeks, the share price for our common stock ranged from a low of \$ 3-1. 79-00 to a high of \$ 9-4. 18-82. We cannot assure you that the market price for our common stock will be less volatile or will remain at its current level. A decrease in the market price for our shares could result in substantial losses for investors. The market price of our common stock may be significantly affected by one or more of the following factors, many of which are beyond our control, including: · our Company’ s ability to execute on its business plan; · the status of particular development programs and the timing of performance under specific development agreements; · actual or anticipated demand for our products and future products and technologies; · amount and timing of our costs related to our development and marketing efforts or other initiatives and expansion of our operations; · changes in anticipated commercial deployment of certain products and financial results; · our ability to enter into, renegotiate or renew key agreements or strategic relationships ; · our ability to develop expanded product production facilities, along with silicon- based foundry and other outside contractor relationships; · issuance of new or updated research or reports by securities analysts; · the use by investors or analysts of third- party data regarding our business that may not reflect our operations; · fluctuations in the valuation of companies perceived by investors to be comparable to us; · share price and volume fluctuations attributable to inconsistent trading volume levels of our shares; · large trades, block trades or short selling of our common stock ; · actual or anticipated changes in our competitive position relative to our industry competitors; · announcements or implementation by our competitors of technological innovations or new products; · changes in laws or regulations applicable to our products or industry; · additions or departures of key personnel; · capital- raising activities or commitments; · product shortages requiring suppliers to allocate minimum quantities; · the commencement or conclusion of legal proceedings that involve us; · costs related to possible future acquisitions of technologies or businesses; · economic conditions specific to our industry, as well as general economic and market conditions; or · other events or factors, including those resulting from civil unrest, war, foreign invasions, terrorism, or public health crises or responses to such events. 23 Furthermore, the stock markets frequently experience extreme price and volume fluctuations that affect the market prices of equity securities of many companies. These fluctuations often have been unrelated or disproportionate to the operating performance of those companies. These broad market and industry fluctuations, as well as general economic, political, and market conditions such as recessions, elections, interest rate changes, or international currency fluctuations, may negatively impact the market price of our common stock. As a result of such fluctuations, you may not realize any return on your investment in us and may lose some or all of your investment. In the past, companies that have experienced volatility in the market price of their stock have been subject to securities class action litigation or derivative litigation. 47-A sale of a substantial number of shares of our common stock may cause the price of our common stock to decline and may impair our ability to raise capital in the future. Our common stock is traded on The NASDAQ Capital Market and, despite certain increases of trading volume from time to time, there have been periods when the market for our common stock could be considered “ thinly- traded, ” meaning that the number of persons interested in purchasing our common stock at or near bid prices at any given time may be relatively small. Finance transactions or option / warrant exercises resulting in a large amount of newly issued shares that become readily tradable, or other events that cause current stockholders to sell shares, could place downward pressure on the trading price of our stock the trading price of our stock could decline. Additionally, we believe a significant portion of our shares are held by shareholders that accumulated their shares during a time when our shares prices were significantly less than our current share prices. If these shareholders, some of which hold a substantial number of shares of our common stock, decide to sell some or all of their shares at once without regard to the impact of their sales on the market price of our stock, the trading price of our stock could decline. In addition, the lack of a robust resale market may require a stockholder who desires to sell a large number of shares of common stock to sell the shares in increments over time to mitigate any adverse impact of the sales on the market price of our stock. If our existing stockholders sell, or the market perceives that our stockholders intend to sell, substantial amounts of our common stock in the public market, including shares issued upon the exercise of outstanding options or warrants or pursuant to the 2023-2025 Purchase Agreement with Lincoln Park, and the Roth Sales Agreement with Roth Capital, the market price of our common stock could decline. Sales of a substantial number of shares of our common stock may make it more difficult for us to sell equity or equity- related securities in the future at a time and price that we deem reasonable or appropriate. We may become involved in securities class action litigation that could divert management’ s attention and harm our business. Our common stock will be subject to potential delisting if we do not maintain the listing requirements of the Nasdaq Capital Market. Our common stock commenced trading on The NASDAQ Capital Market on September 1, 2021. We cannot assure you that that an active trading market for our common stock will continue to be sustained. Nasdaq has rules for continued listing, including, without limitation, minimum market capitalization and other requirements. Failure to maintain our listing, or de- listing from Nasdaq, would make it more difficult for stockholders to dispose of our securities and more difficult to obtain accurate price quotations on our securities. This

could have an adverse effect on the price of our common stock. Our ability to issue additional securities for financing or other purposes, or otherwise to arrange for any financing we may need in the future, may also be materially and adversely affected if our common stock and / or other securities are not traded on a national securities exchange. If securities or industry analysts do not publish research or reports about our business, or if they change their recommendations regarding our stock adversely, our stock price and trading volume could decline. The trading market for most listed companies' securities depends in part on the research and reports that securities or industry analysts publish about them or their business. We currently have no independent research analysts that cover our stock and we may not obtain research coverage by securities and industry analysts until our products are commercialized and we obtain revenues, and there is no assurance that we will ever obtain independent research analysts coverage. If no securities or industry analysts commence coverage of us, the trading price for our common stock could be negatively affected. In the event any analyst who covers us downgrades our securities, the price of our securities would likely decline. If one or more of these analysts ceases to cover us or fails to publish regular reports on us, interest in the purchase of our securities could decrease, which could cause the price of our common stock and its trading volume to decline. Our board of directors has the authority, without stockholder approval, to issue preferred stock with terms that may not be beneficial to existing common stockholders and with the ability to affect adversely stockholder voting power and perpetuate their control over us. Our articles of incorporation, as amended, allow us to issue shares of preferred stock without any vote or further action by our stockholders. Our board of directors has the authority to fix and determine the relative rights and preferences of preferred stock. Our board of directors also has the authority to issue preferred stock without further stockholder approval, including large blocks of preferred stock. As a result, our board of directors could authorize the issuance of a series of preferred stock that would grant to holders thereof the preferred right to our assets upon liquidation, the right to receive dividend payments before dividends are distributed to the holders of common stock or other preferred stockholders and the right to the redemption of the shares, together with a premium, prior to the redemption of our common stock or existing preferred stock, if any. 48-24 Preferred stock could be used to dilute a potential hostile acquirer. Accordingly, any future issuance of preferred stock or any rights to purchase preferred stock may have the effect of making it more difficult for a third party to acquire control of us. This may delay, defer or prevent a change of control or an unsolicited acquisition proposal. The issuance of preferred stock also could decrease the amount of earnings attributable to, and assets available for distribution to, the holders of our common stock and could adversely affect the rights and powers, including voting rights, of the holders of our common stock and preferred stock. Our articles of incorporation and amended and restated bylaws, and certain provisions of Nevada corporate law, as well as certain of our contracts, contain provisions that could delay or prevent a change in control even if the change in control would be beneficial to our stockholders. Nevada law, as well as our articles of incorporation, as amended, and amended and restated bylaws, contain anti- takeover provisions that could delay or prevent a change in control of our Company, even if the change in control would be beneficial to our stockholders. These provisions could lower the price that future investors might be willing to pay for shares of our common stock. These anti- takeover provisions: · authorize our board of directors to create and issue, without stockholder approval, preferred stock, thereby increasing the number of outstanding shares, which can deter or prevent a takeover attempt; · prohibit cumulative voting in the election of directors, which would otherwise allow less than a majority of stockholders to elect director candidates; · empower our board of directors to fill any vacancy on our board of directors, whether such vacancy occurs as a result of an increase in the number of directors or otherwise; · provide that our board of directors be divided into three classes, with approximately one- third of the directors to be elected each year; · provide that special meetings of our stockholders may only be called by the chairperson, president or chief executive officer, or by resolution of the board of directors or at the request in writing of stockholders owning 66 2 / 3 % in amount of the entire capital stock of the Company issued and outstanding and entitled to vote; · establish advance notice procedures with regard to stockholder proposals relating to stockholder nominees for director and other stockholder proposals ; · provide that our board of directors is expressly authorized to adopt, amend or repeal our bylaws; and · provide that our directors will be elected by a plurality of the votes cast in the election of directors. Nevada Revised Statutes, the terms of our employee stock option agreements and other contractual provisions may also discourage, delay or prevent a change in control of our Company. Nevada Revised Statutes sections 78. 378 to 78. 3793 provide state regulation over the acquisition of a controlling interest in certain Nevada corporations unless the articles of incorporation or bylaws of the corporation provide that the provisions of these sections do not apply. Our articles of incorporation, as amended, and amended and restated bylaws do not state that these provisions do not apply. The statute creates a number of restrictions on the ability of a person or entity to acquire control of a Nevada company by setting down certain rules of conduct and voting restrictions in any acquisition attempt, among other things. The statute contains certain limitations and it may not apply to our Company. Our 2016 Equity Incentive Plan includes change- in- control provisions that allow us to grant options that may become vested immediately upon a change in control. Our board of directors also has the power to adopt a stockholder rights plan that could delay or prevent a change in control of our Company even if the change in control is generally beneficial to our stockholders. These plans, sometimes called “ poison pills, ” are oftentimes criticized by institutional investors or their advisors and could affect our rating by such investors or advisors. If our board of directors adopts such a plan, it might have the effect of reducing the price that new investors are willing to pay for shares of our common stock. Together, these charter, statutory and contractual provisions could make the removal of our management and directors more difficult and may discourage transactions that otherwise could involve payment of a premium over prevailing market prices for our common stock. Furthermore, the existence of the foregoing provisions, as well as the significant common stock beneficially owned by our founders, executive officers, and members of our board of directors, could limit the price that investors might be willing to pay in the future for shares of our common stock. They could also deter potential acquirers of our Company, thereby reducing the likelihood that you could receive a premium for your common stock in an acquisition. 49-Item 1B. Unresolved Staff Comments.