Lightwave Logic, Inc.
Form 424B3
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Registration No.
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PROSPECTUS

10,000,000 Shares

Common Stock

This prospectus relates to the sale of up to 10,000,000 shares of our common stock, par value $0.001, which may be offered by the selling shareholder, Lincoln Park Capital Fund, LLC, or Lincoln Park, from time to time. The shares of common stock being offered by the selling shareholder have been or are issuable pursuant to the Purchase Agreement with Lincoln Park dated as of June 6, 2013, which we refer to in this prospectus as the 2013 Purchase Agreement. Please refer to the section of this prospectus entitled "The Lincoln Park Transactions" for a description of the 2013 Purchase Agreement and the section entitled "Selling Shareholder" for additional information on Lincoln Park. Such registration does not mean that Lincoln Park will actually offer or sell the full number of these shares. We will not receive any proceeds from the sales of shares of our common stock by the selling shareholder; however, we may receive proceeds of up to $20,000,000 under the 2013 Purchase Agreement.

In consideration for entering into the 2013 Purchase Agreement, we issued to Lincoln Park 200,000 shares of our common stock as a commitment fee, and such shares are also being registered hereunder. The prices at which Lincoln Park may sell the shares will be determined by the prevailing market price for the shares or in negotiated transactions.

The selling stockholder may sell the shares of common stock described in this prospectus in a number of different ways and at varying prices. See "Plan of Distribution" for more information about how the selling stockholder may sell the shares of common stock being registered pursuant to this prospectus. The selling stockholder is an "underwriter" within the meaning of Section 2(a)(11) of the Securities Act of 1933, as amended.

We will pay the expenses incurred in registering the shares, including legal and accounting fees. See "Plan of Distribution".

Our common stock is currently quoted on the OTC Markets (OTCQB) under the symbol "LWLG". On September 17, 2013, the last reported sale price of our common stock was $0.92 per share.

Investing in our securities involves a high degree of risk. See "Risk Factors" beginning on page 8 of this prospectus for a discussion of information that should be considered in connection with an investment in our securities.

Neither the Securities and Exchange Commission nor any state securities regulators have approved or disapproved of these securities or determined if this prospectus is truthful or complete. Any representation to the contrary is a criminal offense.

The date of this prospectus is October 4, 2013.

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You should rely only on the information contained in this prospectus. We have not, and the selling shareholder has not, authorized any person to provide you with different information. If anyone provides you with different or inconsistent information, you should not rely on it. This prospectus is not an offer to sell, nor is the selling shareholder seeking an offer to buy, securities in any state where the offer or solicitation is not permitted. The information contained in this prospectus is complete and accurate as of the date on the front cover of this prospectus, but information may have changed since that date. We are responsible for updating this prospectus to ensure that all material information is included and will update this prospectus to the extent required by law.

This prospectus includes statistical and other industry and market data that we obtained from industry publications and research, surveys and studies conducted by third parties. Industry publications and third-party research, surveys and studies generally indicate that their information has been obtained from sources believed to be reliable, although they do not guarantee the accuracy or completeness of such information. While we believe that these industry publications and third-party research, surveys and studies are reliable, we have not independently verified such data and we do not make any representation as to the accuracy of the information.

PROSPECTUS SUMMARY

The items in the following summary are described in more detail later in this prospectus. This summary does not contain all of the information you should consider. Before investing in our securities, you should read the entire prospectus carefully, including the "Risk Factors" beginning on page 8 and the financial statements and related notes beginning on page F-1.

Overview

Lightwave Logic, Inc. (then known as Eastern Idaho Internet Service, Inc.) was organized under the laws of the State of Nevada in 1997, where we engaged in the business of marketing Internet services until June 30, 1998 when our operations were discontinued. We were then inactive until we acquired PSI-TEC Corporation as our wholly owned subsidiary on July 14, 2004, at which time our name was changed to PSI-TEC Holdings, Inc. On October 20, 2006, we completed a parent-subsidiary merger with PSI-TEC Corporation whereby we were the surviving corporation of the merger, and our name was changed to Third-Order Nanotechnologies, Inc. On March 10, 2008, we changed our name to Lightwave Logic, Inc. to better suit our strategic business plan and to facilitate stockholder recognition of our Company and our business. Unless the context otherwise requires, all references to the "Company," "we," "our" or "us" and other similar terms means Lightwave Logic, Inc., a Nevada corporation.

We are a development stage, organic nonlinear materials and electro-optical device company. Our primary area of expertise is the chemical synthesis of chromophore dyes used in the development of organic Application Specific Electro-Optic Polymers (ASEOP) and Organic Non-Linear All-Optical Polymers (NLAOP) that have high electro-optic and optical activity. Both types of materials are thermally and photo-chemically stable, which we believe could have utility across a broad range of applications in devices that address markets like, telecommunication, data communications, high-speed computing and photovoltaic cells. Secondarily, we are developing proprietary electro-optical and all-optical devices utilizing the advanced capabilities of our materials for the application in the fields mentioned above.

Electro-optic devices convert data from electric signals into optical signals for use in communications systems and in optical interconnects for high-speed data transfer. We expect our patented and patent-pending optical materials, when completed and tested, to be the core of the future generations of optical devices, modules, sub-systems and systems that we will develop or be licensed by electro-optic device manufacturers, such as telecommunications component and systems manufacturers, networking and switching suppliers, semiconductor companies, aerospace companies and government agencies.

Our optical polymers (polymers) are property-engineered at the molecular level (nanotechnology level) to meet the exacting thermal, environmental and performance specifications demanded by electro-optic devices. We believe that our patented and patent pending technologies will enable us to design optical polymers that are free from the numerous diverse and inherent flaws that plague competitive polymer technologies employed by other companies and research groups. We engineer our polymers with the intent to have temporal, thermal, chemical and photochemical stability within our patented and patent pending molecular architectures.

Our non-linear all optical polymers have demonstrated resonantly enhanced third-order properties approximately 2,630 times larger than fused silica, which means that they are highly photo-optically active in the absence of an RF layer. In this way they differ from other optical polymers and are considered more advanced next-generation materials.

Our patented and patent pending molecular architectures are based on a well-understood chemical and quantum mechanical occurrence known as aromaticity. Aromaticity provides a high degree of molecular stability. Aromaticity is what will enable our core molecular structures to maintain stability under a broad range of polymerization conditions that otherwise appear to affect other current polymer molecular designs. Polymers, polymer-based devices, hybrid devices and the processes used to create them are often patentable, which can provide the developers of such technology with a significant competitive advantage. We consider our proprietary intellectual property to be unique.

Our Business Development

PSI-TEC Corporation (PSI-TEC) was founded in 1991 and incorporated under the laws of the State of Delaware on September 12, 1995. Dr. Frederick J. Goetz founded PSI-TEC in Upland, Pennsylvania where he established a laboratory with a small amount of private funding. PSI-TEC subsequently moved its operations to laboratory space provided by the U.S. Army on the Aberdeen Proving Grounds in cooperation with a division of the Department of Defense for the advancement of ultra wide-bandwidth satellite telecommunications. Thereafter, PSI-TEC commenced operations of its own organic synthesis and thin-films laboratory in Wilmington, Delaware.

In order to become a non-reporting publicly-held corporation, in July 2004 PSI-TEC reorganized with Eastern Idaho Internet Services, Inc. (Eastern Idaho) whereby (i) Eastern Idaho changed its name to PSI-TEC Holdings, Inc. (PSI-TEC Holdings); (ii) PSI-TEC Holdings acquired all of the issued and outstanding shares of PSI-TEC stock; (iii) PSI-TEC became PSI-TEC Holdings' wholly-owned operating subsidiary; and (iv) PSI-TEC Holdings' then sole officer and director resigned, PSI-TEC's nominees were elected to PSI-TEC Holdings' board of directors and new management was appointed. For accounting purposes, this acquisition transaction was accounted for as a reverse-acquisition, whereby PSI-TEC was deemed to have purchased PSI-TEC Holdings. As a result, the historical financial statements of PSI-TEC became the historical financial statements of PSI-TEC Holdings.

Immediately prior to the time of the reorganization transaction, Eastern Idaho was a non-reporting development stage company whose stock was quoted on the OTC: Pink Sheets. It had no substantive business operations and it was seeking other business opportunities. Eastern Idaho was originally incorporated under the laws of the State of Nevada on June 24, 1997 to operate as an Internet services marketing firm. It was unsuccessful in this venture, and in June 1998 it ceased its operations and sold all of its operating assets.

On October 20, 2006, in order to consolidate the operations of PSI-TEC Holdings, Inc. and PSI-TEC Corp. (PSI-TEC Holdings, Inc.'s wholly owned subsidiary), PSI-TEC Holdings, Inc. and PSI-TEC Corp. merged; and PSI-TEC Holdings, Inc., a Nevada corporation, became the surviving entity and subsequently changed its name to Third-Order Nanotechnologies, Inc. No change of control or domicile occurred as a result of the merger.

On March 10, 2008, Third-order Nanotechnologies, Inc. changed its name to Lightwave Logic, Inc. to better suit its strategic business plan and to facilitate stockholder recognition of our Company and our business. Therefore, unless the context otherwise requires, all references herein to the "Company," "we," "our" or "us" and other similar terms means Lightwave Logic, Inc., a Nevada corporation.

In February and April 2011, respectively, the United States Patent Office granted us two patents: US Patent No. 7,894,695 covering our Tricyclic Spacer System for Non-Linear Optical Devices and US Patent No. 7,919,619 for Heterocyclical Chromophore Architectures directed to our Perkinamine TM chromophores. These composition of matter patents taken together protect the core of our electro-optical materials portfolio.

In March 2011, we entered into a research and development agreement with the City University of New York's Laboratory for Nano Micro Photonics (LaNMP) to develop Third-order non-linear devices. We believe that the combination of LaNMP's device capabilities together with our materials expertise should accelerate the development of all-optical devices.

In March 2011, the City University of New York's Laboratory for Nano Micro Photonics (LaNMP) fabricated our first-ever all optical waveguide using one of our Perkinamine NR TM chromophores. It is anticipated that LaNMP will use this device architecture to develop various all-optical devices including an all-optical transistor.

In March 2011, we announced a two-year research and development collaboration with the University of Alabama to explore the advanced energy capture properties of our Perkinamine TM class of chromophores. Our material absorbs light across a wide range of wavelengths from near infra-red into the near ultraviolet. The University intends to explore how to efficiently capture a wide range of solar radiation with our material.

In December 2011, we announced the discovery of a new material named Perkinamine IndigoTM. We believe this represents a major advancement in the field of organic nonlinear optical materials. The material demonstrated an unusually high electro-optical effect of greater than 250 picometers per volt with excellent thermal and photo stability. Independent research laboratories at Photon-X and The University of Colorado confirmed these characteristics. We do, however, have to do a complete characterization of these materials to fully understand what material properties are causing these results before any of our partners will move forward with this material. The major microelectronics company we are working with will be characterizing the material at their location using their proprietary devices while we continue our work with the University of Colorado, Boulder. In order to further characterize our Perkinamine class of materials, including Perkinamine IndigoTM, the Company has developed Mach-Zehnder interferometry and standard Teng-Man test set-ups in its own facilities. The Company’s optical lab is starting to test materials.

In June 2012 we opened a new internal research laboratory facility in Newark, Delaware in the Delaware Technology Park, near the University of Delaware. This new lab facility enables us to synthesize and test our materials in the same facility and will help us accelerate our development efforts. It is equipped with state of the art equipment necessary to expand our ability to conduct synthetic chemistry in much more tightly controlled conditions. Additionally, we have equipped a separate advanced optical laboratory at the same location where the necessary testing of material candidates will be performed as they emerge from our new synthesis laboratory.

In July 2012 we entered into an agreement with The University of Colorado, Boulder to conduct analytical testing and to carry out studies that will give a better understanding of the properties of a new class of composite organic electro-optic materials. This class of materials is our Perkinamine IndigoTM. The processing and measurements are to be carried out primarily at the Guided Wave Optics Laboratory (GWOL). The work is being done in close collaboration with Company personnel.

In September 2012 the United States Patent Office granted our Company U.S. Patent No. 8,269,004, entitled Heterocyclical Anti-Aromatic Chromophore Architectures. This patent protects the unique molecular structures that give our chromophores the thermal stability necessary to withstand CMOS processing temperatures without compromising electro-optical effects.

In November 2012 Australia granted our Company Australian Patent No. AU2005302506 entitled Heterocyclical Chromophore Architectures. This patent protects the unique molecular structures that give our chromophores the thermal stability necessary to withstand CMOS processing temperatures without compromising electro-optical effects.

In February 2013 we delivered to a potential large system supplier customer prototype devices that were coated with our advanced organic nonlinear electro-optical polymer, Perkinamine IndigoTM. Tests conducted by the University of Colorado, Boulder on coupons coated with the material demonstrated consistent R33 measurements from 100-125 picometers per volt, which exceeded the potential large system supplier customer's stated requirements.

In March 2013 we entered into a product development contractor agreement with EM Photonics (EMP) of Newark, Delaware to fabricate and test waveguides and phase modulators during an initial development phase using existing EMP polymer modulator design and processes.

In June 2013 we consolidated the EMP design program into our University of Colorado, Boulder (UCB) program after we fabricated structures with UCB that will be used as the basic building blocks of our Integrated Optical Device effort for the construction of both our advanced telecom modulator and data communications transceiver.

In April 2013 our potential large system supplier customer informed us that their preliminary testing results on the prototype devices coated with Perkinamine Indigo™ that we delivered to them in February 2013 demonstrated several of the key performance parameters that they desired. There are still additional tests that need to be completed. We are working with our potential customer utilizing our Perkinamine Indigo™ chromophore in a number of host polymers and will evaluate these polymers in conjunction with our chromophores for a specific performance attributes for their application.

In April 2013 Japan granted our Company Japanese Patent No. 5241234 entitled Heterocyclical Chromophore Architectures. This patent protects the unique molecular structures that give our chromophores the thermal stability necessary to withstand CMOS processing temperatures without compromising electro-optical effects.

Corporate Information

Our principal executive office is located at 111 Ruthar Drive, Newark, DE 19711, and our telephone number is (302) 356-2717. Our website address is www.lightwavelogic.com. No information found on our website is part of this prospectus. Also, this prospectus includes the names of various government agencies and the trade names of other companies. Unless specifically stated otherwise, the use or display by us of such other parties' names and trade names in this prospectus is not intended to and does not imply a relationship with, or endorsement or sponsorship of us by, any of these other parties.

The Offering

Common stock outstanding prior to the offering (1)	52,046,797 shares, including 200,000 initial commitment shares previously issued to Lincoln Park under the 2013 Purchase Agreement (and included in this offering).
Common Stock offered by the selling shareholder	Up to 10,000,000 shares, consisting of the 200,000 initial commitment shares already issued to Lincoln Park, up to 400,000 shares to be issued to Lincoln Park as additional commitment shares and the remaining shares to be purchased from time to time under the 2013 Purchase Agreement
Common stock to be outstanding after giving effect to the issuance of 10,000,000 shares to Lincoln Park under the 2013 Purchase Agreement	62,046,797 shares
Use of proceeds	We will not receive any proceeds from the sale of the shares of common stock by Lincoln Park. However, we may receive up to $20,000,000 from sales of shares under the 2013 Purchase Agreement. Any proceeds that we receive from sales to Lincoln Park under the 2013 Purchase Agreement will be used to further our business plan of expanding our research and development of our polymer materials technologies, commercialize potential optical devices and materials and for general and administrative purposes. See “Use of Proceeds”.
OTC Markets (OTCQB) symbol	LWLG
Risk factors	This investment involves a high degree of risk. See “Risk Factors” for a discussion of factors you should consider carefully before making an investment decision.

(1) The number of shares of our common stock set forth above is based on 52,046,797 shares of common stock outstanding as of the date of this prospectus, and excludes:

• options to purchase 5,557,000 shares of our common stock pursuant to our 2007 Employee Stock Plan, of which 4,851,375 have vested as of the date of this prospectus, at a weighted average exercise price of $1.22 per share; and

• warrants to purchase an aggregate of 3,125,250 shares of our common stock, of which 3,010,668 have vested as of the date of this prospectus at a weighted average exercise price of $1.04 per share.

The Lincoln Park Transactions

On May 3, 2011, we executed a Purchase Agreement with Lincoln Park (referred to herein as the 2011 Purchase Agreement) and a registration rights agreement whereby we have the right to sell, at its sole discretion, to Lincoln Park up to $20,000,000 of our common stock, over a 30-month period. Under the 2011 Purchase Agreement, we sold Lincoln Park 4,194,840 shares of common stock and received $6,849,998 and $13,150,002 remains available. The 2011 Purchase Agreement terminates in December 2013.

On June 6, 2013, we entered into a new purchase agreement with Lincoln Park (referred to herein as the 2013 Purchase Agreement) pursuant to which Lincoln Park has agreed to purchase from us up to $20,000,000 of our common stock (subject to certain limitations) from time to time over a 30-month period. Also on June 6, 2013, we entered into a Registration Rights Agreement, or the Registration Rights Agreement, with Lincoln Park, pursuant to which we have filed with the SEC the registration statement that includes this prospectus to register for resale under the Securities Act of 1933, as amended, or the Securities Act, the shares that have been or may be issued to Lincoln Park under the 2013 Purchase Agreement.

Other than 200,000 shares of our common stock that we have already issued to Lincoln Park pursuant to the terms of the 2013 Purchase Agreement as consideration for its commitment to purchase shares of our common stock under the 2013 Purchase Agreement, we did not have the right to commence any sales to Lincoln Park under the 2013 Purchase Agreement until the SEC declared effective the registration statement of which this prospectus forms a part. Thereafter, we may, from time to time and at our sole discretion, direct Lincoln Park to purchase shares of our common stock in amounts up to 100,000 shares on any single business day so long as at least one business day has passed since the most recent purchase. We can also accelerate the amount of our common stock to be purchased under certain circumstances to up to 200,000 shares or $500,000 per purchase plus an additional "accelerated amount" under certain circumstances. The registration statement was declared effective on October 4, 2013. Except as described in this prospectus, there are no trading volume requirements or restrictions under the 2013 Purchase Agreement, and we will control the timing and amount of any sales of our common stock to Lincoln Park. The purchase price of the shares that may be sold to Lincoln Park under the 2013 Purchase Agreement will be based on the market price of our common stock immediately preceding the time of sale as computed under the 2013 Purchase Agreement without any fixed discount; provided that in no event will such shares be sold to Lincoln Park when our closing sale price is less than $1.00 per share, subject to adjustment as provided in the 2013 Purchase Agreement. The purchase price per share will be equitably adjusted for any reorganization, recapitalization, non-cash dividend, stock split, or other similar transaction occurring during the business days used to compute such price. We may at any time in our sole discretion terminate the 2013 Purchase Agreement without fee, penalty or cost upon one business day notice. Lincoln Park may not assign or transfer its rights and obligations under the 2013 Purchase Agreement.

As of September 17, 2013, there were 52,046,797 shares of our common stock outstanding, of which 42,171,126 shares were held by non-affiliates, excluding the 200,000 shares that we have already issued to Lincoln Park under the 2013 Purchase Agreement. Although the 2013 Purchase Agreement provides that we may sell up to $20,000,000 of our common stock to Lincoln Park, only 10,000,000 shares of our common stock are being offered under this prospectus, which represents (i) 200,000 shares that we issued to Lincoln Park as a commitment fee (ii) an additional 9,400,000 shares which may be issued to Lincoln Park in the future under the 2013 Purchase Agreement and (iii) 400,000 shares that we are required to issue proportionally in the future, as an additional commitment fee, if and when we sell shares to Lincoln Park under the 2013 Purchase Agreement. If all of the 10,000,000 shares offered by Lincoln Park under this prospectus were issued and outstanding as of the date hereof, such shares would represent 17% of the total number of shares of our common stock outstanding and 20% of the total number of outstanding shares held by non-affiliates, in each case as of the date hereof. If we elect to issue and sell more than the 10,000,000 shares offered under this prospectus to Lincoln Park, which we have the right, but not the obligation, to do, we must first register for resale under the Securities Act any such additional shares, which could cause additional substantial dilution to our stockholders. The number of shares ultimately offered for resale by Lincoln Park is dependent upon the number of shares we sell to Lincoln Park under the 2013 Purchase Agreement.

Issuances of our common stock in this offering will not affect the rights or privileges of our existing stockholders, except that the economic and voting interests of each of our existing stockholders will be diluted as a result of any such issuance. Although the number of shares of common stock that our existing stockholders own will not decrease, the shares owned by our existing stockholders will represent a smaller percentage of our total outstanding shares after any such issuance to Lincoln Park.

Glossary of Select Technology Terms Used Herein

All-optical devices

All-optical devices convert data in the form of input light signals to a secondary light data stream. The future market of all-optical devices and switches is expected to include all-optical transistors.

All-optical transistors

All-optical transistors are devices currently under development that use an input light signal to switch a secondary light signal. All-optical transistors are expected to enable the fabrication of an entirely new generation of high-speed computers that operate on light instead of electricity. We believe that this will significantly improve computation speeds.

Aromaticity

Aromaticity causes an extremely high degree of molecular stability. It is a molecular arrangement wherein atoms combine into a ring or rings and share their electrons among each other. Aromatic compounds are extremely stable because the electronic charge distributes evenly over a great area preventing hostile moieties, such as oxygen and free radicals, from finding an opening to attack.

CLD-1

An electro-optic material based upon unstable polyene molecular architectures. Unlike our own molecular designs, CLD-1 is not a CSC model molecule and exhibits thermal degradation at low temperatures (~250 C) making it less suitable for commercial and military applications.

CSC (Cyclical Surface Conduction) theory

Most charge-transfer dyes (e.g. Disperse Red 1, CLD, FTC) are based upon a polyene architecture wherein the ground state and first excited state differ by the alteration of single and double bonds. CSC model molecules use nitrogenous heterocyclical structures.

Electro-optic devices

Electro-optic devices convert data from electric signals into optical signals for use in communications systems and in optical interconnects for high-speed data transfer.

Electro-optic material

Electro-optic material is the core active ingredient in high-speed fiber-optic telecommunication systems. Electro-optic materials are materials that are engineered at the molecular level. Molecular level engineering is commonly referred to as “nanotechnology.”

Electro-optic modulators

Electro-optic modulators are electro-optic devices that perform electric-to-optic conversions within the infrastructure of the Internet. Data centers may also benefit from this technology through devices that could significantly increase bandwidth and speed while decreasing costs.

Nanotechnology

Nanotechnology refers to the development of products and production processes at the molecular level, which is a scale smaller than 100 nanometers (a nanometer is one-billionth of a meter).

Nitrogenous heterocyclical structure

A multi-atom molecular ring or combination of rings that contain nitrogen.

Plastics/Polymers

Polymers, also known as plastics, are large carbon-based molecules that bond many small molecules together to form a long chain. Polymer materials can be engineered and optimized using nanotechnology to create a system in which unique surface, electrical, chemical and electro-optic characteristics can be controlled. Materials based on polymers are used in a multitude of industrial and consumer products, from automotive parts to home appliances and furniture, as well as scientific and medical equipment.

Polymerization

Polymerization is a molecular engineering process that provides the environmental and thermal stability necessary for functional electro-optical devices. Polymer materials can be engineered and optimized using nanotechnology to create a system in which unique surface, electrical, chemical and electro-optic characteristics can be controlled.

Thermal Gravimetric Analysis (TGA)

The basic principle in TGA is to measure the mass of a sample as a function of temperature. This, in principle, simple measurement is an important and powerful tool in solid-state chemistry and materials science. The method, for example, can be used to determine water of crystallization, follow degradation of materials, determine reaction kinetics, study oxidation and reduction, or to teach the principles of stoichiometry, formulae and analysis.

Zwitterionic-aromatic push-pull

Most charge-transfer dyes (e.g. Disperse Red 1, CLD, FTC) have an excited state (such as during photonic absorption) wherein a full charge is separated across the molecule. Such a molecule is said to be excited-state zwitterionic. Within such a molecular system the zwitterionic state is unstable and the molecule typically collapses rapidly into its lower dipole ground state. In our patented molecular designs, the excited state is further stabilized by the aromatization of the molecular core. In that aromaticity stabilizes this excited state, it is said to "pull" the molecule into this higher energy state; on the other hand, the unstable zwitterionic state is said to "push" the molecule out of the excited state.

SUMMARY FINANCIAL DATA

The following tables summarize our financial data. We have derived the following summary of our statement of operations data for the years ended December 31, 2012 and 2011 from our audited financial statements appearing later in this prospectus. We have derived the following summary of our statement of operations data for the six months ended June 30, 2013 and 2012 and balance sheet data as of June 30, 2013 from our unaudited financial statements appearing later in this prospectus. Our historical results are not necessarily indicative of the results that may be expected in the future. You should read the summary of our financial data set forth below together with our financial statements and the related notes to those statements, as well as "Management's Discussion and Analysis of Financial Condition and Results of Operations" appearing later in this prospectus.

	Years Ended December 31,		Six Months Ended June 30,	
	2012	2011	2013	2012
Statement of Operations Data:				
NET SALES	$-	$-	$-	-
COST AND EXPENSE				
Research and development	2,489,747	1,682,557	986,498	927,662
General and administrative	1,936,417	1,633,786	881,004	851,050
LOSS FROM OPERATIONS	(4,426,164)	(3,316,343)	(1,867,502)	(1,778,712)
OTHER INCOME (EXPENSE)	(130,374)	(166,279)	(204,414)	(120,882)
NET LOSS	$(4,556,538)	$(3,482,622)	$(2,071,634)	(1,898,950)
Basic and Diluted Loss per Share	$(0.09)	$(0.08)	$(0.04)	(0.04)
Basic and Diluted Weighted Average Number of Shares	48,778,783	44,386,149	51,097,111	47,893,907

	As of June 30, 2013
Balance Sheet Data:	
Current assets	$ 3,425,951
Property and equipment - net	348,614
Other assets	-
Intangible assets - net	507,588
TOTAL ASSETS	$ 4,282,153
TOTAL LIABILITIES	210,503
TOTAL STOCKHOLDERS' EQUITY	4,071,650
TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY	$ 4,282,153

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RISK FACTORS

Before you make a decision to invest in our securities, you should consider carefully the risks described below, together with other information in this prospectus. 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 potential products. As a result of these activities, we have incurred significant losses and experienced negative cash flow since our inception. We incurred a net loss of $4,556,538 for the year ended December 31, 2012 and $3,482,622 for the year ended December 31, 2011, and we also incurred a net loss of $2,071,634 for the six months ended June 30, 2013. We anticipate that we will continue to incur operating losses through at least the end of 2013.

We may not be able to generate significant revenue either through development contracts from the U.S. government or government subcontractors or through customer contracts for our potential products or technologies. 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 additional 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 product sales and marketing capabilities;
- Establish and maintain markets for our potential 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 and outside contractor relationships;
- 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.

If we are unable to achieve one or several of the above factors, we may be forced to cease operations.

If we fail to effectively manage our growth, and effectively transition from our focus on research and development activities to commercially successful products, 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. The transition from a focus on research and development to being a vendor of products requires effective planning and management. Additionally, growth arising from the expected synergies from 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; and
- Expand our facilities and increase capital investments.

We cannot assure you that we will be able to accomplish these tasks effectively or otherwise effectively manage our growth.

We are entering new markets, and if we fail to accurately predict growth in these new markets, we may suffer substantial losses.

We are devoting significant resources to engineer next-generation electro-optic polymers for future applications to be utilized by electro-optic device manufacturers, such as telecommunications component and systems manufacturers, networking and switching suppliers, semiconductor companies, aerospace companies and government agencies. 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.

If we fail to accurately predict growth in new markets, or if we are exposed to any of the aforementioned risks, we could be forced to cease operations.

Our plan to develop relationships with strategic partners may not be successful which could have a materially adverse affect on our business.

Part of our business strategy is to maintain and develop strategic relationships with government agencies, private firms, and academic institutions to conduct research and development of technologies and products. 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.

The failure to establish and maintain collaborative relationships may have a materially adverse affect on our business.

We plan to sell many of our products directly to commercial customers or through potential industry partners. For example, we expect to sell our electro-optic polymer products to electro-optic device manufacturers, such as telecommunications component and systems manufacturers, networking and switching suppliers, semiconductor companies, aerospace companies and government agencies. Our ability to generate 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, which could have a material adverse effect on our business.

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, reduces any anticipated cost savings or revenue enhancement resulting from these ventures or may cause a material adverse effect on our business.

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 electro-optic polymer products, which could have a materially adverse effect on our business.

We are developing our electro-optic polymer products to be utilized by electro-optic device manufacturers, such as telecommunications component and systems manufacturers, networking and switching suppliers, semiconductor companies, aerospace companies and government agencies. All of our potential products are still in the development stage, and we do not know when a market for these products will develop, if at all. Our success depends, in part, upon our ability to gain market acceptance of our products. To be accepted, our products must meet the technical and performance requirements of our potential customers. OEMs, suppliers or government agencies may not accept polymer-based products. In addition, even if we achieve some degree of market acceptance for our potential products in one industry, we may not achieve market acceptance in other industries for which we are developing products.

Achieving market acceptance for our products will require marketing 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. Failure to achieve broad acceptance of our products by customers and to compete effectively would harm our operating results.

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 require that both 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, the absence of which could have a materially adverse affect on our business.

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, and failure to achieve such objectives could have a materially adverse affect on our business.

Two of our significant target markets are the telecommunications and networking markets, which continue to be subject to overcapacity and slow growth or decline which could have a materially adverse affect on our business.

Two of our significant target markets are the telecommunications and networking markets, and developments that adversely affect the telecommunications or networking markets, including delays in traffic growth and changes in U.S. government regulation, could slow down, or even halt our efforts to enter into these markets. Reduced spending and technology investment by telecommunications companies may make it more difficult for our products to gain market acceptance. Such companies may be less willing to purchase new technology such as ours or invest in new technology development when they have reduced capital expenditure budgets.

Our inability to successfully acquire and integrate other businesses, assets, products or technologies could harm our business and cause us to fail at achieving or anticipated growth.

It is our intent to continue to 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 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.

We may require additional capital to continue to fund our operations. 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 June 2014; 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 the Lincoln Park financing transactions described below and throughout this prospectus, 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.

In May 2011, we entered into the 2011 Purchase Agreement with Lincoln Park, under which we may direct Lincoln Park to purchase up to, as of the date of this prospectus, a remaining $13,150,002 worth of shares of our common stock until December 2013, after which the 2011 Purchase Agreement terminates by its terms.

In June 2013, we entered into the 2013 Purchase Agreement with Lincoln Park, under which we may direct Lincoln Park to purchase up to $20,000,000 worth of shares of our common stock over a 30-month period once the registration statement of which this prospectus forms a part has been declared effective by the SEC. The registration statement was declared effective on October 4, 2013. However, the extent to which we will rely on the 2011 Purchase Agreement through December 2013, or the 2013 Purchase Agreement with Lincoln Park as sources of funding will depend on a number of factors, including the prevailing market price of our common stock and volume of trading and the extent to which we are able to secure working capital from other sources. More specifically, Lincoln Park does not have the obligation to purchase any shares of our common stock under the 2011 Purchase Agreement on any business day that the price of our common stock is less than $1.00 per share, and under the 2013 Purchase Agreement Lincoln Park does not have the obligation to purchase any shares of our common stock pursuant to a Regular Purchase on a purchase date where the closing sale price on the purchase date is below $1.00.

We are registering the resale of 10,000,000 shares by Lincoln Park pursuant to this prospectus. In the event we elect to issue more than the 10,000,000 shares offered hereby, we would be required to file a new registration statement and have it declared effective by the SEC. If obtaining sufficient funding from Lincoln Park does not occur or is prohibitively dilutive, we will need to secure another source of funding in order to satisfy our working capital needs. Should the financing we require to sustain our working capital needs be unavailable or prohibitively expensive when we require it, the consequences could be a material adverse effect on our business, operating results, financial condition and prospects.

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 prospectus. 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 either short-term or long-term capital requirements, or if planned revenues are not generated, we may be required to substantially limit our operations.

We may not be able to access the full amounts available under the 2011 Purchase Agreement or the 2013 Purchase Agreement, which could prevent us from accessing the capital we need to continue our operations that could have an adverse affect on our business.

Under the 2011 Purchase Agreement with Lincoln Park, we may direct Lincoln Park to purchase up to $20,000,000 worth of shares of our common stock over a 30-month period through December 2013. On any trading day selected by us, we may sell to Lincoln Park up to $200,000 of common stock by delivering a purchase notice to Lincoln Park. The Purchase Price of such shares is equal to the lesser of: (i) the lowest sale price of our common stock on the purchase date; or (ii) the arithmetic average of the three lowest closing sale prices for our common stock during the twelve consecutive trading days ending on the trading day immediately preceding the purchase date. Lincoln Park does not have the right or the obligation to purchase any shares of our common stock on any business day that the market price of our common stock is less than $1.00. To the extent that the market price of our common stock is below $1.00 per share on a trading day, we would not receive any proceeds under the Purchase Agreement for that day.

If the market price of our common stock is not below $9.50 per share, our sales will be limited to up to $1,000,000 of our common stock on each purchase date. If the market price of our common stock is not below $4.50 per share, our sales will be limited to up to $500,000 of our common stock on each purchase date. If the market price of our common stock is not below $3.50 per share, our sales will be limited to up to $400,000 of our common stock on each purchase date. If the market price of our common stock is not below $2.50 per share, our sales will be limited to up to $300,000 of our common stock on each purchase date.

Depending on the prevailing market price of our common stock, we may not be able to sell shares to Lincoln Park for the maximum $20,000,000 over the term of the 2011 Purchase Agreement, which expires in December 2013. In addition, we only registered up to 10,000,000 shares of our common stock in connection with the 2011 Purchase Agreement, of which 150,839 shares were initial commitment shares previously issued to Lincoln Park. Assuming a purchase price of $1.00 per share, which is the minimum purchase price at which shares can be sold under the Purchase Agreement, and the issuance to Lincoln Park of an aggregate 10,000,000 shares, which would be comprised of 9,851,412 shares purchased at $1.00 per share and 148,588 shares issued as additional pro rata commitment shares for no additional consideration, the proceeds to us would only be $9,851,412. In the event we elect to issue more than 10,000,000 shares, we would be required to file a new registration statement and have it declared effective by the SEC.

Under the 2013 Purchase Agreement with Lincoln Park, we may direct Lincoln Park to purchase up to $20,000,000 worth of shares of our common stock over a 30-month period, commencing on the date of effectiveness of the registration statement of which this prospectus is made a part. On any trading day selected by us, we may sell shares of common stock to Lincoln Park in amounts up to 100,000 shares per regular sale, which may be increased to up to 200,000 shares depending on certain conditions as set forth in the 2013 Purchase Agreement, up to the aggregate commitment of $20,000,000 (we refer to these as Regular Purchases in this prospectus). If the market price of our common stock is not below $2.00 per share on the purchase date, then the Regular Purchase amount may be increased to 150,000 shares. If the market price is not below $2.50 per share on the purchase date, then the Regular Purchase amount may be increased to 200,000 shares. Although there are no upper limits on the per share price Lincoln Park may pay to purchase our common stock, the Company may not sell more than $500,000 in shares of common stock to Lincoln Park per Regular Purchase.

In addition to Regular Purchases, we may in our sole discretion direct Lincoln Park on each purchase date to make “accelerated purchases” on the following business day up to the lesser of (i) two (2) times the number of shares purchased pursuant to such Regular Purchase or (ii) 30% of the trading volume on the accelerated purchase date at a purchase price equal to the lesser of (i) the closing sale price on the accelerated purchase date and (ii) 93% of the accelerated purchase date’s volume weighted average price.

The purchase price of the shares related to the $20,000,000 of future funding will be based on the prevailing market prices of the Company’s shares of common stock, which shall be equal to the lesser of the lowest sale price of the common shares during the purchase date and the average of the three (3) lowest closing sale prices of the common shares during the twelve (12) business days prior to the purchase date without any fixed discount. However, Lincoln Park shall not have the right or the obligation to purchase any shares of our common stock pursuant to a Regular Purchase on a purchase date where the closing sale price on the purchase date is below $1.00. To the extent that the closing sale price of our common stock is below $1.00 per share on a purchase date, we would not receive any proceeds under the 2013 Purchase Agreement for that day.

Depending on the prevailing market price of our common stock, we may not be able to sell shares to Lincoln Park for the maximum $20,000,000 over the term of the 2013 Purchase Agreement. In addition, we are only registering up to 10,000,000 shares of our common stock in connection with the 2013 Purchase Agreement, which includes 200,000 shares previously issued to Lincoln Park as initial commitment shares. Assuming a purchase price of $1.00 per share,

which is the minimum purchase price at which shares can be sold under the Purchase Agreement, and the issuance to Lincoln Park of 9,800,000 additional shares under the 2013 Purchase Agreement, which would be comprised of 9,400,000 shares purchased at $1.00 per share and 400,000 shares issued as additional pro rata commitment shares for no additional consideration, the proceeds to us would only be $9,400,000. In the event we elect to issue more than 9,800,000 shares, we would be required to file a new registration statement and have it declared effective by the SEC.

The sale of shares of our common stock to Lincoln Park under the 2011 and 2013 Purchase Agreements may cause substantial dilution to our existing stockholders and could cause the price of our common stock to decline.

Under each of the 2011 and 2013 Purchase Agreements with Lincoln Park, we may sell to Lincoln Park, from time to time and under certain circumstances, up to $20,000,000 of our common stock over approximately 30 months (for the 2011 Purchase Agreement, through December 2013, and for the 2013 Purchase Agreement, from the date that the SEC declares effective the resale registration statement of which this prospectus is made a part). Generally, with respect to each Purchase Agreement, we have the right, but no obligation, to direct Lincoln Park to periodically purchase up to $20,000,000 of our common stock in specific amounts under certain conditions, which periodic purchase amounts can be increased under specified circumstances.

We also agreed to issue to Lincoln Park up to an aggregate of 452,498 and 600,000 shares of common stock as a fee for Lincoln Park's commitment to purchase our shares under the 2011 Purchase Agreement and 2013 Purchase Agreement, respectively. Of these commitment shares, we issued 150,839 and 200,000 shares upon entering into the 2011 Purchase Agreement and 2013 Purchase Agreement, respectively. The remaining 198,329 and 400,000 commitment shares are issuable to Lincoln Park on a pro rata basis as additional purchases are made under the 2011 Purchase Agreement and 2013 Purchase Agreement, respectively.

Depending upon market liquidity at the time, sales of shares of our common stock to Lincoln Park may cause the trading price of our common stock to decline. Lincoln Park may ultimately purchase all, some or none of the $20,000,000 of common stock under each of the 2011 Purchase Agreement and 2013 Purchase Agreement, and after it has acquired shares, Lincoln Park may sell all, some or none of those shares. Therefore, sales to Lincoln Park by us could result in substantial dilution to the interests of other holders of our common stock. The sale of a substantial number of shares of our common stock to Lincoln Park, or the anticipation of such sales, could make it more difficult for us to sell equity or equity-related securities in the future at a time and at a price that we might otherwise wish to effect sales. However, we have the right to control the timing and amount of any sales of our shares to Lincoln Park, and the Purchase Agreement may be terminated by us at any time at our discretion without any cost to us.

The exercise of options and warrants and other issuances of shares of common stock or securities convertible into common stock will dilute your interest.

As of December 31, 2012, we have outstanding options and warrants to purchase an aggregate of 7,714,850 shares of our common stock at exercise prices ranging from $0.25 per share to $1.75 per share with a weighted average exercise price of $1.15 per share. As of June 30, 2013, we have outstanding options and warrants to purchase an aggregate of 8,582,250 shares of our common stock at exercise prices ranging from $0.25 per share to $1.75 per share with a weighted average exercise price of $1.16 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 2011 Purchase Agreement and the 2013 Purchase Agreement with Lincoln Park.

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.

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.

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.

Our quarter-to-quarter performance may vary substantially, and this variance, as well as general market conditions, may cause our stock price to fluctuate greatly and even potentially expose us to litigation.

We have generated no sales to date and we cannot accurately estimate future quarterly revenue and operating expenses based on historical performance. Our quarterly operating results may vary significantly based on many factors, including:

- Fluctuating demand for our potential products and technologies;
- Announcements or implementation by our competitors of technological innovations or new products;
- Amount and timing of our costs related to our marketing efforts or other initiatives;
- The status of particular development programs and the timing of performance under specific development agreements;
- Timing and amounts relating to the expansion of our operations;
- Product shortages requiring suppliers to allocate minimum quantities;
- Announcements or implementation by our competitors of technological innovations or new products;
- The status of particular development programs and the timing of performance under specific development agreements;
- Our ability to enter into, renegotiate or renew key agreements;
- Timing and amounts relating to the expansion of our operations;
- Costs related to possible future acquisitions of technologies or businesses; or
- Economic conditions specific to our industry, as well as general economic conditions.

Our current and future expense estimates are based, in large part, on estimates of future revenue, which is difficult to predict. We expect to continue to make significant operating and capital expenditures in the area of research and development and to invest in and expand production, sales, marketing and administrative systems and processes. We may be unable to, or may elect not to, adjust spending quickly enough to offset any unexpected revenue shortfall. If our increased expenses were not accompanied by increased revenue in the same quarter, our quarterly operating results would be harmed.

Our failure to compete successfully could harm our business.

The markets that we are targeting for our electro-optic polymer technology 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 products that are equal to or superior to our potential products or that will achieve greater market acceptance than our potential products;
- 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 potential products obsolete;
- Introduce products that make the continued development of our potential products uneconomical;
- Obtain patents that block or otherwise inhibit our ability to develop and commercialize our potential products;
- Withstand price competition more successfully than we can; and
- Establish cooperative relationships among themselves or with third parties that enhance their ability to address the needs of our prospective customers.

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

We may be unable to obtain effective intellectual property protection for our potential products and technology which could have a materially adverse affect on our business.

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.

We may be subject to patent infringement claims, which could result in substantial costs and liability and prevent us from commercializing our potential products.

Third parties may claim that our potential 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 potential 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 commercialize our potential 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 potential 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 and retained research institution rights which could cause us to incur substantial expenses which could have a materially adverse affect on our business.

We may have obligations to government agencies or universities 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. In addition, academic research partners often retain certain rights, including the right to use the technology for noncommercial academic and research use, to publish general scientific findings from research related to the technology, and to make customary scientific and scholarly disclosures of information relating to the technology. It is difficult to monitor whether our partners will limit their use of the technology to these uses, and we could incur substantial expenses to enforce our rights to our licensed technology in the event of misuse.

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 Thomas E. Zelibor, our Chief Executive Officer and James S. Marcelli our President and Chief Operating Officer. Accordingly, the loss of the services of either of these persons would adversely affect our business and our ability to timely 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 processes, our operating results would be harmed.

The manufacture of our potential products is a multi-stage process that requires the use of high-quality materials and advanced manufacturing technologies. Also, polymer-related device development and manufacturing 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 processes or to maintain stringent quality controls, or if contamination problems arise, our operating results would be harmed.

The complexity of our anticipated products may lead to errors, defects and bugs, which could result in the necessity to redesign products and could negatively, impact our reputation with customers.

Products as complex as those we intent to market might contain errors, defects and bugs when first introduced or as new versions are released. Delivery of products with production defects or reliability, quality or compatibility problems could significantly delay or hinder market acceptance of our products or result in a costly recall and could damage our reputation and adversely affect our ability to sell our products. If our products experience defects, we may need to undertake a redesign of the product, 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 us, our suppliers and our customers.

If we decide to make commercial quantities of products at our facilities, we will be required to make significant capital expenditures to increase capacity which could have a materially adverse affect on our business.

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 potential 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 potential products in large quantities. In the event of significant demand for our potential 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 which could have a materially adverse affect on our business.

To date, we have produced limited quantities of products 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 commercial quantities, our financial results will be harmed.

We conduct significantly all of our research and development activities at a single facility, and circumstances beyond our control may result in considerable interruptions which could harm our business.

We conduct significantly all of our research and development activities at a single facility. A disaster such as a fire, flood or severe storm at or near this facility could prevent us from further developing our technologies or manufacturing our potential products, which would harm our business.

We are subject to regulatory compliance related to our operations, the costs of which may have a materially adverse affect on our business.

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 be unable to export our potential 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 are developing 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 these potential products into other countries, exporting our technology to those countries, conveying information about our technology to citizens of other countries or selling these potential products to commercial customers. We may be unable to obtain export licenses for products or technology if necessary. We currently cannot assess whether national security concerns would affect our potential products and, if so, what procedures and policies we would have to adopt to comply with applicable existing or future regulations.

We may incur liability arising from the use of hazardous materials, which could severely harm our business.

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.

A material weakness in internal controls may remain undetected for a longer period because of our Company's exemption from the auditor attestation requirements under Section 404(b) of Sarbanes-Oxley.

Our most recently filed annual report does not include an attestation report of the Company’s independent registered public accounting firm regarding internal control over financial reporting. Management’s report was not subject to attestation by the Company’s registered public accounting firm pursuant to rules of the Securities and Exchange Commission that permit the Company to provide only management’s attestation in this annual report. As a result, a material weakness in our internal controls may remain undetected for a longer period and such weakness may cause harm to our business.

Shares Eligible for Future Sale May Adversely Affect the Market.

From time to time, certain of the Company's shareholders may be eligible to sell all or some of their shares of common stock by means of ordinary brokerage transactions in the open market pursuant to Rule 144, promulgated under the Securities Act, subject to certain limitations. In general, a non-affiliate stockholder who has satisfied a six-month holding period may, under certain circumstances, sell its shares, without limitation. Any substantial sale of the Company's common stock pursuant to Rule 144 or pursuant to any resale prospectus may have a material adverse effect on the market price of our common stock.

There Is A Limited Market For Our Common Stock Which May Make It More Difficult For You To Sell Your Stock.

Our Company's common stock is quoted on the OTC Market (OTCQB) under the symbol "LWLG". The trading market for our common stock is limited, accordingly, there can be no assurance as to the liquidity of any markets that may develop for our common stock, your ability to sell our common stock, or the prices at which you may be able to sell our common stock.

We are subject to the "penny stock" rules and brokers cannot generally solicit the purchase of our common stock, which adversely affects its liquidity and market price.

The SEC has adopted regulations that generally define "penny stock" to be an equity security that has a market price of less than $5.00 per share, subject to specific exemptions. The market price of our common stock on the over-the-counter market has been substantially less than $5.00 per share and therefore we are currently considered a "penny stock" according to SEC rules. This designation requires any broker-dealer selling these securities to disclose certain information concerning the transaction, obtain a written agreement from the purchaser and determine that the purchaser is reasonably suitable to purchase the securities. These rules limit the ability of broker-dealers to solicit purchases of our common stock and therefore reduce the liquidity of the public market for our shares.

Our Company's Stock Price May Be Volatile.

The market price of our Company's common stock is likely to be highly volatile and could fluctuate widely in price in response to various factors, many of which are beyond our control, including:

- Technological innovations or new products and services by our Company or our competitors;
- Additions or departures of key personnel;
- Sales of our Company's common stock;
- Our Company's ability to integrate operations, technology, products and services;
- Our Company's ability to execute our business plan;
- Operating results below expectations;
- Loss of any strategic relationship;
- Industry developments;
- Economic and other external factors; and
- Period-to-period fluctuations in our Company's financial results.

Because we have a limited operating history, you may consider any one of these factors to be material. Our stock price may fluctuate widely as a result of any of the above listed factors.

In addition, the securities markets have from time to time experienced significant price and volume fluctuations that are unrelated to the operating performance of particular companies. These market fluctuations may also materially and adversely affect the market price of our Company's common stock.

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SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus contains forward-looking statements that involve substantial risks and uncertainties. The forward-looking statements are contained principally in the sections entitled “Prospectus Summary”, “Risk Factors”, “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and “Business” but are also contained elsewhere in this prospectus. In some cases, you can identify forward-looking statements by the words “may”, “might”, “will”, “could”, “would”, “should”, “expect”, “intend”, “plan”, “objective”, “anticipate”, “believe”, “estimate”, “pred “potential”, “continue” and “ongoing,” or the negative of these terms, or other comparable terminology intended to identify statements about the future. These statements involve known and unknown risks, uncertainties and other factors that may cause our actual results, levels of activity, performance or achievements to be materially different from the information expressed or implied by these forward-looking statements. Although we believe that we have a reasonable basis for each forward-looking statement contained in this prospectus, we caution you that these statements are based on a combination of facts and factors currently known by us and our expectations of the future, about which we cannot be certain. Forward-looking statements include, but are not limited to, statements about:

- lack of available funding;
- general economic and business conditions;
- competition from third parties;
- intellectual property rights of third parties;
- regulatory constraints;
- changes in technology and methods of marketing;
- delays in completing various engineering and manufacturing programs;
- changes in customer order patterns;
- changes in product mix;
- success in technological advances and delivering technological innovations;
- shortages in components;
- production delays due to performance quality issues with outsourced components;
- other risks to which our Company is subject; and
- other factors beyond the Company's control.

In addition, you should refer to the “Risk Factors” section of this prospectus for a discussion of other important factors that may cause our actual results to differ materially from those expressed or implied by our forward-looking statements. As a result of these factors, we cannot assure you that the forward-looking statements in this prospectus will prove to be accurate or that we will achieve the plans, intentions or expectations expressed or implied in our forward-looking statements. Furthermore, if our forward-looking statements prove to be inaccurate, the inaccuracy may be material. In light of the significant uncertainties in these forward-looking statements, you should not regard these statements as a representation or warranty by us or any other person that we will achieve our objectives and plans in any specified time frame, or at all. Any forward-looking statements we make in this prospectus speak only as of its date, and we undertake no obligation to publicly update any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law.

You should read this prospectus and the documents that we reference in this prospectus and have filed as exhibits to the registration statement, of which this prospectus is a part, completely and with the understanding that our actual future results may be materially different from what we expect. We qualify all of our forward-looking statements by these cautionary statements.

USE OF PROCEEDS

This prospectus relates to shares of our common stock that may be offered and sold from time to time by Lincoln Park. We will not receive any proceeds upon the sale of shares by Lincoln Park. However, we may receive proceeds of up to $20,000,000 under the 2013 Purchase Agreement with Lincoln Park, subject to the terms and conditions of the 2013 Purchase Agreement.

We will retain broad discretion in determining how we will allocate the proceeds from any sales to Lincoln Park. However, any proceeds that we receive from sales to Lincoln Park under the 2013 Purchase Agreement will be used to further our business plan of expanding our research and development of our polymer materials technologies, commercialize potential optical devices and materials and for general and administrative purposes.

Although we have no specific plans for use of proceeds as of the date of this prospectus, we believe that approximately 65% of any proceeds received may be used towards our research and development efforts which may include, without limitation, (a) retaining additional management, sales, marketing, technical and other staff to our workforce, (b) expanding our research and development facilities, including the purchase of additional laboratory and production equipment, (c) marketing our future products as they are introduced into the marketplace, (d) developing and maintaining collaborative relationships with strategic partners, (e) developing and improving our manufacturing processes and quality controls, and approximately 35% of any proceeds received may used for increasing our general and administrative activities related to our operations as a reporting public company and related corporate compliance requirements.

CAPITALIZATION

The following table sets forth our cash and cash equivalents and our capitalization as of June 30, 2013:

Cash and cash equivalents	$3,259,183
Stockholders' equity:	
Preferred stock, $0.001 par value, 1,000,000 shares authorized, no shares issued or outstanding	-
Common stock, $0.001 par value, 100,000,000 shares authorized, 52,046,797 issued and outstanding	52,047
Additional paid-in-capital	34,523,103
Accumulated deficit	(15,827)
Deficit accumulated during development stage	(30,487,673)
Total stockholders' equity	4,071,650
Total capitalization	$4,282,153

The number of shares of common stock outstanding in the table above excludes, as of June 30, 2013 (a) 5,557,000 shares of our common stock issuable upon the exercise of outstanding options and (b) 3,025,250 shares of our common stock issuable upon the exercise of outstanding warrants, with a weighted average exercise price of $1.16 per share.

MARKET FOR COMMON EQUITY AND RELATED SHAREHOLDER MATTERS

Market For Common Equity

Our common stock is currently traded under the symbol "LWLG" on the OTC Markets (OTCQB). Previously, our common stock traded on the over-the-counter bulletin board.

The following table set forth below lists the closing high and low bid and ask for our common stock for each fiscal quarter for the last two fiscal years. The prices in the table reflect inter-dealer prices, without retail markup, markdown or commission and may not represent actual transactions.

		Bid		Ask	
		High	Low	High	Low
2011 (1)	1st Quarter	$1.56	$1.10	$1.58	$1.25
	2nd Quarter	$1.20	$0 (3)	$1.40	$0 (3)
	3rd Quarter	$---	(4) $--- (4)	$---	(4) $--- (4)
	4th Quarter	$---	(4) $--- (4)	$---	(4) $--- (4)
2012 (2)	1st Quarter	$2.85	$1.61	$2.87	$1.65
	2nd Quarter	$1.52	$0.86	$1.60	$0.90
	3rd Quarter	$0.96	$0.831	$0.98	$0.845
	4th Quarter	$1.21	$0.825	$1.23	$0.85
2013 (2)	1st Quarter	$1.65	$0.83	$1.66	$0.85
	2nd Quarter	$1.55	$0.83	$1.62	$0.835

(1) Reflects prices and information obtained from the over-the-counter bulletin board.
(2) Reflects prices and information obtained from the OTC Markets.
(3) Reflects that at least two market makers posted two-sided quotes for our common stock and all of the quotes were priced at zero.
(4) Reflects that no priced bids or asks were calculated because there was not a minimum of 2 two-sided quotes for our common stock.

Holders

As of September 17, 2013, we have a total of 52,046,797 shares of common stock issued and outstanding, held by approximately 94 shareholders of record. We do not have any shares of preferred stock issued or outstanding.

Dividends

No cash dividends have been declared or paid on our common stock to date. No restrictions limit our ability to pay dividends on our common stock. The payment of cash dividends in the future, if any, will be contingent upon our Company's revenues and earnings, if any, capital requirements and general financial condition. The payment of any dividends is within the discretion of our board of directors. Our board of director's present intention is to retain all earnings, if any, for use in our business operations and, accordingly, the board of directors does not anticipate paying any cash dividends in the foreseeable future.

Securities Authorized for Issuance under Equity Compensation Plans

Equity Compensation Plans as of December 31, 2012

Equity Compensation Plan Information

Plan category	Number of securities to be issued upon exercise of outstanding options, warrants and rights (a)	Weighted-average exercise price of outstanding options, warrants and rights (b)	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a)) (c)
Equity compensation plans approved by security holders (1)	5,372,000	$1.20	1,482,450
Equity compensation plans not approved by security holders (2)	2,066,500	$0.95	0
Total	7,438,500	$1.13	1,482,450

(1) Reflects our 2007 Employee Stock Plan for the benefit of our directors, officers, employees and consultants.
(2) We have reserved 8,000,000 shares of common stock for such persons pursuant to that plan.

Comprised of common stock purchase warrants we issued for services.

Penny Stock Regulations and Restrictions on Marketability

The SEC has adopted rules that regulate broker-dealer practices in connection with transactions in penny stocks. Penny stocks are generally equity securities with a market price of less than $5.00, other than securities registered on certain national securities exchanges or quoted on the NASDAQ system, provided that current price and volume

information with respect to transactions in such securities is provided by the exchange or system. The penny stock rules require a broker-dealer, prior to a transaction in a penny stock, to deliver a standardized risk disclosure document prepared by the SEC, that: (a) contains a description of the nature and level of risk in the market for penny stocks in both public offerings and secondary trading; (b) contains a description of the broker's or dealer's duties to the customer and of the rights and remedies available to the customer with respect to a violation of such duties or other requirements of the securities laws; (c) contains a brief, clear, narrative description of a dealer market, including bid and ask prices for penny stocks and the significance of the spread between the bid and ask price; (d) contains a toll-free telephone number for inquiries on disciplinary actions; (e) defines significant terms in the disclosure document or in the conduct of trading in penny stocks; and (f) contains such other information and is in such form, including language, type size and format, as the SEC shall require by rule or regulation.

The broker-dealer also must provide, prior to effecting any transaction in a penny stock, the customer with (a) bid and offer quotations for the penny stock; (b) the compensation of the broker-dealer and its salesperson in the transaction; (c) the number of shares to which such bid and ask prices apply, or other comparable information relating to the depth and liquidity of the market for such stock; and (d) a monthly account statement showing the market value of each penny stock held in the customer's account.

In addition, the penny stock rules require that prior to a transaction in a penny stock not otherwise exempt from those rules, the broker-dealer must make a special written determination that the penny stock is a suitable investment for the purchaser and receive the purchaser's written acknowledgment of the receipt of a risk disclosure statement, a written agreement as to transactions involving penny stocks, and a signed and dated copy of a written suitability statement.

These disclosure requirements may have the effect of reducing the trading activity for our common stock. Therefore, stockholders may have difficulty selling our securities.

Recent Sales of Unregistered Securities

The Company made the following securities issuances without registering the securities under the Securities Act:

Securities Issued for Cash

Fiscal Year Ended December 31, 2010:

April – December 2010	Common stock – 947,200 shares of common stock at $0.25 per share for aggregate proceeds of $236,800 pursuant to warrant exercises.
May 2010	Common stock – 15,000 shares of common stock at $0.25 per share for aggregate proceeds of $3,750 pursuant to option exercises.
April 2010	Common stock – 10,000 shares of common stock at $0.345 per share for aggregate proceeds of $3,450 pursuant to a warrant exercise.
June 2010	Common stock – 25,000 shares of common stock at $0.50 per share for aggregate proceeds of $12,500 pursuant to a warrant exercise.
April 2010	Common stock – 282,500 shares of common stock at $1.00 per share for aggregate proceeds of $282,500 pursuant to warrant exercises.
August - December 2010	Common stock/Warrants - 1,500,000 shares of common stock and warrants to purchase 375,000 shares of common stock for aggregate proceeds of $1,500,000 pursuant to a private offering.

Fiscal Year Ended December 31, 2011:

June 2011	Common stock – 185,185 shares of common stock for aggregate proceeds of $200,000 pursuant to the 2011 Purchase Agreement.
3rd/4th FQ 2011	Common stock/Warrants - 1,000,000 shares of common stock and warrants to purchase 1,000,000 shares of common stock for

	aggregate proceeds of $1,000,000 pursuant to a private offering.

Fiscal Year Ended December 31, 2012:

January 2012	Warrant Exercise – 250,000 shares of common stock at $.65 per share for aggregate proceeds of $162,500.
January 2012	Warrant Exercise – 40,000 shares of common stock at $1.25 per share for aggregate proceeds of $50,000.
February 2012	Warrant Exercise – 20,000 shares of common stock at $.34 per share for aggregate proceeds of $6,900.
April 2012	Warrant Exercise – 400,000 shares of common stock at $.25 per share for aggregate proceeds of $100,000.
April 2012	Warrant Exercise – 500,000 shares of common stock at $.25 per share for aggregate proceeds of $125,000.

Fiscal Year Ending December 31, 2013:

March 2013	Warrant Exercise - 12,500 shares of common stock purchased at $1.25 for proceeds of $15,625.
June 2013	Warrant Exercise – 20,000 shares of common stock purchased at $0.345 for proceeds of $6,900.

Securities Issued For Services

Fiscal Year Ended December 31, 2010:

January 2010	Warrant - 650,000 shares of common stock at $1.51 per share for services.
March 2010	Warrant - 150,000 shares of common stock at $0.25 per share for services.
August 2010	Common stock - 4,800 shares of common stock for $6,000 in services.
November 2010	Common stock - 5,000 shares of common stock for $4,650 in services.
December 2010	Common stock - 10,000 shares of common stock for $12,000 in services.

Fiscal Year Ended December 31, 2011:

January 2011	Warrant - 10,000 shares of common stock at $1.25 per share for legal services.
January 2011	Warrant - 25,000 shares of common stock at $1.25 per share for research and development.
March 2011	Common stock - 10,000 shares of common stock for $14,500 investor relations expense.
April 2011	Warrant - 150,000 shares of common stock at $1.18 per share for accounting services.
May/June 2011	Common stock – 153,847 shares of common stock for commitment fee to institutional investor.
June 2011	Common stock - 10,000 shares of common stock for $10,400 in services.
September 2011	Common stock - 10,000 shares of common stock for $14,500 in services.

October 2011	Common stock – 2,018 shares of common stock for $2,163 in services.

Fiscal Year Ended December 31, 2012:

February 2012	Common Stock - 1,406 shares of common stock at $1.14 per share for services.
March 2012	Warrant - 10,000 shares of common stock at $1.69 per share for services.
May 2012	Warrant - 100,000 shares of common stock at $1.20 per share for services.
December 2012	Warrant - 125,000 shares of common stock at $0.93 per share for services.

Fiscal Year Ended December 31, 2013:

March 2013	Option grant - 75,000 shares of common stock at $1.16 per share issued for services. The option was valued at $81,076 using the Black-Scholes Option Pricing Formula.
May 2013	Option grant – 10,000 shares of common stock at $1.03 per share issued for services. The option was valued at $9,574 using the Black-Scholes Option Pricing Formula.
May 2013	Option grant – 100,000 shares of common stock at $1.00 per share issued for services. The option was valued at $80,824 using the Black-Scholes Option Pricing Formula.
June 2013	Common Stock – 200,000 shares of common stock for services valued at $170,000.

Securities Issued Pursuant to our 2007 Employee Stock Plan

Fiscal Year Ended December 31, 2010:

December 2010	Stock options – 100,000 shares of common stock at $1.50 per share.
December 2010	Stock options – 585,000 shares of common stock at $1.00 per share.

Fiscal Year Ended December 31, 2011:

May 2011	Stock options - 200,000 shares of common stock at $1.12 per share.
August 2011	Stock options - 150,000 shares of common stock at $1.01 per share.
November 2011	Stock options - 150,000 shares of common stock at $0.63 per share.
December 2011	Stock options – 250,000 shares of common stock at $1.01 per share.
December 2011	Stock options - 150,000 shares of common stock at $1.30 per share.

Fiscal Year Ended December 31, 2012:

March 2012	Stock options - 100,000 shares of common stock at $1.69 per share.
March 2012	Stock options - 25,000 shares of common stock at $1.69 per share.
May 2012	Stock options - 500,000 shares of common stock at $1.30 per share.
June 2012	Stock options – 200,000 shares of common stock at $0.90 per share.
August 2012	Stock options - 100,000 shares of common stock at $0.925 per share.
August 2012	Stock options - 50,000 shares of common stock at $0.93 per share.

Fiscal Year Ending December 31, 2013:

August 2013	Stock options - 25,000 shares of common stock at $0.84 per share.
August 2013	Stock options – 50,000 shares of common stock to a Director at $0.84 per share.

No underwriters were utilized and no commissions or fees were paid with respect to any of the above transactions. These persons were the only offerees in connection with these transactions. We relied on Section 4(2) and Rule 506 of Regulation D of the Securities Act since the transaction does not involve any public offering.

DILUTION

Investors who purchase our common stock will be diluted to the extent of the difference between the public offering price per share of our common stock and the pro forma as adjusted net tangible book value per share of our common stock immediately after this offering. Net tangible book value per share is determined by dividing our total tangible assets less total liabilities by the number of outstanding shares of our common stock. As of June 30, 2013, we had a net tangible book value of $3,564,062, or approximately $0.0685 per share of common stock.

Dilution in net tangible book value per share represents the difference between the amount per share paid by purchasers of common stock in this offering, assuming a purchase price of $1.00 per share, which is the minimum purchase price at which shares can be sold under the 2013 Purchase Agreement, and the pro forma as adjusted net tangible book value per share of common stock immediately after the completion of this offering. Of the 10,000,000 shares being offered hereunder, 200,000 shares were previously issued to Lincoln Park at June 30 2013. Therefore, after giving effect to our assumed receipt of $9,330,000 in estimated net proceeds from the issuance of 9,800,000 additional shares of common stock under the 2013 Purchase Agreement and registered in this offering (assuming a purchase price of $1.00 per share and the issuance of 400,000 additional commitment shares for no additional cash consideration, offering expenses of $70,000, and assuming all such sales and issuances were made on June 30, 2013), our pro forma as adjusted net tangible book value as of June 30, 2013 would have been approximately $12,894,062, or $0.2085 per share. This would represent an immediate increase in the net tangible book value of $0.14 per share to existing shareholders attributable to this offering. The following table illustrates this per share dilution:

Assumed public offering price per share of common stock (minimum allowed price)	$1.00
As adjusted net tangible book value per share as of June 30, 2013	0.0685
Increase in as adjusted net tangible book value per share attributable to this offering	0.1400
Pro forma net tangible book value per share after this offering	02085
Dilution per share to new investors	$0.7915

To the extent that we sell more or less than $20,000,000 worth of shares under the 2013 Purchase Agreement, or to the extent that some or all sales are made at prices in excess of the minimum allowable purchase price of $1.00 per share, then the dilution reflected in the table above will differ. The above table is based on 52,046,797 shares of our common stock outstanding as of June 30, 2013, adjusted for the assumed sale of $9,400,000 in shares to Lincoln Park under the 2013 Purchase Agreement at the assumed minimum purchase price described above. In addition, the calculations in the foregoing table do not take into account, as of June 30, 2013:

• 5,557,000 shares of our common stock issuable upon the exercise of outstanding options; and

• 3,025,250 shares of our common stock issuable upon the exercise of outstanding warrants, with a weighted average exercise price of $1.04 per share.

To the extent that options or warrants are exercised, new options are issued under our equity benefit plans, or we issue additional shares of common stock in the future, there may be further dilution to investors participating in this offering. In addition, we may choose to raise additional capital because of market conditions or strategic considerations, even if we believe that we have sufficient funds for our current or future operating plans. If we raise additional capital through the sale of equity or convertible debt securities, the issuance of these securities could result in further dilution to our shareholders.

SELECTED FINANCIAL DATA

You should read the following selected financial data together with “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and our financial statements and accompanying notes included later in this prospectus. The selected financial data in this section is not intended to replace our financial statements and the accompanying notes.

We have derived the selected statement of operations data for the years ended December 31, 2012 and 2011 and the selected balance sheet data as of December 31, 2012 and 2011 from our audited financial statements that are included in this prospectus. We have derived the statement of operations data for the years ended December 31, 2010, 2009 and 2008 and the selected balance sheet data as of December 31, 2010, 2009 and 2008 from our audited financial statements that are not included in this prospectus.

Our historical results are not necessarily indicative of the results to be expected in any future period.

	Year Ended December 31,				
	2012	2011	2010	2009	2008
Statement of Operations Data:					
NET SALES	$-	$-	$3,200	$-	$-
COST AND EXPENSE					
Research and development	2,489,747	1,682,557	1,709,171	1,662,813	1,421,955
General and administrative	1,936,417	1,633,786	2,006,900	1,058,071	2,820,398
LOSS FROM OPERATIONS	(4,426,164)	(3,316,343)	(3,712,871)	(2,720,884)	(4,242,353)
OTHER INCOME (EXPENSE)	(130,374)	(166,279)	(361)	(987)	(98,254)
NET LOSS	$(4,556,538)	$(3,482,622)	$(3,713,232)	$(2,721,871)	$(4,340,607)
Basic and Diluted Loss per Share	$(0.09)	$(0.08)	$(0.09)	$(0.07)	$(0.12)
Basic and Diluted Weighted Average Number of Shares	48,778,783	44,386,149	42,253,450	39,431,766	34,726,411

	Year Ended December 31,				
Balance Sheet Data:	2012	2011	2010	2009	2008
Current assets	$3,026,854	$401,580	$1,028,056	$513,362	$100,423
Property and equipment - net	300,994	88,751	97,568	104,087	61,726
Other assets		-	-	-	-
Intangible assets - net	488,526	431,104	346,009	261,215	212,416
TOTAL ASSETS	$3,816,374	$921,435	$1,471,633	$878,664	$374,565
TOTAL LIABILITIES	155,328	238,426	116,012	131,676	168,027
TOTAL STOCKHOLDERS' EQUITY	3,661,046	683,009	1,355,621	746,988	206,538

TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY	$3,816,374	$921,435	$1,471,633	$878,664	$374,565

MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The following management's discussion and analysis of financial condition and results of operations provides information that management believes is relevant to an assessment and understanding of our plans and financial condition. The following selected financial information is derived from our historical financial statements and should be read in conjunction with such financial statements and notes thereto set forth elsewhere herein and the "Forward-Looking Statements" explanation included herein.

Overview

Lightwave Logic, Inc. (then known as Eastern Idaho Internet Service, Inc.) was organized under the laws of the State of Nevada in 1997, where we engaged in the business of marketing Internet services until June 30, 1998 when our operations were discontinued. We were then inactive until we acquired PSI-TEC Corporation as our wholly owned subsidiary on July 14, 2004, at which time our name was changed to PSI-TEC Holdings, Inc. On October 20, 2006, we completed a parent-subsidiary merger with PSI-TEC Corporation whereby we were the surviving corporation of the merger, and our name was changed to Third-Order Nanotechnologies, Inc. On March 10, 2008, we changed our name to Lightwave Logic, Inc. to better suit our strategic business plan and to facilitate stockholder recognition of our Company and our business. Unless the context otherwise requires, all references to the "Company," "we," "our" or "us" and other similar terms means Lightwave Logic, Inc., a Nevada corporation.

We are a development stage, organic nonlinear materials and electro-optical device company. Our primary area of expertise is the chemical synthesis of chromophore dyes used in the development of organic Application Specific Electro-Optic Polymers (ASEOP) and Organic Non-Linear All-Optical Polymers (NLAOP) that have high electro-optic and optical activity. Both types of materials are thermally and photo-chemically stable, which we believe could have utility across a broad range of applications in devices that address markets like, telecommunication, data communications, high-speed computing and photovoltaic cells. Secondarily, the company is developing proprietary electro-optical and all-optical devices utilizing the advanced capabilities of our materials for the application in the fields mentioned above.

In order to transmit digital information at extremely high-speeds (wide bandwidth) over the Internet, it is necessary to convert the electrical signals produced by a computer into optical signals for transmission over long-distance fiber-optic cable. Molecularly engineered materials known as electro-optic polymers when designed into optical devices perform the actual conversion of an electrical signal to an optical signal.

We are currently developing electro-optic polymers that promise performance many times faster than any technology currently available and that have unprecedented thermal stability. High-performance electro-optic materials produced by our Company have demonstrated stability as high as 350 degrees Celsius. Stability above 250 degrees Celsius is necessary for vertical integration into many semi-conductor production lines. In December 2011 one of our non-linear optical polymers, Perkinamine IndigoTM demonstrated an unusually high electro-optical effect of greater than 250 picometers per volt on 1.5 micron films with excellent thermal and photo stability. Independent research laboratories at Photon-X and The University of Colorado confirmed these characteristics. We continued our development program on Perkinamine IndigoTM to better understand the properties that gave us the results reported in December 2011. More recent measurements have shown an electro-optical effect closer to 100 picometers per volt in a 500 nm thin films. We are continuing to perform development work to better understand these results.

Our non-linear all optical polymers have demonstrated resonantly enhanced Third-order properties about 2,630 times larger than fused silica, which means that they are very photo-optically active in the absence of an RF layer. In this way they differ from our electro-optical polymers and are considered more advanced next-generation materials.

Our revenue model relies substantially on the assumption that we will be able to successfully develop non-linear polymer materials and photonic device products, which will use non-linear all-optical and electro-optic polymers for applications within the industries described below. When appropriate, we intend to create specific materials for each of these applications and use our proprietary knowledge base to continue to enhance its discoveries.

- telecommunications/data communications
- backplane optical interconnects
- cloud computing and data centers
- photovoltaic cells
- medical applications
- satellite reconnaissance
- navigation systems
- radar applications
- optical filters
- special light modulators
- all-optical transistors
- entertainment

To be successful, we must, among other things:

- Develop and maintain collaborative relationships with strategic partners;
- Continue to expand our research and development efforts for our products;
- Develop and continue to improve on our manufacturing processes and maintain stringent quality controls;
- Produce commercial quantities of our products at commercially acceptable prices;
- Rapidly respond to technological advancements;
- Attract, retain and motivate qualified personnel; and
- Obtain and retain effective intellectual property protection for our products and technology.

We believe that Moore's Law (a principle which states the number of transistors on a silicon chip doubles approximately every eighteen months) will create markets for our high-performance electro-optic materials and photonic device products.

Plan of Operation

Since inception, we have been engaged primarily in the research and development of our polymer materials technologies and potential photonic device products. We are devoting significant resources to engineer next-generation electro-optic polymers for future applications to be utilized by electro-optic device manufacturers, such as telecommunications component and systems manufacturers, networking and switching suppliers, semiconductor companies, aerospace companies, government agencies and internal device development. We expect to continue to develop products that we intend to introduce to these rapidly changing markets and to seek to identify new markets. We expect to continue to make significant operating and capital expenditures for research and development activities.

As we move from a development stage company to a product supplier, we expect that our financial condition and results of operations will undergo substantial change. In particular, we expect to record both revenue and expense from product sales, to incur increased costs for sales and marketing and to increase general and administrative expense. Accordingly, the financial condition and results of operations reflected in our historical financial statements are not expected to be indicative of our future financial condition and results of operations.

On September 25, 2006 we obtained independent laboratory results that confirmed the thermal stability of our PerkinamineTM electro-optic materials. Thermal stability as high as 350 degrees Celsius was confirmed, significantly exceeding many other then commercially available high performance electro-optic materials, such as CLD-1 that exhibits thermal degradation in the range of 250 degrees Celsius to 275 degrees Celsius. This high temperature stability of our materials eliminates a major obstacle to vertical integration of electro-optic polymers into standard microelectronic manufacturing processes (e.g. wave/vapor-phase soldering) where thermal stability of at least 300 degrees Celsius is required. In independent laboratory tests, ten-percent material degradation, a common evaluation of overall thermal stability, did not occur until our PerkinamineTM materials base was exposed to temperatures as high as 350 degrees Celsius, as determined by Thermo-Gravimetric Analysis (TGA). The test results supported our Company's progress to introduce our materials into commercial applications such as optical interconnections, high-speed telecom and datacom modulators, and military/aerospace components.

On September 26, 2006, we were awarded the 2006 Electro-Optic Materials Technology Innovation of the Year Award by Frost & Sullivan. Frost & Sullivan's Technology Innovation of the Year Award is bestowed upon candidates whose original research has resulted in innovations that have, or are expected to bring, significant contributions to multiple industries in terms of adoption, change, and competitive posture. This award recognizes the quality and depth of our Company's research and development program as well as the vision and risk-taking that enabled us to undertake such an endeavor.

In July 2007, our Company developed an innovative process to integrate our unique architecture into our anticipated commercial devices, whereby dendritic spacer systems are attached to its core chromophore. In the event we are successful in developing a commercially viable product, we believe these dendrimers will reduce the cost of manufacturing materials and reduce the cost and complexity of tailoring the material to specific customer requirements.

In March 2008, we commenced production of our first prototype photonic chip, which we delivered to Photon-X, LLC to fabricate a prototype polymer optical modulator and measure its technical properties. In June 2009 we released test results conducted by Dr. C.C. Teng that re-confirmed our previous test results.

In August 2009, Photon-X, LLC commenced a compatibility study, process sequences, and fabricated wafers/chips containing arrays of phase modulators. The first one hundred plus modulators (bench top devices) were completed at the end of October 2009, and were successfully characterized for insertion loss, Vpi, modulation dynamic range and initial frequency response in March 2010. The multi-step manufacturing process we utilized to fabricate our modulators involved exposing our proprietary PerkinamineTM materials to extreme conditions that is typically found in standard commercial manufacturing settings. Our step-by-step analysis throughout the fabrication process demonstrated to us that our PerkinamineTM materials could successfully withstand each step of the fabrication process without damage.

In August 2009, we retained Perdix, Inc. in Boulder, Colorado to help us identify and build prototype products for high growth potential target markets in fiber optic telecommunications systems. During October 2009, we initiated the development and production of our prototype amplitude modulator, which can ultimately be assembled into 1- and 2-dimensional arrays that are useful for optical computing applications, such as encryption and pattern recognition. We expected our initial prototype amplitude modulator to be completed by the end of the second quarter 2010. We continued to work on this device throughout 2010 and discovered its design had limitations so we terminated the program to take a different design approach. We embarked on the new design approach in 2011 with another partner, Boulder Nonlinear Systems (BNS). A feasibility study with the new design partner was started in late 2011. This research and development program continued through 2012 into the first half of 2013, and it is expected to be completed by the end of the third quarter of 2013. We expect the results of this study will guide us on how to better design our prototype spatial light modulator.

In December 2009, we filed our sixth patent application. The provisional application covers stable free radical chromophores for use in Non-Linear optical applications. The new polymeric electro-optic material has enormous potential in spatial light modulation and all optical signal processing (light switching light).

In March 2010, we successfully concluded the electrical and optical performance testing stage of our proof of principle prototype phase modulator and began application engineering of our technology in customer design environments. The Company is working directly with interested large system suppliers to attempt to engineer specific individual electro-optic materials in support of their proprietary device designs, which would be implemented in next generation products.

In October of 2010, we completed the concept stage of a novel design for an advanced optical computing application and moved forward into the design stage with Celestech, Inc. of Chantilly, Virginia. This application is presently on hold while Celestech continues to engage its customer on its schedule. Additionally, we are working on three other applications with Celestech, two of which are in white paper design stage. Development of these applications continued through 2012 and into 2013. If these projects continue to move forward, they will incorporate one or more of our Company's advanced electro-optical polymer materials.

In October of 2010, we announced the results of testing performed by Lehigh University that demonstrated the Third-order non-linear properties of our proprietary molecules in the Perkinamine NRTM chromophore class. Lehigh University determined that the material was 100 times stronger than the highest off-resonance small molecule currently known. They also determined that it was 2,600 times more powerful than fused silica and demonstrated extremely fast (less than 1 picosecond) photo-induced non-linear response that would be capable of modulation at a rate of 1 THz (terahertz). Additional testing at Lehigh University of the Company's other Perkinamine class of materials demonstrated Third-order non-linear properties, which may have utility in all optical switches.

In February and April 2011, respectively, the United States Patent Office granted our Company two patents: US Patent No. 7,894,695 covering our Tricyclic Spacer System for Non-Linear Optical Devices and US Patent No. 7,919,619 for Heterocyclical Chromophore Architectures directed to our PerkinamineTM chromophores. These composition of matter patents taken together protect the core of our electro-optical materials portfolio.

In March 2011, we entered into a research and development agreement with the City University of New York's ("CUNY") Laboratory for Nano Micro Photonics (LaNMP) to develop Third-order non-linear devices. The combination of LaNMP's device capabilities together with our materials expertise should accelerate the development of all-optical devices. The agreement ran through the end of 2011. The goal of the project was to fabricate and test slot waveguides embedded with two types of nonlinear optical polymers obtained from our Company. These two polymers were PerkinamineTM and Perkinamine NRTM. In CUNY's final report it showed they successfully demonstrated that the Perkinamine and Perkinamine NR survived their 170o C processing temperature without degradation. According to

their report, they were successful in one processing run wherein they showed the possibility to realize waveguides with very smooth sidewalls. Reflectivity measurements carried out under optical pumping showed phase shift in the PerkinamineTM material. We are continuing research in this area with the University of Colorado, Boulder.

In March 2011 the City University of New York's Laboratory for Nano Micro Photonics (LaNMP) fabricated our first-ever all optical waveguides using PerkinamineTM and Perkinamine NRTM chromophores. It is anticipated that LaNMP could use this device architecture to develop various all-optical devices including an all-optical transistor. This effort, starting with an all-optical switch, is being continued at the University of Colorado, Boulder through an agreement entered into in January 2013.

In December 2011, we announced the discovery of a new material named Perkinamine IndigoTM. We believe this represents a major advancement in the field of organic nonlinear optical materials. The material demonstrated an unusually high electro-optical effect of greater than 250 picometers per volt with excellent thermal and photo stability. Independent research laboratories at Photon-X and The University of Colorado confirmed these characteristics. We do, however, have to do a complete characterization of these materials to fully understand what material properties are causing these results before any of our partners will move forward with this material. The potential large system supplier we are working with will be characterizing the material at their location using their proprietary devices while we continue our work with the University of Colorado, Boulder. In order to further characterize our Perkinamine class of materials, including Perkinamine IndigoTM, the Company has developed Mach-Zehnder interferometry and standard Teng-Man test set-ups in its own facilities. The Company's optical lab is testing and measuring the electro-optic coefficient of our materials.

In June 2012 we opened a new internal research laboratory facility in Newark, Delaware in the Delaware Technology Park, near the University of Delaware. This new lab facility enables us to synthesize and test our materials in the same facility and will help us accelerate our development efforts. It is equipped with state of the art equipment necessary to expand our ability to conduct synthetic chemistry in much more tightly controlled conditions. Additionally, we have equipped a separate advanced optical laboratory at the same location where the necessary testing of material candidates will be performed as they emerge from our new synthesis laboratory.

In July 2012 we entered into an agreement with The University of Colorado, Boulder to conduct analytical testing and to carry out studies that will give a better understanding of the properties of a new class of composite organic electro-optic materials. This class of materials is our Perkinamine IndigoTM. The processing and measurements are to be carried out primarily at the Guided Wave Optics Laboratory (GWOL). The work is being done in close collaboration with Company personnel.

In September 2012 the United States Patent Office granted our Company U.S. Patent No. 8,269,004, entitled Heterocyclical Anti-Aromatic Chromophore Architectures. This patent protects the unique molecular structures that give our chromophores the thermal stability necessary to withstand CMOS processing temperatures without compromising electro-optical effects.

In November 2012 Australia granted our Company Australian Patent No. AU2005302506 entitled Heterocyclical Chromophore Architectures. This patent protects the unique molecular structures that give our chromophores the thermal stability necessary to withstand CMOS processing temperatures without compromising electro-optical effects.

In February 2013 we delivered to a potential large system supplier customer prototype devices that were coated with our advanced organic nonlinear electro-optical polymer, Perkinamine IndigoTM. Tests conducted by the University of Colorado, Boulder on coupons coated with the material demonstrated consistent R33 measurements from 100-125 picometers per volt, which exceeded the potential large system supplier customer's stated requirements.

In March 2013 we entered into a product development contractor agreement with EM Photonics (EMP) of Newark, Delaware to fabricate and test waveguides and phase modulators during an initial development phase using existing EMP polymer modulator design and processes. In June 2013 we consolidated the EMP design program into our University of Colorado, Boulder (UCB) program after we fabricated structures with UCB that will be used as the basic building blocks of our Integrated Optical Device effort for the construction of both our advanced telecom modulator and data communications transceiver.

In April 2013 our potential large system supplier customer informed us that their preliminary testing results on the prototype devices coated with Perkinamine Indigo™ that we delivered to them in February 2013 demonstrated several of the key performance parameters that they desired. There are still additional tests that need to be completed. We are working with our potential customer utilizing our Perkinamine Indigo™ chromophore in a number of host polymers and will evaluate these polymers in conjunction with our chromophores for a specific performance attributes for their application.

In April 2013 Japan granted our Company Japanese Patent No. 5241234 entitled Heterocyclical Chromophore Architectures. This patent protects the unique molecular structures that give our chromophores the thermal stability necessary to withstand CMOS processing temperatures without compromising electro-optical effects.

We ultimately intend to use our next-generation non-linear all-optical and electro-optic polymers for future applications vital to the following industries. We expect to create specific materials for each of these applications as appropriate:

- telecommunications/data communications
- backplane optical interconnects
- cloud computing and data centers
- photovoltaic cells
- medical applications
- satellite reconnaissance
- navigation systems
- radar applications
- optical filters
- special light modulators
- all-optical transistors and
- entertainment

In an effort to maximize our future revenue stream from our non-linear all-optical and electro-optic polymer products, our business model anticipates that our revenue stream will be derived from one or some combination of the following: (i) technology licensing for specific product applications; (ii) joint venture relationships with significant industry leaders; or (iii) the production and direct sale of our own electro-optic device components. Our objective is to be a leading provider of proprietary technology and know-how in the photonic device markets. In order to meet this objective, subject to successful testing of our technology and having available financial resources, we intend to:

- Develop non-linear all-optical and electro-optic polymers and photonic devices;
- Continue to develop proprietary intellectual property;
- Streamline our product development process;
- Develop a comprehensive marketing plan;
- Maintain/develop strategic relationships with government agencies, private firms, and academic institutions; and
- Continue to attract and retain high level science and technology personnel to our Company.

Our Proprietary Products in Development

As part of a two-pronged marketing strategy, our Company is developing several devices, which are in various stages of development that utilize our organic nonlinear optical materials.

They include:

Telecommunications Modulator

We have recently begun a second-generation design of a unique telecommunications modulator incorporating our newly developed material PerkinamineTM Indigo. To date, we have completed phase one of the second-generation design, and the first set of optical structures that will be used as the basic building blocks of our unique telecommunications modulator. We intend to have a working bench-top prototype sometime during 2013 followed by fully packaged modulators for commercial marketing. We anticipate this modulator will be able to exceed the performance of existing legacy modulators by an order of magnitude, and will allow for improvements in the form of reduced power consumption and reduced device cost.

Spatial Light Modulator

We have a development program to develop a Spatial Light Modulator with an outside manufacturer, Boulder Nonlinear Systems (BNS) utilizing certain PerkinamineTM chromophores. A spatial modulator is a form of optical computer that can perform various advanced tasks, such as object and facial recognition, by using advanced mathematical calculations known as Fourier Transforms. Our organic nonlinear optical materials can potentially produce update rates of more than a million times per second, which is a significant improvement in processing speed over existing Liquid Crystal Display technology that updates at only 30 to 60 times per second.

Optical Filter

We are in preliminary design and fabrication phases of development of an optical filter using our proprietary PerkinamineTM and Perkinamine NRTM materials within a SiNx photonics platform. A tunable optical filter is ideal for any application requiring tuning over a wide range of wavelengths. Initial work has been done in collaboration with City University of New York, but limitations in their process capabilities have led us to seek alternate fabrication facilities, which are underway at this time.

All-Optical Switch

An all-optical switch is one that enables signals in optical fibers or networks to be selectively switched from one fiber or circuit to another. Many device designs have been developed and commercialized in today's telecom networks to effect optical switching by using mechanical or electrical control elements to accomplish the switching event. Future networks will require all-optical switches that can be more rapidly activated with a low energy and short duration optical (light) control pulse. We are in early development of an all-optical switch in collaboration with the University of Colorado, Boulder under a sponsored research agreement.

Multi-Channel Optical Modem

We are in early feasibility study of a multi-wavelength optical modem that will enable an order of magnitude increase in Internet capacity over legacy fiber.

Additionally, we must create an infrastructure, including operational and financial systems, and related internal controls, and recruit qualified personnel. Failure to do so could adversely affect our ability to support our operations.

We have incurred substantial net losses since inception. We have satisfied our capital requirements since inception primarily through the issuance and sale of our common stock. During 2004 we raised approximately $529,000 from the issuance of convertible promissory notes, of which $30,000 was converted into common stock of the Company during 2004 and the remaining $499,000 converted in 2005. Also, during 2005, we raised an aggregate of $1,000,000 from the private sale of our common stock. During 2006 we raised approximately $425,000 from the private sale of our common stock, of which $200,000 was rescinded during 2007. During 2007 we raised approximately $2,301,524 from the private sale of our common stock. During 2008 we raised approximately $414,000 from the private sale of our common stock and $375,270 from the exercise of outstanding warrants. Through June 30, 2009, we raised approximately $855,000 from the private sale of our common stock. We also issued shares of our common stock and warrants to purchase shares of our common stock in exchange for services rendered to our Company, including professional services. During October 2009 we obtained proceeds of $455,000 from the exercise of outstanding warrants. During 2010 we raised $1,500,000 from the private sale of our common stock and $539,000 from the exercise of outstanding options and warrants. We also issued shares of our common stock and warrants to purchase shares of our common stock in exchange for services rendered to our Company.

During 2011 we raised $1,000,000 from the private sale of our common stock and warrants to purchase our common stock. We also issued shares of our common stock and warrants to purchase shares of our common stock in exchange for services rendered to our Company.

Additionally, in May 2011, we signed an agreement with Lincoln Park Capital Fund, LLC (“Lincoln Park”) to sell up to $20 million of common stock. Under the agreement subject to certain conditions and at our sole discretion, Lincoln Park has committed to invest up to $20 million in our common stock over a 30-month period. We filed a registration statement with the U.S. Securities and Exchange Commission covering the resale of the shares that may be issued to Lincoln Park. Lincoln Park is obligated to make purchases as we direct in accordance with the agreement, which may be terminated by us at any time, without cost or penalty. Sales of shares are made in specified amounts and at prices that are based upon the market prices of our common stock immediately preceding the sales to Lincoln Park. The agreement expires in December 2013.

During 2011 Lincoln Park purchased 185,185 shares of common stock for proceeds of $200,000. During 2012 Lincoln Park purchased 3,539,100 shares of common stock for proceeds of $4,849,999. Also, during 2012, we raised $447,700 from the exercise of options and warrants. For the six months ending June 30, 2013, Lincoln Park purchased 1,628,386 shares of common stock for proceeds of $1,800,001.

In June 2013 we signed a new agreement with Lincoln Park to sell up to $20 million of common stock. Under the agreement subject to certain conditions and at our sole discretion, Lincoln Park has committed to invest up to $20 million in the Company’s common stock over a 30-month period. We filed a registration statement with the U.S. Securities and Exchange Commission covering the resale of the shares that may be issued to Lincoln Park. Sales of shares will be made in specified amounts and at prices that are based upon the market prices of our Company's common stock.

Results of Operations

Comparison of Three Months Ended June 30, 2013 to Three Months Ended June 30, 2012

Revenues

As a development stage company, we had no revenues during the three months ended June 30, 2013 and 2012. The Company is in various stages of material evaluation and product development with potential customers and expects the next revenue stream to be in prototype devices, application and non-recurring engineering charges and sale of electro-optic polymer materials prior to moving into production.

Operating Expenses

Our operating expenses were $964,502 and $1,009,113 for the three months ended June 30, 2013 and 2012, respectively, for a decrease of $44,611. This is primarily due to increases in salaries and wages, laboratory materials and supplies, laboratory rent, depreciation, laboratory electro-optic device prototype, development and outsourced testing expenses, insurance expense, professional fees, internet and website design, accounting and conferences offset by decreases in non-cash stock option and warrant amortization and legal expenses.

Included in our operating expenses for the three months ended June 30, 2013 was $531,116 for research and development expenses compared to $455,253 for the three months ended June 30, 2012, for an increase of $75,863. This is primarily due to increases in salaries and wages, laboratory materials and supplies, laboratory rent, depreciation and laboratory electro-optic device prototype, development and outsourced testing expenses offset by a decrease in non-cash stock option and warrant amortization.

Research and development expenses currently consist primarily of compensation for employees engaged in internal research, product and application development activities; laboratory operations, outsourced material testing and prototype electro-optic device design, development and processing work; customer testing; fees; costs; and related operating expenses.

We expect to continue to incur substantial research and development expense to develop and commercialize our electro-optic material platform. These expenses will increase as a result of accelerated development effort to support commercialization of our non-linear optical polymer materials technology; outsourcing work to build device prototypes; expanding and equipping in-house laboratories; hiring additional technical and support personnel; engaging a senior technical advisor; pursuing other potential business opportunities and collaborations; customer testing and evaluation; and incurring related operating expenses.

Wages and salaries increased $70,712 from $134,148 for the three months ended June 30, 2012 to $204,860 for the three months ended June 30, 2013 primarily due to additional employees hired to perform in-house material testing and material and device development in the Company's new lab facility. Accordingly laboratory materials and supplies increased $17,918 from $6,142 for the three months ended June 30, 2012 to $24,060 for the three months ended June 30, 2013. Also, laboratory electro-optic device prototype, development and outsourced testing expenses increased $48,397 to $109,737 for the three months ended June 30, 2013 from $61,340 for the three months ended June 30, 2012 as the Company expands its prototype development efforts.

Non-cash stock option amortization decreased $95,604 from $191,956 for the three months ended June 30, 2012 to $96,352 for the three months ended June 30, 2013.

During the second half of 2012, the Company leased additional laboratory space and rent expense increased accordingly $6,538 from $12,960 for the three months ended June 30, 2012 to $19,498 for the three months ended June 30, 2013. Depreciation expense increased $19,743 from $9,282 for the three months ended June 30, 2012 to $29,025 for the three months ended June 30, 2013 primarily due to the additional equipment purchased for the new lab facility.

General and administrative expense consists primarily of compensation and support costs for management staff, and for other general and administrative costs, including executive, sales and marketing, investor relations, accounting and finance, legal, consulting and other operating expenses.

General and administrative expenses decreased $120,474 to $433,386 for the three months ended June 30, 2013 compared to $553,860 for the three months ended June 30, 2012. The decrease is due primarily to decreases in non-cash amortization of options and warrants and legal expense offset by increases in wages and salaries, insurance expense, professional fees, internet and website design, accounting and conferences.

Non-cash stock compensation decreased by $170,779 to $89,163 for the three months ended June 30, 2013 compared to $259,942 for the three months ended June 30, 2012.

Legal fees decreased $17,258 to $51,438 for the three months ended June 30, 2013 compared to $68,696 for the three months ended June 30, 2012.

Wages and salaries increased $13,193 to $127,395 for the three months ended June 30, 2013 from $114,202 for the three months ended June 30, 2012.

Insurance increased $21,229 from $31,523 for the three months ended June 30, 2012 to $52,752 for the three months ended June 30, 2013.

Conferences increased $8,115 to $8,115 for the three months ended June 30, 2013 compared to $0 for the three months ended June 30, 2012.

Internet and website expenses increased $5,786 to $9,208 for the three months ended June 30, 2013 compared to $3,422 for the three months ended June 30, 2012.

Professional fees increased $5,000 to $5,000 for the three months ended June 30, 2013 compared to $0 for the three months ended June 30, 2012.

Accounting fees increased $3,990 to $24,090 for the three months ended June 30, 2013 compared to $20,100 for the three months ended June 30, 2012 primarily for the implementation of an employee stock option software program for interactive option exercises by employees and directors under the 2007 Employee Stock Plan.

We expect general and administrative expense to increase in future periods as we increase the level of corporate and administrative activity, including increases associated with our operation as a public company; and significantly increase expenditures related to the future production and sales of our products.

Other Income (Expense)

Other income (expense) increased $166,170 to ($184,661) for the three months ended June 30, 2013 from ($18,491) for the three months ended June 30, 2012, relating primarily to the commitment fee associated with the resale of shares to an institutional investor of a new agreement for resale during the corresponding three-month period.

Net Loss

Net loss was $1,149,163 and $1,027,604 for the three months ended June 30, 2013 and 2012, respectively, for an increase of $121,559, primarily due to an increase in salaries and wages, laboratory materials and supplies, laboratory rent, depreciation, laboratory electro-optic device prototype, development and outsourced testing expenses, commitment fee to institutional investor, insurance expense, professional fees, internet and website design, accounting and conferences offset by decreases in non-cash stock option and warrant amortization and legal expenses.

Comparison of Six months Ended June 30, 2013 to Six Months Ended June 30, 2012

Revenues

As a development stage company, we had no revenues during the six months ended June 30, 2013 and 2012. The Company is in various stages of material evaluation and product development with potential customers and expects the next revenue stream to be in prototype devices, application and non-recurring engineering charges and sale of electro-optic polymer materials prior to moving into production.

Operating Expenses

Our operating expenses were $1,867,502 and $1,778,712 for the six months ended June 30, 2013 and 2012, respectively, for an increase of $88,790. This increase in operating expenses was due primarily to increases in salaries and wages, laboratory lease rent, depreciation, laboratory materials and supplies, insurance expense, accounting, and conferences offset by decreases in laboratory electro-optic device prototype, development and outsourced testing expenses, non-cash stock option and warrant amortization and legal expenses.

Included in our operating expenses for the six months ended June 30, 2013 was $986,498 for research and development expenses compared to $927,662 for the six months ended June 30, 2012, for an increase of $58,836. This is primarily due to increases in salaries and wages, laboratory materials and supplies, laboratory rent and depreciation offset by decreases in laboratory electro-optic device prototype, development and outsourced testing expenses and non-cash stock option and warrant amortization.

Research and development expenses currently consist primarily of compensation for employees engaged in internal research, product and application development activities; laboratory operations, outsourced material testing and prototype electro-optic device design, development and processing work; customer testing; fees; costs; and related operating expenses.

We expect to continue to incur substantial research and development expense to develop and commercialize our electro-optic material platform. These expenses will increase as a result of accelerated development effort to support commercialization of our non-linear optical polymer materials technology; outsourcing work to build device prototypes; expanding and equipping in-house laboratories; hiring additional technical and support personnel; engaging a senior technical advisor; pursuing other potential business opportunities and collaborations; customer testing and evaluation; and incurring related operating expenses.

Wages and salaries increased $107,231 from $269,963 for the six months ended June 30, 2012 to $377,194 for the six months ended June 30, 2013 primarily due to additional employees hired to perform in-house material testing and material and device development in the Company’s new lab facility. Accordingly laboratory materials and supplies increased $15,587 from $22,594 for the six months ended June 30, 2012 to $38,181 for the six months ended June 30, 2013. Also, laboratory electro-optic device prototype, development and outsourced testing expenses decreased $7,701, to $167,620 for the six months ended June 30, 2013 from $175,321 for the six months ended June 30, 2012.

Non-cash stock option amortization decreased $114,244 from $340,881 for the six months ended June 30, 2012 to $226,637 for the six months ended June 30, 2013.

During the second half of 2012, the Company leased additional laboratory space and rent expense increased accordingly $23,376 from $15,621 for the six months ended June 30, 2012 to $38,997 for the six months ended June 30, 2013. Depreciation expense increased $35,648 from $15,726 for the six months ended June 30, 2012 to $51,374 for the six months ended June 30, 2013 primarily due to the additional equipment purchased for the new lab facility.

General and administrative expense consists primarily of compensation and support costs for management staff, and for other general and administrative costs, including executive, sales and marketing, investor relations, accounting and finance, legal, consulting and other operating expenses.

General and administrative expenses increased $29,954 to $881,004 for the six months ended June 30, 2013 compared to $851,050 for the six months ended June 30, 2012. The increase is due primarily to increases in wages and salaries, insurance expense, accounting and conferences offset by decreases in non-cash amortization of options and warrants and legal expense.
In May 2012, the board of directors appointed its current Non-Executive Chairman of the board of directors as its Executive Chairman of the board of directors and Chief Executive Officer. As a result, wages and salaries increased $54,266 to $255,973 for the six months ended June 30, 2013 from $201,707 for the six months ended June 30, 2012.

Non-cash stock compensation decreased by $93,980 to $228,802 for the six months ended June 30, 2013 compared to $322,782 for the six months ended June 30, 2012.

Insurance increased $46,308 from $53,378 for the six months ended June 30, 2012 to $99,686 for the six months ended June 30, 2013.

Accounting fees increased $7,390 to $46,990 for the six months ended June 30, 2013 compared to $39,600 for the six months ended June 30, 2012 primarily for the implementation of an employee stock option software program for interactive option exercises by employees and directors under the 2007 Employee Stock Plan.

Conferences increased $8,445 to $9,060 for the six months ended June 30, 2013 compared to $615 for the six months ended June 30, 2012.

Legal fees decreased $8,186 to $89,272 for the six months ended June 30, 2013 compared to $97,458 for the six months ended June 30, 2012.

We expect general and administrative expense to increase in future periods as we increase the level of corporate and administrative activity, including increases associated with our operation as a public company; and significantly increase expenditures related to the future production and sales of our products.

Other Income (Expense)

Other income (expense) increased $83,894 to ($204,132) for the six months ended June 30, 2013 from ($120,238) for the six months ended June 30, 2012, relating primarily to the commitment fee associated with the resale of shares to an institutional investor of new agreement for resale during the corresponding six-month period.

Net Loss

Net loss was $2,071,634 and $1,898,950 for the six months ended June 30, 2013 and 2012, respectively, for an increase of $172,684, due primarily to increases in salaries and wages, laboratory lease rent, depreciation, laboratory materials and supplies, insurance expense, accounting, conferences and commitment fee to institutional investor offset by decreases in outsourced testing expenses, non-cash stock option and warrant amortization and legal expenses.

Significant Accounting Policies

Our discussion and analysis of our financial condition and results of operations are based on our financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States. The preparation of these financial statements requires us to make estimates and judgments that affect the reported amounts of assets, liabilities, revenues and expenses, and related disclosure of contingent assets and liabilities. On an ongoing basis, we evaluate our estimates based upon historical experience and various other assumptions that we believe to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Our actual results may differ materially from these estimates.

We believe our significant accounting policies affect our more significant estimates and judgments used in the preparation of our financial statements. Our Annual Report on Form 10-K for the year ended December 31, 2012 contains a discussion of these significant accounting policies. There have been no significant changes in our significant accounting policies since December 31, 2012. See our Note 1 in our unaudited financial statements for the six months ended June 30, 2013, as set forth herein.

Liquidity and Capital Resources

During the six months ended June 30, 2013, net cash used in operating activities was $1,374,206 and net cash used in investing activities was $126,015, which was due primarily to the Company's research and development activities and general and administrative expenditures. Net cash provided by financing activities for the six months ended June 30, 2013 was $1,822,525. At June 30, 2013, our cash and cash equivalents totaled $3,259,183, our assets totaled $4,282,153, our liabilities totaled $210,503, and we had stockholders' equity of $4,071,650.

Sources and Uses of Cash

Our future expenditures and capital requirements will depend on numerous factors, including: the progress of our research and development efforts; the rate at which we can, directly or through arrangements with original equipment manufacturers, introduce and sell products incorporating our polymer materials technology; the costs of filing, prosecuting, defending and enforcing any patent claims and other intellectual property rights; market acceptance of our products and competing technological developments; and our ability to establish cooperative development, joint venture and licensing arrangements. We expect that we will incur approximately $3,000,000 of expenditures over the next 12 months. Our cash requirements are expected to increase at a rate consistent with the Company's path to revenue growth as we expand our activities and operations with the objective of commercializing our electro-optic polymer technology during 2013. We continue to develop and test our next generation electro-optic and third-order material platform to support and cultivate potential customers, strategic partners and develop photonic devices. Management believes our initial revenue stream will be in prototype devices, application and non-recurring engineering charges, and material charges for specialty non-linear application prior to moving into full commercialization and production.

Our business does not presently generate the cash needed to finance our current and anticipated operations. Presently, our Company has a cash position of approximately $3,020,000; based upon our current cash position and expenditures of approximately $250,000 per month and no debt service, management believes we have sufficient funds currently to finance our operations through July 2014. We plan to continue obtaining additional financing, now and in the future, until such time that we can conduct profitable revenue-generating activities.

Such future sources of financing may include cash from equity offerings, exercise of stock options, warrants and proceeds from debt instruments; but we cannot assure you that such equity or borrowings will be available or, if available, will be at rates or prices acceptable to us.

In May 2011 we signed our stock purchase agreement with Lincoln Park whereby subject to certain conditions and at our sole discretion, Lincoln Park has committed to purchase up to $20 million of our common stock over a 30-month period. We registered for resale by Lincoln Park 10,000,000 shares of our common stock in June 2011. The stock purchase agreement expires in December 2013. In June 2013 we signed our new stock purchase agreement with Lincoln Park to sell up to $20 million of common stock whereby subject to certain conditions and at our sole discretion, Lincoln Park has committed to purchase up to $20 million of our common stock over a 30-month period. We filed a registration statement with the U.S. Securities and Exchange Commission covering the resale of the shares that may be issued to Lincoln Park pursuant to the new stock purchase agreement. Pursuant to both agreements, Lincoln Park is obligated to make purchases as the Company directs in accordance with the purchase agreements,

which may be terminated by the Company at any time, without cost or penalty. Sales of shares will be made in specified amounts and at prices that are based upon the market prices of our Company's common stock immediately preceding the sales to Lincoln Park. We expect this financing to provide our Company with sufficient funds to maintain its operations for the foreseeable future. With the additional capital, we expect to achieve a level of revenues attractive enough to fulfill our development activities and adequate enough to support our business model for the foreseeable future. We cannot assure you that we will meet the conditions of the stock purchase agreement with Lincoln Park in order to obligate Lincoln Park to purchase our shares of common stock. In the event we fail to do so, and other adequate funds are not available to satisfy either short-term or long-term capital requirements, or if planned revenues are not generated, we may be required to substantially limit our operations. This limitation of operations may include reductions in capital expenditures and reductions in staff and discretionary costs.

There are no trading volume requirements or restrictions under the purchase agreement, and we will control the timing and amount of any sales of our common stock to Lincoln Park. Lincoln Park has no right to require any sales by us, but is obligated to make purchases from us as we direct in accordance with the purchase agreement. We can also accelerate the amount of common stock to be purchased under certain circumstances. There are no limitations on use of proceeds, financial or business covenants, restrictions on future funding, rights of first refusal, participation rights, penalties or liquidated damages in the purchase agreement. We may terminate the purchase agreement at any time, at our discretion, without any penalty or cost to us. Lincoln Park may not assign or transfer its rights and obligations under the purchase agreement.

We expect that our cash used in operations will increase during 2013 and beyond as a result of the following planned activities:

- The addition of management, sales, marketing, technical and other staff to our workforce;
- Increased spending for the expansion of our research and development efforts, including purchases of additional laboratory and production equipment;
- Increased spending in marketing as our products are introduced into the marketplace;
- Developing and maintaining collaborative relationships with strategic partners;
- Developing and improving our manufacturing processes and quality controls; and
- Increases in our general and administrative activities related to our operations as a reporting public company and related corporate compliance requirements.

Analysis of Cash Flows

Net cash used in operating activities was $1,374,206 for the six months ended June 30, 2013, primarily attributable to the net loss of $2,071,634 adjusted by $78,071 in warrants issued for services, $377,368 in options issued for services, $204,274 in common stock issued for services, $59,333 in depreciation expenses and patent amortization expenses, ($76,793) in prepaid expenses and $55,175 in accounts payable and accrued expenses. Net cash used in operating activities consisted of payments for research and development, legal, professional and consulting expenses, rent and other expenditures necessary to develop our business infrastructure.

Net cash used by investing activities was $126,015 for the six months ended June 30, 2013, consisting of $26,493 in cost for intangibles and $99,522 in asset additions primarily for the new lab facility.

Net cash provided by financing activities was $1,822,525 for the six months ended June 30, 2013 and consisted of $1,800,000 proceeds from resale of common stock to an institutional investor and $22,525 from the exercise of warrants.

Inflation and Seasonality

We do not believe that our operations are significantly impacted by inflation. Our business is not seasonal in nature.

BUSINESS

General

Lightwave Logic, Inc. is developing a new generation of advanced organic nonlinear materials to be used to make electro-optic polymers and non-linear all-optical polymers and devices that utilize them. These polymer-based materials, when used in modulators or waveguide structures, can convert high-speed electronic signals into optical (light) signals for use in communications systems, high-speed data transfer or advanced high speed computing. In the case of nonlinear all-optical polymers, certain of our Company's materials can be used in devices that use light waves to switch other light waves, in other words, have third-order properties.

Organic material with electro-optic characteristics is the core active ingredient in high-speed fiber-optic telecommunication systems. Utilizing our proprietary technology, we are in the process of engineering advanced organic polymers that we believe may lead to significant performance advancements, component size and cost reduction, ease of processing, and thermal and temporal stability. We believe that polymer materials engineered at the molecular level may have a significant role in the future development of commercially significant electro-optic related products.

Our organic materials work by affecting the optical properties of light in the presence of an electric field at extremely high frequencies (wide bandwidths), but possess inherent advantages to inorganic materials.

Currently, the core electro-optic material contained in most modulators is a crystalline material, such as lithium niobate or gallium arsenide. The following chart describes some of the characteristics of crystalline materials and electro-optical polymers.

Crystalline Materials	Electro-optical Polymers
Must be manufactured in strict dust-free conditions since even slight contamination can render them inoperable	Capable of being manufactured in less stringent environmental conditions. Capable of being tailored at the molecular level for optimal performance characteristics
More expensive to manufacture	Less expensive to manufacture
Limited to telecommunication speeds that are less than 40Gb/s (40 billion digital bits of data per second)	Demonstrated the ability to perform at speeds that are greater than 100Gb/s (100 billion digital bits of data per second)
Lithium niobate devices require large power levels (modulation voltages) to operate and are large in size -- typically measuring about four inches long (considering that most integrated circuits are literally invisible to the naked eye, these devices are enormous)	Require significantly lower power levels, up to 60% less (modulation voltages) to operate and are capable of miniaturization
Requires more elaborate, expensive mechanical packaging (housings) generally comprised of materials, such as gold-plated Kovar, in order to assure operational integrity over required time	Initial tests indicate no requirement for more elaborate, expensive packaging (housings)

and operating temperature ranges

We consider organic polymers with electro-optic qualities to be the most feasible technology for future high-speed (wide bandwidth) electronic-optical conversion. Due to the ease of processing afforded by electro-optic polymers, as well as their capacity to foster component size reduction, we believe electro-optic polymers have the potential to replace existing high-speed fiber-optics components that are used today in many commercial and military applications.

We also believe the miniaturization provided by advanced electro-optic polymers may allow for the successful fabrication of chip-to-chip (backplane) optical interconnect devices for computers that create the high-speed data transmission necessary for extremely high-speed computations. Further, we believe that additional potential applications for electro-optic polymers may include phased array radar, cable television (CATV), input-output devices for large data center applications, high speed computing, electronic counter measure (ECM) systems, ultra-fast analog-to-digital conversion, land mine detection, radio frequency photonics, spatial light modulation and all-optical (light-switching-light) signal processing.

Our Electro-Optic Technology Approach

Our proposed solution to produce high-performance, high-stability electro-optic polymers for high-speed (wide bandwidth) telecommunication applications lies in a less mainstream, yet firmly established, scientific phenomenon called aromaticity. Aromaticity causes a high degree of molecular stability. It is a molecular arrangement wherein atoms combine into multi-membered rings and share their electrons among each other. Aromatic compounds are stable because the electronic charge distributes evenly over a great area preventing hostile moieties, such as oxygen and free radicals, from finding an opening to attack.

For the past two decades, corporations as well as numerous universities and U.S. Government Agencies, have been attempting to produce high-performance, high-stability electro-optic polymers for high-speed (wide bandwidth) telecommunication applications. These efforts have largely been unsuccessful due, in our opinion, to the industry's singular adherence to an industry pervasive engineering model known as the Bond Length Alternation (BLA) theory model. The BLA model, like all other current industry-standard molecular designs, consists of molecular designs containing long strings of atoms called polyene chains. Longer polyene chains provide higher electro-optic performance, but are also more susceptible to environmental threats, which result in unacceptably low-performing, thermally unstable electro-optic polymers.

As a result, high frequency modulators engineered with electro-optic polymers designed on the BLA model or any other polyene chain design models are unstable over typical operating temperature ranges, and often exhibit performance degradation within days, hours or even minutes. Similarly, lower frequency modulators exhibit comparable failings, but to a lesser extent. These flaws, in most cases, have prevented commercial quality polymer-based modulators operating at 10-40Gb/s from entering the commercial marketplace. The thermal stability of these devices does not generally meet the minimum Telcordia GR-468 operating temperature range (-40 degrees Celsius to +85 degrees Celsius) much less the more harsh MILSPEC 883D (military specification) range of -55 degrees Celsius to 150 degrees Celsius.

None of our patented molecular designs rely on the BLA polyene chain design model.

Our Intellectual Property

We have the following issued U.S. Patents:

US 7 919 619 - Heterocyclical Chromophore Architectures (Granted April 5, 2011)
US 7 894 695- Tricyclic Spacer Systems for Nonlinear Optical Devices (Granted – February 22, 2011)
US 8 269 004- Heterocyclical Chromophore Architectures (Granted September 18, 2012)
US 8 298 326 - Tricyclic Spacer Systems for Nonlinear Optical Devices (Granted- October 30, 2012)

We also have the following issued Australian Patent:

AU 2005302506 - Heterocyclical Chromophore Architectures (Granted November 29, 2012)

In April 2013 Japan granted our Company Japanese Patent No. 5241234 entitled Heterocyclical Chromophore Architectures. This patent protects the unique molecular structures that give our chromophores the thermal stability necessary to withstand CMOS processing temperatures without compromising electro-optical effects.

In addition, we have twenty-six pending patent applications (including six patent families with applications in Australia, Canada, China, European Patent Office, Japan and the U.S. based on the PCT and U.S. applications below) in the field of nonlinear optic chromophore design as follows:

12/956597- Stable Free Radical Chromophores, processes for preparing the same.
13/307663- Stable Free Radical Chromophores, processes for preparing the same.

PCT/US05/39212- Tricyclic Spacer Systems for Nonlinear Optical Devices
PCT/US05/39664- Anti-Aromatic Chromophore Architectures
PCT/US05/39213- Heterocyclical Anti-Aromatic Chromophore Architectures
PCT/US05/39010- Heterocyclical Chromophore Architectures
PCT/US06/11637- Heterocyclical Chromophore Architectures with Novel Electronic Acceptor Systems.

Heterocyclical Anti-Aromatic Systems Two of our provisional patents cover heterocyclical anti-aromatic electronic conductive pathways, which are the heart of our high-performance, high-stability molecular designs. The completely heterocyclical nature of our molecular designs "lock" conductive atomic orbitals into a planar (flat) configuration, which provides improved electronic conduction and a significantly lower reaction to environmental threats (e.g. thermal, chemical, photochemical, etc.) than the BLA design paradigm employed by other competitive electro-optic polymers. The anti-aromatic nature of these structures dramatically improves the "zwitterionic-aromatic push-pull" of the systems, providing for low energy charge transfer. Low energy charge transfer is important for the production of extremely high electro-optic character.

Heterocyclical Steric Hindering System This patent describes a nitrogenous heterocyclical structure for the integration of steric hindering groups that are necessary for the nanoscale material integration. Due to the [pi]-orbital configuration of the nitrogen bridge, this structure has been demonstrated not to interfere with the conductive nature of the electronic conductive pathway and thus is non-disruptive to the electro-optic character of the core molecular construction. The quantum mechanical design of the system is designed to establish complete molecular planarity (flatness) for optimal performance.

Totally Integrated Material Engineering System This patent covers material integration structures under a design strategy known as Totally Integrated Material Engineering. These integration structures provide for the "wrapping" of the core molecule in sterically hindering groups that maximally protect the molecule from environmental threats and maximally protect it from microscopic aggregation (which is a major cause of performance degradation and optical loss) within a minimal molecular volume. These structures also provide for the integration of polymerizable groups for integration of materials into a highly stable cross-linked material matrix.

Historic Breakthroughs and Results

During 2004, independent quantum mechanical calculations performed on our electro-optic polymer designs at government laboratories located at the Naval Air Warfare Center Weapons Division in China Lake, California suggested that our initial aromatic molecules perform two and a half (2.5) to three and three-tenths (3.3) times more efficiently than currently available telecom grade electro-optic polymers. Our conclusion was that performance improvements of this magnitude indicate a significant breakthrough in the field of fiber-optic telecommunication.

In May and June of 2006, performance evaluations of one of our first extremely high-performance electro-optic materials were performed by electro-optic expert, Dr. C.C. Teng, co-inventor of the renowned Teng-Man test, and subsequently confirmed by the University of Arizona's College of Optical Sciences. Under identical laboratory conditions at low molecular loadings, one of our molecular designs outperformed one of the industry's highest performance electro-optic systems by a factor as high as 650%. Our conclusion was that the Teng-Man test established the validity of our novel, patent pending molecular design paradigm known as CSC (Cyclical Surface Conduction) theory; and that the success of CSC theory has the potential to establish the fundamental blueprint of electro-optic material design for decades to come, and to have broad application in commercial and military telecommunication and advanced computational systems.

On September 25, 2006 we obtained independent laboratory results that confirmed the thermal stability of our PerkinamineTM electro-optic materials. Thermal stability as high as 350 degrees Celsius was confirmed, significantly exceeding many other then commercially available high performance electro-optic materials, such as CLD-1 that exhibits thermal degradation in the range of 250 degrees Celsius to 275 degrees Celsius. This high temperature stability of our materials eliminates a major obstacle to vertical integration of electro-optic polymers into standard microelectronic manufacturing processes (e.g. wave/vapor-phase soldering) where thermal stability of at least 300 degrees Celsius is required. In independent laboratory tests, ten-percent material degradation, a common evaluation of overall thermal stability, did not occur until our PerkinamineTM materials base was exposed to temperatures as high as 350 degrees Celsius, as determined by Thermo-Gravimetric Analysis (TGA). The test results supported our Company's progress to introduce our materials into commercial applications such as optical interconnections, high-speed telecom and datacom modulators, and military/aerospace components.

In July 2007, our Company developed an innovative process to integrate our unique architecture into our anticipated commercial devices, whereby dendritic spacer systems are attached to its core chromophore. In the event we are successful in developing a commercially viable product, we believe these dendrimers will reduce the cost of manufacturing materials and reduce the cost and complexity of tailoring the material to specific customer requirements.

In March 2008, we commenced production of our first prototype photonic chip, which we delivered to Photon-X, LLC to fabricate a prototype polymer optical modulator and measure its technical properties. In June 2009 we released test results conducted by Dr. C.C. Teng that re-confirmed our previous test results.

In August 2009, Photon-X, LLC commenced a compatibility study, process sequences, and fabricated wafers/chips containing arrays of phase modulators. The first one hundred plus modulators (bench top devices) were completed at the end of October 2009, and were successfully characterized for insertion loss, Vpi, modulation dynamic range and initial frequency response in March 2010. The multi-step manufacturing process we utilized to fabricate our modulators involved exposing our proprietary PerkinamineTM materials to extreme conditions that are typically found in standard commercial manufacturing settings. Our step-by-step analysis throughout the fabrication process demonstrated to us that our PerkinamineTM materials could successfully withstand each step of the fabrication process without damage.

In August 2009, we retained Perdix, Inc. in Boulder, Colorado to help us identify and build prototype products for high growth potential target markets in fiber optic telecommunications systems. During October 2009, we initiated the development and production of our prototype amplitude modulator, which can ultimately be assembled into 1- and 2-dimensional arrays that are useful for optical computing applications, such as encryption and pattern recognition.

In March 2010 we successfully concluded initial electrical and optical performance testing stage of our prototype phase modulator and began Application Engineering of our technology in customer design environments and working directly with interested large system suppliers to attempt to engineer specific individual product materials and device designs for sale to or by these suppliers.

In October of 2010 we completed the concept stage of a novel design for an advanced optical computing application and moved forward into the design stage with Celestech, Inc. of Chantilly, Virginia. If this project moves forward it will incorporate one of our advanced electro-optical polymer materials.

In October of 2010 we announced the results of testing performed by Lehigh University that demonstrated the Third-order non-linear properties of our proprietary molecules in the Perkinamine NRTM chromophore class. Lehigh University determined that the material was 100 times stronger than the highest off-resonance small molecule currently known. They also determined that it was 2,600 times more powerful than fused silica and demonstrated extremely fast (less than 1 picosecond) photo-induced non-linear response that would be capable of modulation at raters of 1 THz (terahertz).

In March 2011 we entered into a research and development agreement with the City University of New York’s Laboratory for Nano Micro Photonics (LaNMP) to develop Third-order non-linear devices. The combination of LaNMP’s device capabilities together with our materials expertise should accelerate the development of all-optical devices.

In March 2011 the City University of New York’s Laboratory for Nano Micro Photonics (LaNMP) fabricated our first-ever all optical waveguides using PerkinamineTM and Perkinamine NRTM chromophores. It is anticipated that LaNMP could use this device architecture to develop various all-optical devices including an all-optical transistor. This effort, starting with an all-optical switch, is being continued at the University of Colorado, Boulder through an agreement entered into in January 2013.

In March 2011 we announced a two-year research and development collaboration with the University of Alabama to explore the advanced energy capture properties of our PerkinamineTM class of chromophores. Our material absorbs light across a wide range of wavelengths from near infrared into the near ultraviolet. We have subsequently ended our relationship with the University.

In December 2011, we announced the discovery of a new material named Perkinamine IndigoTM. We believe this represents a major advancement in the field of organic nonlinear optical materials. These are initial results and we have much to learn about how to harness full potential of Perkinamine IndigoTM. The material demonstrated an

unusually high electro-optical effect of greater than 250 picometers per volt at 1550 nanometers with excellent thermal and photo stability. Independent research laboratories at Micron Inc., Photon-X and The University of Colorado confirmed these characteristics.

In June 2012 we opened a new internal research laboratory facility in Newark, Delaware in the Delaware Technology Park, near the University of Delaware. This new lab facility enables us to synthesize and test our materials in the same facility and will help us accelerate our development efforts. It is equipped with state of the art equipment necessary to expand our ability to conduct synthetic chemistry in much more tightly controlled conditions. Additionally, we have equipped a separate advanced optical laboratory at the same location where the necessary testing of material candidates will be performed as they emerge from our new synthesis laboratory.

In July 2012 we entered into an agreement with The University of Colorado, Boulder to conduct analytical testing and to carry out studies that will give a better understanding of the properties of a new class of composite organic electro-optic materials. This class of materials is our Perkinamine IndigoTM. The processing and measurements are to be carried out primarily at the Guided Wave Optics Laboratory (GWOL). The work is being done in close collaboration with Company personnel.

In February 2013 we delivered to a potential large system supplier customer prototype devices that were coated with our advanced organic nonlinear electro-optical polymer, Perkinamine IndigoTM. Tests conducted by the University of Colorado, Boulder on coupons coated with the material demonstrated consistent R33 measurements from 100-125 picometers per volt, which exceeded the potential large system supplier customer's stated requirements.

In March 2013 we entered into a product development contractor agreement with EM Photonics (EMP) of Newark, Delaware to fabricate and test waveguides and phase modulators during an initial development phase using existing EMP polymer modulator design and processes.

In June 2013 we consolidated the EMP design program into our University of Colorado, Boulder (UCB) program after we fabricated structures with UCB that will be used as the basic building blocks of our Integrated Optical Device effort for the construction of both our advanced telecom modulator and data communications transceiver.

In April 2013 our potential large system supplier customer informed us that their preliminary testing results on the prototype devices coated with Perkinamine Indigo™ that we delivered to them in February 2013 demonstrated several of the key performance parameters that they desired. There are still additional tests that need to be completed. We are working with our potential customer utilizing our Perkinamine Indigo™ chromophore in a number of host polymers and will evaluate these polymers in conjunction with our chromophores for a specific performance attributes for their application.

The Electro-Optic Device Market

General

Electro-optic devices such as fiber-optic modulators translate electric signals into optical signals. Such devices are used in communication systems to transfer data over fiber-optic networks. Optical data transfer is significantly faster and more efficient than transfer technologies using only electric signals, permitting more cost-effective use of bandwidth for broadband Internet and voice services.

Two distinct technologies currently exist for the fabrication of fiber-optic devices, such as fiber-optic modulators. The first, which is the more traditional technology, utilizes an electro-optically active inorganic core crystalline material (e.g. lithium niobate). The second, which is the focus of the Company’s research and development, involves the exploitation of electro-optic polymers.

Traditional Technology - Inorganic Crystals

Traditional technology translates electric signals into optical signals generally relying upon electro-optic materials, such as lithium niobate or gallium arsenide. Five of the largest inorganic fiber-optic component manufactures hold approximately 85% of the electro-optic modulator component market. They are JDSU, Sumitomo, Oclaro, Fujitsu and ThorLabs. These companies are heavily invested in the production of crystalline-based electro-optic modulator technologies, as well as the development of novel manufacturing techniques and integrated laser/modulator designs. While each company possesses their own modulator design and processing patents, the underlying core constituents (lithium niobate, gallium arsenide, indium phosphide) occur in nature and as such cannot be patented.

New Technology - Organic Polymers

Our developing technology that translates electric signals into optical signals relies upon organic electro-optic materials, such as electro-optic polymers. Electro-optic polymers involve the material integration of specifically engineered organic (carbon-based) compounds. The molecular designs of these compounds are precise and do not occur naturally; thus they may be protected under patent law.