

Company

XG Sciences, Inc. (“XGS”), formed in May 2006, is a first mover and market leader in the design and manufacture of graphene nanoplatelets. Graphene nanoplatelets are particles consisting of multiple layers of graphene and are considered a game changer for numerous industries. XGS’ graphene nanoplatelets, trademarked under the name xGnP®, have demonstrated performance impacting multi-billion dollar markets and have unique capabilities for energy storage, thermal conductivity, electrical conductivity, barrier properties and the ability to impart strength when incorporated into plastics or other matrices. XGS has sold products to over 1,000 customers in 47 countries who are in various stages of trialing its products for numerous applications. XGS has also licensed elements of its technology to leading supply chain and distribution partners, such as Cabot Corp and POSCO. Headquartered in Lansing, Michigan, the Company has raised \$32 million to date and has 23 full-time employees.

Lux Research says:

XG Sciences – Positive – Advanced Materials. Top Ten Innovative Companies.

“Despite increasing competition from a handful of new entrants to the graphene space, XG remains the low cost leader and also boasts the most impressive business execution to date.”

XG Sciences Well Positioned for Success

- **Significant Customer Traction:** 1,000+ in 40+ countries since inception. **Strong portfolio of customer engagements** in end-use markets ranging from polymer composites, energy storage, electrically conductive films and thermal management.
- **Revenue Traction:** Commercial sales started in multiple applications and gaining momentum. **\$5-10 million in estimated 2016 revenue.**
- **Proven Technology: Significant IP** in the form of patents, trade secrets and know-how. XG SiG™ Composite with **3-5x the energy storage capacity** versus today’s LiB anode technology. XG Leaf® with one-third the density of copper films, **50% more thermally conductive than copper** and more than 2x that of aluminum. Formulated water- and solvent-based inks with conductivity approaching $1 \Omega/\square$ at 1 mil thickness. **Industry-leading performance** available in bulk powders and dispersions.
- **Positioned To Grow:** Technology, partners and management positions XG for substantial growth. **Proven manufacturing technology** and strong customer channel to deliver on success. Moved beyond proof of concept into **commercialization phase.**
- **Strategic Partners:** Well positioned with **world class strategic partners, investors and licensees.** Investors: *Aspen Advanced Opportunity Fund, Hanwha, POSCO and Samsung Ventures.* Licensees: *Cabot and POSCO.*

Graphene: The “Miracle Material”

First discovered in 2004, graphene is the thinnest material known - a single layer of carbon atoms configured in an atomic-scale honeycomb lattice, and is noted for its strength, density, impermeability, light weight, and both electrical and thermal conductivity. Among many noted properties, graphene is

harder than diamonds, lighter than steel but significantly stronger, conducts electricity better than copper and one of the most thermally conductive materials available today.

Markets

XGS is a “platform play” in advanced materials where the Company’s proprietary processes produce varying grades of graphene nanoplatelets which can be mapped to a variety of applications in many market segments. The Company’s primary focus markets are Energy Storage and Thermal Management where they currently have a portfolio of products undergoing design-in with a range of marquee customers. They also target the Inks & Coatings market with products in development and are engaged in commercial and development activities for the Composites market.

XGS Market/Application Focus Areas & 2018 Market Size

Key Markets	Energy Storage			Thermal Management		Composites
Application	<u>Lithium Ion Battery</u> Next-Generation Anode	<u>Lithium Ion Battery</u> Cathode Conductive Additive	<u>Pb-Carbon Battery</u> Anode Slurry Additive	<u>Portable Electronics</u> Heat Management Powders/Film	<u>Semi Packaging</u> Heat Management Paste/Adhesive	<u>Specialty Plastics</u> Multi-Function Performance Additive
Performance Driver	Higher Energy Storage Capacity	Increased Rate Performance	Longer Cycle Life, Faster Charge Acceptance	Lower and More Stable Operating Temperatures	Improved Heat Transfer	Improved Thermal, Electrical and Physical Properties
Business Model	Silicon Graphene Composite ("XG SiG™") Sales	xGnP® Powder Sales	xGnP® Powder Sales	xGnP® Powder & Graphene Paper Sales ("XG Leaf™")	Formulated Products Sales	xGnP® Powder Sales
Timing	Near Term to Medium Term	Near Term	Near Term	Near Term to Medium Term	Near Term to Medium Term	Medium Term to Longer Term
Potential Market Size	\$26.5 Bn (Li-ion Battery Cell - 2020) ¹	\$5.2 Bn (LiB Cathode Active Materials - 2020) ¹	\$9-\$12 Bn (Start-Stop Batteries - 2020) ³	\$2,976 Bn (Consumer Electronics - 2020) ⁵	\$28 Bn (Semiconductor Packaging - 2020) ⁷	\$654 Bn (Worldwide Plastics Market - 2020) ⁹
Anticipated Addressable Market Size	\$1.3 Bn (LiB Anode Materials - 2018) ¹	\$200 Mn (LiB Cathode Additives - 2018) ²	\$140 Mn (Anode Slurry Additives - 2018) ⁴	\$900 Mn (Graphitic Heat Spreaders - 2018) ⁶	\$780 Mn (Polymeric Thermal Interface - 2018) ⁸	\$9.1 Bn (Composite Additives - 2018) ¹⁰

XG SiG™ in Lithium-ion Battery Markets

The global LiB market is large and growing rapidly. According to Avicenne Energy¹, the 2014 LiB market is \$13.6B and growing to \$21.5B in 2016, driven by the rapid proliferation of tablets, smart phones, electric vehicles, and grid storage applications. The portion of the market that XGS addresses is the anode materials segment, which Avicenne values at about \$850 million in 2014 and expects to grow to \$1.3-1.4B by 2018.

XG Leaf® in Portable Electronics

¹ Avicenne Energy, "The Worldwide Rechargeable Battery Market 2014 - 2025", 24th Edition - V3, July 2015.

² Avicenne Energy, "The Worldwide Rechargeable Battery Market 2014 - 2025", 24th Edition - V3, July 2015 & Internal Estimates.

³ ArcActive via Nanalyze, April 3, 2015.

⁴ ArcActive via Nanalyze, April 3, 2015 & Internal Estimates.

⁵ Future Markets Insights, "Consumer Electronics Market: Global Industry Analysis and opportunity Assessment 2015 - 2020", May 8, 2015.

⁶ Prismark, "Market Assessment: Thin Carbon-Based Heat Spreaders", August 2014.

⁷ Reporterlink.com, "Semiconductor & IC Packaging Materials Market...", May 2014.

⁸ Prismark, 2015.

⁹ Grand View Research, "Global Plastics Market Analysis...", August 2014.

¹⁰ From (9) and internal estimates: 2018 = 305 million tons of plastic, if 10% of the market adopted xGnP to enhance their properties, and at only 1% by weight as an additive, then in 2018 305,000 tons or 305,000,000 kilos of xGnP would be required. At \$30 a Kg - the value is \$9.1 Bn per year.

XG Leaf® can be used for a variety of applications such as heat dissipation in electronics, electromagnetic interference (EMI) shielding, and resistive heating. Among these, thermal application has the biggest apparent market potential especially in consumer electronics. According to a private client study by Prismark Partners, LLC, a leading electronics industry consulting firm specializing in advanced materials, the 2014 market for finished graphitic heat spreaders as sold to the OEM and EMS companies with adhesive, PET, and/or copper backing for selected portable applications, is \$600 million, and is expected to reach \$900 million in 2018. The market is currently in a significant expansion period driven by the demand for portable devices.

Other Markets

- **Energy Storage:** lead acid batteries, supercapacitor electrodes, lithium-ion battery cathodes, lithium-ion anodes;
- **Thermal Management:** circuit boards, portable electronic devices, such as cell phones and tablets, thermal management systems for battery packs used in electric vehicles; inks, coatings, polymer composites and greases; cooling liquids / fluids;
- **Electrical Conductivity:** aqueous and solvent-based formulations to print conductive circuits using flexo, gravure, off-set and screen-printing processes on flexible and rigid substrates;
- **Composites:** polymers (urethanes, polycarbonate, Teflon, rubber, polypropylene, thermoplastic polyolefin and nylon), polymer processes (e.g., thermoset, solvent cast and thermoplastic) and cement; and
- **Lubricity:** oil and grease additives.

XGS Products

xGnP® Graphene Nanoplatelets

xGnP® graphene nanoplatelets consist of ultrathin particles of graphite that are short stacks of graphene. They are produced in various grades, which vary by average particle thickness, and average particle diameters. xGnP® graphene nanoplatelets are especially applicable for use as additives in polymeric or metallic composites, or in coatings or other formulations where particular electrical, thermal or barrier applications are desired by our customers.

XG Leaf®

XG Leaf® is a family of sheet products suited for use in industrial, electronics, and automotive markets. These sheets are made using special formulations of xGnP® graphene nanoplatelets as precursors, along with other materials for specific applications. There are several different types of XG Leaf™ available in various thicknesses (20 to 120 microns), depending on the end-use requirements for thermal conductivity, electrical conductivity, or resistive heating.

XG SiG™ Li-ion Battery Anode Materials

XG SiG™ is a composite of silicon and graphene nanoplatelets designed to deliver 3-5 times the energy storage capacity of today's graphite-based LiB anodes. Anode capacity is a key driver for extended battery runtime in applications such as portable electronics, power tools and electric vehicles ("EV"). Silicon has 10x the storage capacity of graphite and has been targeted as the next-generation material

to replace graphite. However, silicon suffers from poor cyclability limiting its adoption in LiB anodes. XGS' breakthrough is the creation of a SiG composite that allows the use of silicon as an active component in anodes, delivering on the industry need for long battery cycle life, high efficiency and at a cost and scale that meets industry targets. Product design-in is underway with battery manufacturers targeting early commercialization performance requirements. The combination of performance, cost and manufacturability positions XG SiG™ and XGS as a leader in high energy density LiB materials.

Strategic Investors and License Agreements

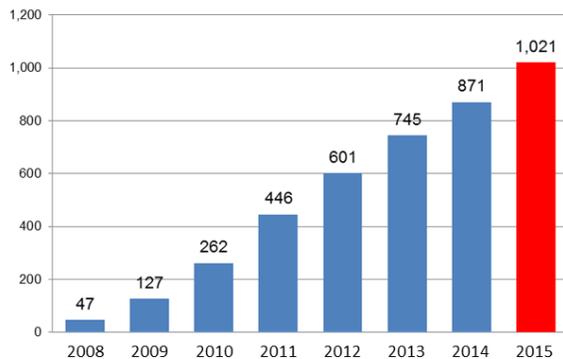
The Company has partnered with leading global companies as manufacturing, technology and distribution partners as a way to accelerate XGS' customer and manufacturing reach. Each of these partners has spent significant time with XGS to validate the technology and market need.

Mar 2014	POSCO	\$1.2M investment exercising certain pre-emptive rights
Jan 2014	Samsung Ventures	\$3M investment + Joint Development Program ongoing with Samsung SDI for next gen Li-Ion batteries
Nov 2011	Cabot Corp	\$4M licensing agreement + royalties
Jun 2011	POSCO	\$4M investment with licensing agreement + royalties
Dec 2010	Hanwha Chemical	\$3M investment

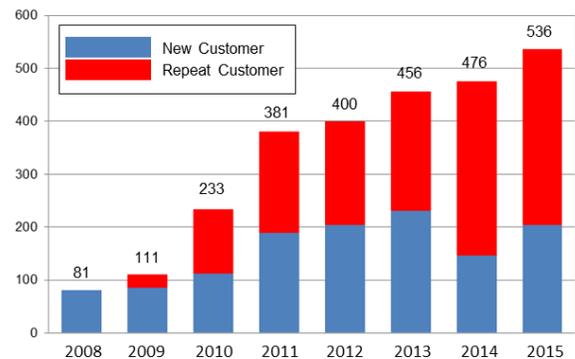
Customer Traction

- Year-on-year addition of new customers in a range of end-use applications.
- Track record of annual order growth as well as repeat customers underlying commercial traction with multiple customers and markets.

Cumulative Customers, by Year



Total Orders, by Year and Customer Type



Management Team

Dr. Philip Rose, CEO

- President, Hitech, Sigma Aldrich (2010 to 2013)
- General Management, M&A, Business Development and Marketing, Rohm and Haas (1989-2010)

Dr. Liya Wang, VP R&D

- Renowned expert in the field of batteries and advanced materials
- Former Principal Scientific Director for Spain's CIC Energigune and Director for emerging technologies at A123

Rob Privette, VP Energy Markets

- 25 years of experience in technology development and commercialization of fuel cells, batteries, and other energy related devices
- Former Director for Product Development at Energy Conversion Devices and Director of US Fuel Cell Development at Umicore with experience at the US DOE, DARPA, the US Army and US Navy.

Dr. Hiroyuki Fukushima, Technical Director

- Founding shareholder and inventor of xGnP® production processes

Scott Murray, VP Operations

- Seasoned professional with 30 years as a senior operations executive
- Formerly Founder and CEO of Uretech International Inc., Director of Development for McKechnie Automotive and various positions with Motor Wheel Corporation

Board of Directors

Dr. Philip Rose, CEO, President, Treasurer and Director

Arnold A. Allemang, Director, Chairman and Audit Committee member. Retired Board member, Dow Chemical, former Operating Officer of Dow

Ravi Shanker, General Manager, Lightweighting Platform, Dow Chemical

Steven C. Jones, Director and Audit Committee Chairman. Chairman, Aspen Capital Group LLC. President, Aspen Capital Advisors, LLC

Michael Pachos, Director and Audit Committee member. Principal, Samsung Ventures

Dave Pendell, Director, owns and operates AdvancedStage Capital LLC, ASC Lease Income, and general partner in Veterans Capital Fund