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## **Growth Potential Looms Large for Graphene Nanomaterials**

Lux Research projects nascent market to grow at 125% CAGR, impacting nanointermediates worth \$53B

Boston, MA – March 26, 2009 – The price and performance advantages of graphene – ultra-thin sheets of carbon atoms – over incumbent carbon-based nanomaterials, such as carbon nanotubes, have made the material a hot topic in nanotech circles. These benefits will help expand the market for graphene from \$196,000 last year to \$59 million in 2015 with potential to impact \$53 billion of intermediate products and help the material make a splash in applications from automobiles to displays, according to a new report from Lux Research.

Lux's report, entitled "Graphene: Near-term Opportunities and Long-term Ambitions," represents the only exhaustive analysis to date of graphene's market potential. It outlines the material's different structures, industry players, manufacturing methods, application timelines and key patents. Lux's report also delivers real-world perspective on pricing, picks likely winners and losers, and projects which industries will feel graphene's impact most.

"Graphene poses an immediate threat to carbon nanotubes in applications like composites, coatings, and energy storage devices," said Oliver Tassinari, a Research Associate at Lux Research and the report's lead author. "But its long-term potential could be even greater, assuming producers actively develop expertise further down the value chain in key applications like electronics."

Lux Research's report reflects intelligence gathered through primary interviews with companies and researchers involved in the production and application development of graphene. Among its key findings:

- **Graphene will be increasingly competitive versus multi-wall nanotubes (MWNTs).** Graphene's price/performance profile already threatens MWNTs in composite, coating and energy storage device applications; and planned production increases will only drop graphene prices further.
- **Single-walled nanotubes (SWNTs) will put up more of a fight.** Graphene's properties could give it an edge over SWNTs as well. But SWNTs are more established in displays and electronics applications, and graphene will take at least a decade to gain a foothold there.
- **Nanointermediate developers will win big.** Graphene stands to benefit compounders, coating developers, companies producing energy storage devices, and other nanointermediate providers by offering lower prices yet comparable or better performance compared to carbon nanotubes.

"Partnerships will be a key barometer for success among graphene suppliers like Angstrom Materials, XG Sciences and Vorbeck Materials," said Jurron Bradley, Senior Analyst at Lux

Research and head of the Lux Nanomaterials Intelligence team. “Unless they plan to repeat the costly mistakes of early nanomaterials companies, graphene producers will need to form strategic partnerships early on with established chemical, materials and electronics companies to cultivate expertise in the markets they target downstream.”

“Graphene: Near-term Opportunities and Long-term Ambitions” is part of Lux Research’s Nanomaterials Intelligence service. Clients subscribing to this service receive continuous research on nanotech industry market trends and forecasts, ongoing technology scouting reports and proprietary data points in the weekly Lux Research Nanomaterials Journal and on-demand inquiry with Lux Research analysts.

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