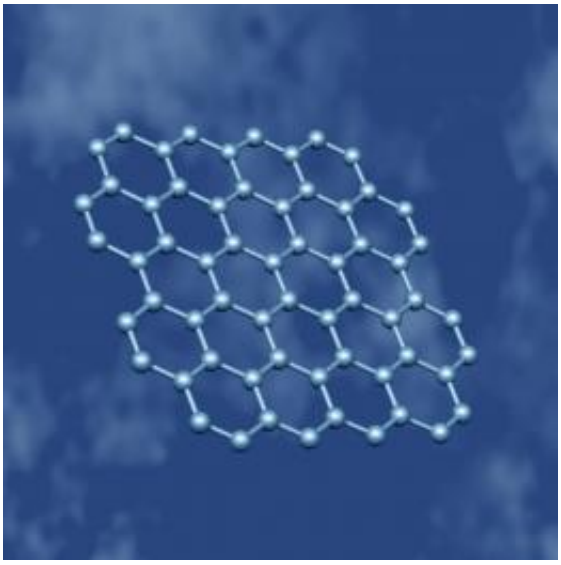
Startup scales up graphene production, develops biosensors and supercapacitors

September 19 2014, by Glenn Johnson



Artistic impression of graphene molecules. Credit: University of Manchester

An official of a materials technology and manufacturing startup based on a Purdue University innovation says his company is addressing the challenge of scaling graphene production for commercial applications.

Glenn Johnson, CEO of BlueVine Graphene Industries Inc., said many of the methodologies being utilized to produce graphene today are not easily scalable and require numerous post-processing steps to use it in functional applications. He said the company's product development team has developed a way to scale the production of graphene to meet

commercial volumes and many different applications.

"Our graphene electrodes are created using a roll-to-roll chemical vapor deposition process, and then they are combined with other materials utilizing a different roll-to-roll process," he said. "We can give the same foundational graphene electrodes entirely different properties, utilizing standard or custom materials that we are developing for our own commercial products. In essence what we've done is developed scalable graphene electrodes that are foundational pieces and can be easily customized to unique customer applications."

Timothy Fisher, founder and Chief Technology Officer of BlueVine Graphene Industries, developed the technology. He also is the James G. Dwyer Professor of Mechanical Engineering at Purdue. The patented technology has been exclusively licensed to BlueVine Graphene Industries through the Purdue Office of Technology Commercialization.

"We're moving up to roll-to-roll, large-scale manufacturing capabilities. These roll-to-roll systems allow us to increase output by a thousand-fold over the original research-scale processes," Fisher said. "These state-of-the-art systems allow us to leverage the game-changing properties of graphene and, in particular, our graphene petal technology, called Folium™, at production scales that provide tremendous pricing advantages."

BlueVine Graphene Industries already is developing and testing two commercial applications for its Folium technology: biosensors and supercapacitors. Johnson said the company's first-generation glucose monitoring technology could impact the use of traditional testing systems like lancets, which are made with gold and other precious metals. The second-generation technology could allow people to use non-invasive methods to test their glucose levels through saliva, tears or urine.

"Patient non-compliance with doctor-recommended glucose testing frequency can be a problem. By making lancets more affordable and potentially non-invasive, we are addressing a critical global need," he said. "More frequent tests could lead to better control of the disease, which could lead to an associated reduction in health risks."

Supercapacitors are BlueVine Graphene Industries' second application under development for its Folium graphene. Johnson said the company's graphene supercapacitors are reaching the energy density of lithium-ion batteries without a similar energy fade over time.

"Our graphene-based supercapacitors charge in just a fraction of the time needed to charge lithium-ion batteries. There are many consumer, industrial and military applications," he said. "Wouldn't it be great if mobile phones could be fully recharged in only a matter of minutes, and if they kept working like new, year after year?"

Johnson said the company will refine its production and quality assurance processes to produce commercial volumes of the Folium graphene.

"We also are focused on working with potential customers to continue to develop baseline products for both our biosensor and supercapacitor applications," he said.

Provided by Purdue University