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Hybrid Plastics doubles size to lead way for 'next generation'

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Joe Lichtenhan, co-founder, president and CEO of Hybrid Plastics in Hattiesburg, was in graduate school in Seattle during the bloom of Microsoft.

"I saw firsthand how the identity of Seattle changed almost overnight from that of a logging town and a place that built a few jets into a high-tech software hub," Lichtenhan said. "I am convinced that this same transition can happen in Mississippi, and look forward to being part of it. We are excited about the future of Hybrid Plastics here in Hattiesburg, and in growing entrepreneurial high-tech within the state."

In October, Hybrid Plastics welcomed Gov. Haley Barbour, Sen. Thad Cochran, Congressman Gene Taylor, former Ambassador John Palmer and other dignitaries at a ribbon cutting for the company's $2.3-million, 15,000-square-foot expansion that will double employment from 30 to 50 people and increase production five-fold. The facility will be Mississippi's first Advanced Nano-tech Materials Production plant. It will provide a clean manufacturing environment to supply high-purity forms of POSS — Polyhedral Oligomeric Silsesquioxane — nanostructured chemical products to the Department of Defense (DoD) and commercial users in the fields of electronics, sensors, food packaging, and filtration.

Hybrid Plastics has pioneered the development of a new chemical technology for plastics. The technology bridges the property space between hydrocarbon-based plastics and ceramics. Lichtenhan said that imparts new or improved properties to materials through the controlled reinforcement of polymer chains at the molecular level (nanoscale). Nanotechnology represents engineering on a molecular level (a nanometer is approximately a billionth of a meter) to make products.

This technology is leading the way to the next generation of plastics.

“Everyone across the world is buying POSS — a technology made here in Mississippi — and it can’t be made anywhere else in the world,” Lichtenhan said. “That’s going to guarantee us a place in global technology.”

The product’s applications include arterial stents, fiber optic light generators, radiation shields and aerospace applications.

Hybrid Plastics relocated from Southern California to Hattiesburg in 2004. The company was attracted by an available building that made it possible to begin to manufacture more quickly, plus the competitive advantages from being located near the University of Southern Mississippi (USM) Polymer Science Research Center.

Research is critically important to the company that has received national recognition in the form of a presidential determination that stated POSS Nanostructured Chemicals were in the strategic economic and defense interests of the U.S.

“Hybrid Plastics and its POSS products are the only nanotechnology to receive this level of endorsement and that is something Mississippi can be proud of,” Lichtenhan said. “The presidential determination enabled us to partner directly with the Defense Production Act Title III program office, which is an authority that can play a powerful role in assisting with the establishment of manufacturing infrastructure for innovative high-tech businesses. Sen. Thad Cochran, Sen. Trent Lott and Congressman Gene Taylor have all provided council and support that enabled Title III to become a reality for us. And I am deeply grateful.”

In May of this year, Hybrid Plastic’s manufacturing processes were inspected by the DoD, and the company received a level eight out of a possible 10 ranking.

“This means that the supply of POSS for the DoD is now considered low risk, and this opens the way for insertion into military systems,” Lichtenhan said. “This is an achievement that no other nanotech company can claim. And it is right here in Hattiesburg. With the additional planned expansion of our infrastructure, we will reach a manufacturing readiness level of 10 within the next three years. In short, we can do what we said we could, and we are proving that Mississippi will have a role in this high-tech field.”

Hybrid Plastics is currently planning an additional $2.8-million expansion that will allow it to manufacture up to 500 tons a year of a lower purity product to be used in less sensitive applications.

The National Science and Technology Council has stated that nanotechnology could impact the production of

virtually every human-made object. The council has said nanotechnology holds the promise of being "the science of the 21st Century."

"As part of this wave of the future, Hybrid Plastics' revolutionary Nanostructured Chemical Technology is foundational in nature and possesses broad utility within the consumer products, aerospace, biological, pharmaceutical, agricultural, transportation and construction industries," said Carl Hagstrom, COO of Hybrid Plastics. "It is a 'green' technology that materially improves the strength, heat resistance, weight and many other desirable properties that have made plastics the material of choice in items that we use every day from aerospace to microelectronics to food packaging to medical devices."

Hagstrom said these POSS compounds are being hailed as the next big leap in plastics and molecular technology, and represent the first new class of chemical feedstocks to be developed in 50 years.

"They are affordable and cost competitive, and represent an entirely new, recyclable polymer feedstock, one that marries the beneficial properties of plastics such as processability and toughness with those of ceramics, hardness and stability," he said. "Significantly, POSS-based technology allows substantial redirection to more innocuous and abundant natural resources. Silicates and sand are the equivalent of crude oil for POSS Nanostructured materials.

"Finally, but not least, the POSS technology can be incorporated directly into existing formulations without modifying manufacturing processes. The result is immediate turn-key applicability and usability."

Hagstrom said Hybrid Plastics is one of the top 10 nanotechnology companies in the U.S. As its production ramps up, customers including those involved in food packaging, microelectronics, and biomedical materials may be attracted to locate near Hybrid Plastics.

"POSS biomedical stent products entered into human clinical trials in 2007 in the United Kingdom," Hagstrom said. "We are optimistic that a few of these customers will eventually decide to also establish their manufacturing in Mississippi either in the Hattiesburg Forrest County Industrial Park near Hybrid Plastics or in the University of Southern Mississippi (USM) Innovation and Commercialization Park."

Hybrid Plastics is employee owned. Hagstrom said it has been able to grow without venture capital or corporate sponsorship. Approximately 70% of the staff of Hybrid Plastics has been recruited from USM and the surrounding area.

“About half of our employees are Ph.D. graduates, most of whom would have needed to leave the area to find comparable employment,” Hagstrom said. “Since its move to Hattiesburg in the summer of 2004, Hybrid Plastics has provided a cumulative contribution to the community of $15.7 million in employment and outsourced expenditures, as well as a total investment in plant and equipment of $6.5 million. Because we employ a very highly skilled work force, we pay employees nationally competitive salaries in order to retain the talent and skill necessary to grow a cutting edge high-tech company.”

Hybrid Plastics was attracted to Hattiesburg because of Southern Miss’ instrumentation base and research expertise in the synthesis and characterization of materials at the molecular level, said Dr. Cecil Burge, vice president of research and economic development at USM.

“When they first came, Hybrid Plastics had to be based in our polymer science facilities,” Burge said. “That was the only place from which they could operate.”

Burge said the university is seeing other opportunities like Hybrid Plastics, but it is important to have transitional space and facilities for them.

“That is why the construction of our Innovation and Commercialization Park is so critical,” Burge said. “Our first building now under construction in the park is designed specifically to accommodate the transition and development of companies like Hybrid.”

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