



## SBIR/STTR SUCCESS

POSS® is a nanostructured chemical that bridges the gap between ceramic and organic materials to improve product performance without sacrificing mechanical properties and is used in a wide variety of industries.

# HYBRID PLASTICS, INC.

Hybrid Plastics, Inc. has found the right mix when it comes to developing and commercializing its innovative Polyhedral Oligomeric Silsesquioxane (POSS®) nanotechnology based on Nanostructured® Chemicals. The technology and company were originally spun out of the U.S. Air Force Research Laboratory through a NIST Advanced Technology Program grant and has grown from six employees at the time of its first SBIR to 20 employees currently.

### PHASE III SUCCESS

The company has grown from six to 20 employees since its first SBIR award and is one of the top 10 nanotechnology companies in the United States.

### AGENCIES

DoD, HHS, NSF, DOE

### SNAPSHOT

In addition to its use by the military commercial applications for POSS® include synthetic organ replacement, next generation microchips, new filter filaments and composites for aviation, and rubbers for improved downhole oil and gas technology capabilities.

### HYBRID PLASTICS, INC.

55 W.L. Runnels Industrial Dr.  
Hattiesburg, MS 39401

[www.hybridplastics.com](http://www.hybridplastics.com)

POSS® is a revolutionary new chemical based on silicon-derived building blocks that provide nanometer-scale control to dramatically improve the properties of traditional polymers, colorants and fillers. In addition to being biocompatible and recyclable, POSS® releases no Volatile Organic Compounds (VOCs), which can have environmental effects.

“We’re working on finding and expanding the role of POSS® in myriad industries and are seeing it in new forms, which is making revolutionary progress in the defense, oil and gas, cosmetics, and biomedical industries,” said Dr. Joe Lichtenhan. “POSS® bridges the gap between ceramic and organic materials, which is unlocking new possibilities that will help both defense and the private sector by improving strength and durability while being environmentally friendly.”

According to the company, the market potential for non-military applications of POSS® span from food packaging, high temperature composite resins, polymer stabilizers, and chemicals for polyurethane, phenolic, epoxy, and polycarbonate coatings. Hybrid Plastics’ SBIR and STTR funding has been provided through multiple federal agencies and consequently, has corroborated the platform nature and applicability of the technology. The Phase I grants helped to validate the technical merit and utility of the technology. The Company’s Phase II grants enabled the development of applications to the engineering stage while the Phase III grants enabled collaboration in commercializing specific applications with partners in several industries. In December 2005, a Presidential Determination deemed POSS® Nanotechnology to be in the strategic national interest of the United States. This allowed the company to secure facility funding through Title III of the Defense Production Act. The act is to ensure that strategically important technologies continue to be manufactured in the United States. The Title III effort is coordinated by the Air Force from the Wright Patterson Air Force Base in Dayton, Ohio. The Company has commercial applications in areas ranging from biomedical, such as synthetic organ



replacement; to electronics, such as next generation microchips with reduced feature sizes; from aviation, such as new filter filaments and composites; to rubbers, such as improved downhole oil and gas technology capabilities.

“SBIR expanded the market potential of POSS® - SBIR created this new frontier for the product by making it compatible for defense and commercial applications, which also makes it a more sustainable product from a business perspective. Specifically the work carried out under the program allows us to reduce the cost of POSS® by improving its producibility and identifying non-defense avenues for the product,” said Lichtenhan.

Hybrid Plastics successfully reduced the cost of several POSS® systems by two orders of magnitude and as a result launched POSS® into the global R&D Chemicals business. As a result POSS® is now distributed globally by Aldrich Chemical Company, Gelest Inc. and in Japan by Tomen Inc. and in Taiwan by Wah Lee Industries.

The company is ISO 9001:2008 certified and has received a Frost and Sullivan Best Practices Award. Frost & Sullivan stated, “Hybrid Plastics’ customer service is unparalleled in the high performance fillers market.” Hybrid Plastics was one of five finalists in Small Times Magazine’s 2002 Best of Small Tech Award. The company has received three R&D 100 Awards. Since POSS® is new molecular technology, it has always involved and relied upon academic participation in the STEM disciplines.

“Partnerships with the DoD, private sector and universities have created the kind of innovation and synergy that will continue to produce better arenas for POSS® to contribute to,” noted Lichtenhan. Early support came through the University of California, Irvine, and Michigan State University and the company’s move to Hattiesburg, Mississippi was partly predicated on being close to and working with the University of Southern Mississippi’s acclaimed School of Polymers and High Performance Materials. Hybrid has been actively involved with the last two EPSCOR (Experimental Program for Scientifically Competitive Research) grants received by Mississippi from NSF. In addition to its close ties with the university, Hattiesburg is also home to a major military installation, Camp Shelby. The location and company success has allowed Hybrid Plastics to continue to expand and create more jobs in the area.

Today, Hybrid Plastics is one of the top 10 nanotechnology companies in the United States and sells worldwide with 40% of its sales overseas. Its dedicated staff of scientists and engineers have received awards naming their customer service as unparalleled in the global high performance fillers market. Hybrid Plastics’ offerings now include both solid, semi-solid and liquid forms of POSS and the company has established partnerships with several companies in Europe and Asia to assist in the development of products containing POSS® Chemicals.