

Hybrid Plastics Teams With Auburn University and ENTECH, Inc. to Develop Next Generation Thin Film Solar Cells and Concentrators for NASA

Fountain Valley, CA: Hybrid Plastics, Auburn University and ENTECH, Inc. have teamed under a NASA Glenn Research Center program to develop protective coatings for next generation thin film solar cells and concentrators for space applications. The effort is to produce a proof of concept demonstration leading to flight validation of more durable and rugged transparent polymers for both thin film solar cell arrays and the Stretched Lens Array (SLA). This collaboration among academia, materials suppliers and engineering adopters represents an empowering formula for providing real world solutions. ENTECH, located in Keller Texas, is a leading provider of advanced solar energy technology for a variety of applications, ranging from daylighting systems for commercial buildings to solar power arrays for spacecraft. Auburn University's Center for Space Power and Advanced Electronics resides within the Space Research Institute and develops space power and propulsion technologies.

This collaboration is designed to develop new materials that protect both thin film solar cell arrays and ENTECH's solar concentrator Fresnel lenses from the harmful effects of the space environment. The space environment includes ultraviolet radiation (especially wavelengths below 200 nm), particle radiation (e.g., electrons and protons), and monatomic oxygen (in low earth orbit). The Fresnel lenses capture sunlight, and focus it onto small solar cells, thereby reducing electricity costs compared to conventional flat-plate (planar) solar energy approaches. The coatings now on thin film solar cells are too thin for protection against the space environment. Therefore, Hybrid Plastics in conjunction with Auburn University will design, evaluate, and develop samples of POSS[®] (Polyhedral Oligomeric Silsesquioxanes) to be used as transparent protective coatings for these applications. The POSS[®] filled coatings will be engineered to provide adequate protection from the harmful space environment.

POSS[®] [Polyhedral Oligomeric Silsesquioxanes] is a revolutionary new Nanotechnology based on silicon-derived building blocks that provide nanometer-scale control to dramatically improve the thermal and mechanical properties of traditional polymers while offering easy incorporation using existing manufacturing protocols. These compounds have an average diameter of just 1.5 nanometers, or billionth of a meter. POSS[®] nanomaterials can be used both as direct replacements for hydrocarbon based materials or as low-density performance additives to traditional plastics. They release no VOCs, and, thereby, produce no odor or air pollution. They are biocompatible, recyclable, non-flammable, and competitively priced with traditional polymer feedstocks. POSS[®] Nanostructured[®] materials can be readily incorporated into virtually any existing polymer system through blending, grafting or copolymerization.

These POSS[®] nanobuilding-blocks were hailed by R&D magazine as globally one of the 100 most technologically significant new products for the year 2000. More recently, Hybrid Plastics was one of five finalists for the Small Times Magazine's *2002 Best of Small Tech Award* for its POSS[®] Nanostructured[®] materials. The Small Times Magazine Best of Small Tech Awards recognize the best people, products and companies in nanotechnology, MEMS and Microsystems globally.

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