BMDO Update
Linking American Businesses to Ballistic Missile Defense Technology

WINTER 2000/2001
ISSUE #36

ADVANCED MATERIALS

SMALL PARTICLES BRING BIG ADVANTAGES TO METAL COATINGS

Fast-moving but low-temperature particles are the key to a novel solid-state spray process that creates superior wear and corrosion-resistant metal coatings. Developed by Inovati (Santa Barbara, CA), kinetic energy metallization (KEM) outperforms competing technologies by offering an environmentally sound alternative to electroplating and competing economically with inexpensive (though less-effective) thermal spray processes.

Green machine. *Inovati's KEM can produce specialized metal coatings without the environmental side-effects associated with competing techniques such as electroplating, which uses polluting solvents during surface cleaning and hazardous chemicals during plating.*

In KEM, metal particles such as aluminum, titanium, or copper are mixed with helium and/or nitrogen in a unique powder fluidizing unit. They are then sprayed at high speeds onto a metal substrate. When the fast-moving particles collide with the substrate, the impact deforms them sufficiently to increase surface area approximately four times, exposing active metal surface area to form metallurgical bonds with the base metal and between particles. Carefully balanced pressure, velocity, and temperature keep particles from heating to a point at which they might melt, oxidize, or otherwise react. A benefit of the particles remaining solid is the opportunity to form mixtures of metals and alloys that are immiscible as liquids and the ability to consolidate nanoparticles. In high-temperature thermal processes, nanoparticles grow during consolidation, negating the benefits of their small cross-sections. KEM enables the consolidation of nanoparticles while maintaining the characteristics (e.g., ductility, strength, and/or magnetic permeability) for which they were engineered.

Developed under a BMDO SBIR contract for low-cost surface modification, KEM could replace environmentally hazardous electroplating processes, which today are restricted in certain areas. And unlike electroplating, KEM is a directed-spray process, which means coatings are applied only where necessary, reducing costs and material waste. Hendry Telephone Products is a customer of Inovati, offering steel telecommunications equipment racks with the KEM coatings. In addition, Inovati is working with helium suppliers to incorporate into its equipment a recycling system that will further increase efficiency. The company is offering equipment sales, coating services, and even franchise opportunities.

☑ Contact Howard Gabel of Inovati at 805-571-8384.

Web site: www.inovati.com
E-mail: hgabel@inovati.com