NANO MATERIALS
INTERNATIONAL CORPORATION
Innovators of Nanomaterials and Nanocoatings

News
Editor Contact:
Barry Manz
Manz Communications, Inc.
(551) 206-7177
manzcom@gmail.com

NMIC Introduces Industry's First Aluminum Diamond Heat Spreader Material for GaN Devices

Exceptional thermal conductivity can reduce device junction temperatures by 25%

TUCSON, AZ (August 8, 2011) — Nano Materials International Corp. (NMIC) today introduced the first commercial device-level solution for dissipating the heat generated by high-density semiconductor devices such as gallium nitride (GaN) RF power transistors. When used as a heat spreader integrated with a device, NMIC's new aluminum diamond metal matrix composites (MMCs), have demonstrated their ability to reduce device junction temperatures by up to 25%, allowing the devices to generate their full power output at their highest efficiency and potentially extend their operating life. NMIC's aluminum diamond MMC material is the first aluminum diamond MMC material to be economically in high volume at a cost that adds minimally to each GaN device.

GaN is the latest advancement in compound semiconductor technology for use in generating high levels of RF power over broad frequency ranges well into the millimeter-wave range. GaN devices have much higher power density than other technologies such as gallium arsenide (GaAs), silicon, and silicon germanium (SiGe) as measured by the amount of power they can generate in given amount of device gate periphery. However, this power density also results in the production of large amounts of waste heat that must be removed from the device, a challenge that must be effectively met if the GaN technology is to achieve its full potential.

Diamond has the highest thermal conductivity of any substance on Earth. When made as an aluminum-diamond composite and used as a heat spreader material, this property remains about 80% higher than its nearest competitor, copper-molybdenum-copper, which is widely used for this purpose. Aluminum diamond also has a coefficient of thermal expansion (CTE) close to that of silicon carbide (SiC), which is essential as most GaN devices employ SiC as their substrate material. NMIC's aluminum diamond also has metallization properties well suited for die attach, along with excellent dimensional tolerance and material stability.

NMIC's MMC material with nickel-gold electrolytic or electroless plating is available in thicknesses, shapes, and sizes required by GaN transistors or Microwave Monolithic Integrated Circuits (MMICs). It can be supplied as MMC material alone or incorporated within a package in order to serve the needs of device manufacturers and package suppliers.

Editors: Readers are encouraged to learn more by visiting www.nanomaterials-intl.com or by calling (520) 300-9272.