



Brush Wellman Presented With "Award of Distinction"

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TUCSON, Ariz. - June 5, 2000 - Brush Wellman, Powder Metal Products Group (a business unit of Electronic Products Division) announced today, their receipt of an "Award of Distinction" from Metal Powder Industries Federation (MPIF) 2000 International Conference on Powder Metallurgy & Particulate Materials in New York, NY. The award was presented to Brush Wellman for their functionally graded materials (FGM) copper/tungsten (Cu/W) packaging substrates. Dr. Juan Sepulveda, Director of Technical Marketing, and David E. Jech, Director of Technology, were presented with this special award on June 1, 2000.

The Powder Metallurgy Design Competition was sponsored by MPIF during their annual conference. Brush Wellman's functionally graded materials, copper/tungsten packaging substrates won this award in the Advanced Particulate Materials category for "outstanding application of powder metallurgy."

Functionally graded materials copper/tungsten are high performance metal matrix composite heat sinks with an effective thermal conductivity (TC) of 320 W/mK and a reduced coefficient of thermal expansion (CTE) of 5.3-7.1 ppm/degrees C. The anisotropic FGM substrates have discrete high thermal conductivity cores (functional cores), for semiconductor die bonding purposes, surrounded by a low coefficient of thermal expansion body to constrain the thermal expansion of the functional cores during temperature excursions.

The FGM approach utilizes the high TC properties of the copper and the low CTE of the tungsten to achieve optimal thermal performance under the area where the semiconductor die is mounted. This FGM design is possibly the only approach that allows the designer to tailor the effective TC and CTE properties of the heat sink independently.

Cu/W FGM substrates are used in optoelectronics as mounts or submounts for laser diodes, sensors, and detectors, and in microelectronic power packages for RF microwave, and millimeter-wave applications. Typical end user applications include cellular phone transmitting stations and pump laser diode based light amplifiers for fiber-optic networks.

Brush Wellman Inc. is a wholly-owned subsidiary of Brush Engineered Materials Inc. (NYSE:BW). Brush Engineered Materials Inc. headquartered in Cleveland, Ohio, is a manufacturer of engineered materials. The Company supplies worldwide markets with Beryllium Products, Alloy Products, Electronic Products, Precious Metal Products and Engineered Materials Systems.