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sp3 Diamond Technologies and Stellar Industries Launch Production Ready Diamond Heat Spreaders for Edge-Emitting Laser Diodes

Heat Spreader Segments feature Extremely Precise Edges and Compliant Metallization while Delivering High Thermal Management Benefits of Diamond

Santa Clara, Calif. — JANUARY 26, 2010—sp3 Diamond Technologies, Inc. (sp3), a leading supplier of diamond products, equipment and services, and Stellar Industries Corp. (Stellar), specializing in thermal management materials and metallization, today announced the availability of new, turnkey metalized diamond heat spreading segments that enable precise critical edges combined with reliable bonding for edge-emitting laser diodes. These new segments have thermal conductivities in excess of 1200 W/mK while delivering the reliability and manufacturability necessary to achieve widespread adoption of diamond heat spreaders in edge-emitting laser diodes. The metalized diamond segments have been shipped to a US-based laser diode manufacturer.

“Diamond is an ideal material to address the extreme thermal management requirements of edge-emitting laser diodes,” stated Dwain Aidala, president and COO of sp3 Diamond Technologies. “Historically, achieving a precise cut to allow for close mounting and finding appropriate metallization materials have been the limiting factors inhibiting broad adoption of diamond heat spreaders for laser diodes. Together with Stellar, we have overcome all of these obstacles and have brought to market a cost-effective solution that represents a significant advance in thermal management capabilities for these devices.”

The heat spreaders developed jointly by sp3 and Stellar deliver three critical advantages to laser diode manufacturers. First, sp3’s diamond snapstrate approach delivers a clean edge that enables optical alignment of the laser with no optical blockage. Second, patterned metallization is performed on a partially cut coupon to ensure top to bottom electrical isolation. Third, Stellar has developed a gold-tin solder process for the metallization step that successfully manages stress, is highly compliant with laser diode manufacturing procedures and allows the segments to maintain the best available thermal path.

“The potential benefits of diamond as a thermal management material are clear,” said Ron Visser, president of Stellar Industries. “Our background in matching metallization processes with thermal management materials enabled us to collaborate with sp3 to identify the ideal metallization to allow the mass commercialization of a diamond heat-spreading solution. Our

gold tin and thin film metal combination is an ideal solution for matching CTE's and bonding directly to diamond.”

The two companies worked together to develop this new, market-ready solution. To manufacture the segments, sp3 grows CVD diamond coupons, and then uses its in-house Bettonville 5XS IR Nd: YAG (TEM 00) laser to partially cut the coupon, prior to metallization. The laser technology is key to the new offering, because it is capable of near vertical (<1 degree) cuts, delivering the clean edge. The partially cut coupons are then metalized using Stellar's gold-tin material which offers a compliant solder approach that minimizes the coefficient of thermal expansion (CTE) stresses between the laser diode and the diamond. Metalizing the partially cut coupons ensures that the top and bottom of the segments are electrically isolated, and once it is complete, the segments are “snapped” out of the coupon, thereby maintaining the electrical isolation and producing the precision edge required by the diode's optical path.

sp3 Diamond Technologies, Inc.

sp3 Diamond Technologies provides diamond-based solutions for electronics thermal management and enhanced cutting surfaces to companies worldwide, across a broad spectrum of industries. By supplying wafer-scale diamond-on-substrate product and services utilizing nano- and micro-crystalline diamond morphology, sp3 is expanding the commercial reach of CVD diamond.

sp3 understands diamond and manufacturing equipment, as well as the cost, reliability and quality needs of its customers. In addition to running CVD diamond manufacturing fabs, sp3 is unique in offering hot filament CVD reactors so customers can manufacture their own CVD diamond in-house.

Founded in 1993 and headquartered in Santa Clara, California, USA, sp3 Diamond Technologies is a subsidiary of sp3 Inc., a privately-owned, full service provider of products and services relating to thin-film and thick-film diamond deposition and other polycrystalline diamond materials. sp3 Inc. and its operational units have deposited diamond on over one million cutting tools and completed more than 15,000 successful diamond deposition runs.

For more information visit <http://www.sp3diamondtech.com>.

Stellar Industries Corp.

Stellar Industries sells to the telecom, biomedical, and defense Industries for custom products and services. Stellar's products include custom lapped and polished electronic grade ceramics composed of alumina, beryllium oxide, aluminum nitride, or specialty ceramics. Stellar also supplies custom services for metallization on these ceramics using a variety of thick film, thin film, and refractory and direct bond copper metallization. Our ceramic substrates are used in a variety of electronic components including laser diode/photo detector sub mounts, high power microelectronic substrates, and microwave and RF thin film substrates. Stellar also specializes in vapor deposited thin films and gold/tin solders on thick film and thin film as well as on semiconductor wafers.

For more information visit <http://www.stellarind.com/>.