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Group4 Labs Introduces World's First Gallium Nitride-on-Diamond(R) Wafer

02.14.06, 8:21 AM ET

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MENLO PARK, Calif., Feb. 14 /PRNewswire/ -- Group4 Labs, LLC, an extreme materials developer and supplier, announces a revolutionary, gallium nitride (GaN)-on-diamond semiconductor wafer. The new Xero Wafer(TM) sits less than 0.5 nanometers away from a synthetic diamond substrate and features unprecedented high temperature resilience for high-power, high-frequency electronic, solid-state white lighting, military and photonics applications. Initially available in modestly priced 10mm x 10mm square pieces, the Xero Wafer is the first in the new product family to be offered commercially. This new industry class of wafer is ideal for use in the conventional epitaxial growth of GaN and its aluminum- and indium-based alloys.

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Group4 Labs' breakthrough technology enables the GaN layer to be atomically attached to a freestanding, proprietary polycrystalline chemical- vapor-deposited (CVD) diamond substrate (25-microns

thick). The GaN exposed is an atomically smooth surface finish that is epi-ready for further epitaxial deposition. The wafer is shipped freestanding or optionally on a disposable, silicon wafer mount to permit easy handling during wafer processing.

The GaN-on-Diamond wafer addresses the classic heat problem plaguing the high power and high-speed transistor industry: excessive heat build-up inside the chip's engine that ultimately leads to device failure. The new wafer offers a unique solution by extricating heat from the chip's core almost at the instant that it is generated. This is due to the sub-nanometer proximity of the chip's active region to diamond, a nearly perfect thermal conductor. CVD diamond's thermal conductivity is about 3X to 30X more than that of conventional semiconductors. A

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3X improvement in the thermal conductivity of a transistor array could boost the array's power-density by tenfold. Group4 Labs' scientists have for the first time, successfully attached a compound semiconductor such as GaN to the tough-to-handle diamond.

According to Group4 Labs' CEO, Felix Ejeckam, "This new type of semiconductor allows manufacturers of power amplifiers (for cellular base stations), microwave and millimeter-wave circuits, UV laser diodes and ultra- bright blue/green/white LEDs, to achieve power density and efficiency levels never before attained."

He continues, "It's an elegant solution for folks who want tremendous power and thermal performance at little or no additional cost, compared to currently available semiconductor solutions."

The new GaN-on-Diamond wafers are currently sold for \$450 per unit through the company's online store (<http://www.Group4Labs.com/Products>).

Group4 Labs, LLC (Menlo Park, CA) is an extreme materials company founded in April 2003. The privately held company develops and manufactures exotic semiconductor materials for a wide variety of applications in the advanced electronics and photonics industries. For more information, please visit <http://www.Group4Labs.com>.

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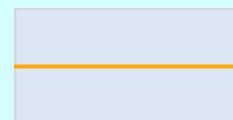
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