**Discovery of 2D structures with unique properties**

Researchers at Stony Brook University, N.Y., discovered the structure of 2D boron crystals, which is relevant to electronic applications and to understanding boron nanostructures. “Boron is in many ways an analog of carbon,” says Xiang-Feng Zhou. “Its nanostructures—nanoparticles, nanotubes, and two-dimensional structures—have attracted a lot of interest in the hopes of replicating, or even surpassing, the unique properties and diversity of carbon nanostructures. Our findings overturn the assumptions and predictions of numerous previous studies.” Flat monolayer structures of boron were found to be extremely unstable, and the actual structures have finite thickness. These findings will likely lead to a revision of structural models of boron nanoparticles and nanotubes. In particular, it is possible that hollow, fullerene-like structures will be unstable for boron. www.stonybrook.edu.

**Electrochemical nanoceramic production line debuts**

Cambridge Nanotherm, UK, installed the first of many fully automated lines to produce Nanotherm ceramic, which is grown on the surface of aluminum to create a dielectric layer directly on the surface of an aluminum substrate. The nanoceramic dielectric layer is reported to be two to three times more effective at heat dissipation than conventional MB PCB (metal back printed circuit board) dielectric materials. The first application of this technology is effective heat dissipation for LED lighting, which reduces operating temperatures by 20% to extend LED life or make it more energy efficient. www.camnano.com.

**Sea creatures inspire ceramic-based armor**

Researchers at Massachusetts Institute of Technology, Cambridge, analyzed the shells of a sea creature, mollusk Placuna placenta, to determine exactly why they are so resistant to penetration and damage—even though they are 99% calcite, a weak, brittle mineral. The shells’ unique properties emerge from a specialized nanostructure that allows optical clarity, as well as efficient energy dissipation and the ability to localize deformation. Engineered ceramic-based armor, while designed to resist penetration, often lacks the ability to withstand multiple blows, due to large-scale deformation and fracture that can compromise its structural integrity, says professor Christine Ortiz. The properties of this natural armor make it a promising template for the development of bio-inspired synthetic materials for both commercial and military applications—such as eye and face protection for soldiers, windows and windshields, and blast shields, Ortiz explains. For more information: Christine Ortiz, 617/452-3084, cortiz@mit.edu, www.dmse.mit.edu.

Transmission electron microscope image shows the region surrounding an indentation researchers made in a piece of shell from Placuna placenta. The image shows the localization of damage to the area immediately surrounding the stress. Courtesy of Ling Li/MIT.