Versatile ceramics offer new directions for emerging applications

April 1 2013, by Jan Gerston

(Phys.org) —Research into a versatile class of material, the MAX phases, with a large variety of potential high-temperature and low-friction applications by Dr. Miladin Radovic, his group, and collaborators was featured on in the April 2013 issue of the *American Ceramic Society Bulletin*.

The cover of this issue showed micrograph of MAX phases by materials science and engineering student Liangfa Hu. Radovic is an associate

professor in the Department of Mechanical Engineering, where he was named a Herbert H. Richardson Fellow, and is on the faculty of Materials Science and Engineering.

Carbides and nitrides with a layered structure, MAX phases and offer the ability to finely tune materials properties according to the article, "MAX Phases: Bridging the Gap Between Metals and Ceramics."

"MAX phases are elastically stiff, good thermal and electrical conductors, resistance to chemical attack, and have relatively low thermal expansion coefficients. Mechanically, they are relatively soft, and most are readily machinable," according to the article by Radovic and Drexel University's Michel W. Barsoum.

MAX phase materials can be fabricated as bulk materials, powders, porous foams, and thin films, and offer high temperature stability, thermal and shock resistance, crack-healing capabilities, damage tolerance, good machinability, and exceptional oxidation resistance, they lend themselves to high-temperature applications, such as heating elements, gas burner nozzles, and industrial die inserts, high-temperature foil bearings, glove and condom molds, and dry drilling of concrete.

Provided by Texas A&M University

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