

'BC5' material shows superhard, superconducting potential

June 22 2010

What could be better than diamond when it comes to a superhard material for electronics under extreme thermal and pressure conditions? Quite possibly BC5, a diamond-like material with an extremely high boron content that offers exceptional hardness and resistance to fracture, but unlike diamond, it is a superconductor rather than an insulator. A research team in China studying BC5 describes its potential in the *Journal of Applied Physics*.

"Our current study reveals a great possibility that BC5 may possess both superhard and superconducting properties that are beneficial to the creation of multifunctional devices under extreme conditions," says Professor Yanming Ma, who led the research team at Jilin University.

At the heart of their study is the proposal that the synthesized BC5 adopts the diamond-[100] structure with special symmetry. Explains Ma, the BC5 structure has atomic packing of the form ABCABC... along the [100] crystallographic direction of diamond. This makes the deep understanding of this superhard and superconducting species possible. Ma believes that the outstanding mechanical and [electrical properties](#) of BC5 can be adapted to design new superconducting nano-electromechanical systems and high-pressure devices.

Quan Li, the study's first author, expects their findings to stimulate further research into other B-C-N compounds with superhard and superconducting properties.

More information: The article, "Superhard and Superconducting Structures of BC5" by Quan Li et al will appear in the Journal of Applied Physics. See: jap.aip.org/

Provided by American Institute of Physics

Citation: 'BC5' material shows superhard, superconducting potential (2010, June 22) retrieved 21 March 2023 from

<https://phys.org/news/2010-06-bc5-material-superhard-superconducting-potential.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.