



## DOPED MAGNESIUM DIBORIDE

Novel and high performance superconducting material

### The Core Technology

The University of Wollongong's Institute for Superconducting and Electronic Materials (ISEM) is a world leader in developing novel high performance superconducting materials.

Superconducting materials are materials that have very low resistance to the flow of electricity below certain temperatures.

One breakthrough technology, developed by ISEM, involves the nano-scale addition (termed doping) of silicon carbide to a known superconducting material; magnesium diboride.

The technology has been verified by leading groups at the University of Cambridge, the National High Magnetic Field Laboratory at Florida, University of Geneva, Los Alamos National Laboratory, the National Institute of Materials Science in Japan, Tokyo University, Northwestern Institute of Nonferrous Metals in China, University of Wisconsin and Ohio State University, University of Geneva and the University of Karlsruhe.

### Advantages

The silicon carbide doped material has achieved a world record high critical current density and upper critical field in superconducting magnesium diboride wires. The in-field critical current density of the doped magnesium diboride wires increases by more than order of magnitude when compared to undoped wires.

The enhanced performance of the magnesium diboride will make it attractive over other superconducting materials already available on the market because of its improved performance, relative low cost and ease of production.

For example, use of the technology could make it possible for magnetic resonance imaging (MRI) to operate at higher temperatures and higher magnetic fields. This means that the next generation MRI machine will be much more powerful, smaller and the costs of MRI significantly reduced.

In addition, the high performance of the nano-doped material opens a technical window to a range of electric power applications previously believed to be only accessible to the copper oxide based high temperature superconducting materials.

### Market

According to Global Change Associated, the superconductor market in the USA alone will grow to nearly \$5 billion by 2010 and \$38 billion by 2020. The top level market segments are medical (e.g. magnet coils for MRI), energy, electronics, industrial and transportation (e.g. magnets used in fast trains and ships).

Reasons for anticipated growth in the energy sector would include: increased power demands; environmental demands to produce "cleaner" power technologies; and increased needs for improved power reliability and quality with societal trends to increased use of computerised and digitised (vs manual) systems.

### IP Position

UOW has filed complete patent specifications that have entered national phase in the USA, Europe and Japan.

### Commercialisation Strategy

UOW has already provided an exclusive licence in the USA to the Ohio-based company, Hyper Tech Research Inc. Non-exclusive licenses to use the technology are available for the jurisdictions of Europe and Japan.

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### MORE INFO:

To discuss your options, contact our Managers of Innovation and Commercialisation (MIC). Contact details are listed at: [www.uow.edu.au/research/mic/staff.html](http://www.uow.edu.au/research/mic/staff.html)