



The
University
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Faculty
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Engineering.

Sheffield Engineering Scholarships

PhD full-fees scholarship for China Scholarships Council scholars from Zhejiang University

Project: *Development of novel high permittivity materials with core-shell nanostructures for energy storage applications*

Electronic materials for energy storage applications are increasingly targeted at thin films and functionally graded structures. Properties are typically tuned by selective doping in which dopant concentration gradients extend from sample/grain surfaces to the grain interiors. We find that an alternative processing variable leading potentially to better optimisation of properties is possible in partially reoxidised materials that have gradients in oxygen content and therefore gradients in electrical properties. These ideas have been tested so far on BaTiO₃-based materials and illustrate both the significance of oxygen concentration gradients and potential application to a wide range of other electroceramic materials.

This project will focus on pure and doped SrTiO₃ which a) shows high permittivity quasi-ferroelectric phenomena at low temperatures b) under certain doping conditions is a low temperature superconductor, and c) for which preliminary experiments have shown that its oxygen content is variable depending on processing conditions.

Supervisors: Professor A R West (Engineering Materials) and Professor D C Sinclair (Engineering Materials)

Scholarship: Sheffield Engineering scholarships cover the full cost of PhD registration fees for 3 years

Eligibility: Sheffield Engineering scholarships are available to students who secure a CSC scholarship. Applicants must meet the University of Sheffield English Language requirements, full details of which are available at:

<http://www.shef.ac.uk/postgraduate/info/englang.html>

Applications: Please send a CV together with a brief covering letter to Dr Catherine Biggs, Faculty of Engineering Head of Research Studies at c.biggs@sheffield.ac.uk by **17th Feb 2010**. Include the title of the project in your covering letter and any English language test results.