THE UNIVERSITY OF MELBOURNE

Mechanical Engineering

SEMINAR SERIES 2008

Associate Professor Tim White

Head, Division of Materials Science
Nanyang Technological University
Singapore

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Theatre 2, Level 1
Alan Gilbert Building
161 Barry St, Carlton

Crystallochemical adaptations of technological apatites.

Hydroxyapatite is well known as the primary inorganic constituent of bone. Less well appreciated is the chemical diversity of the apatite family that can be exploited in environmental and energy technologies. Even in the case of biological apatite, questions remain concerning the manner of incorporation of carbonate and metals (Mg, Fe, Zn) in its crystal structure. This presentation will summarize:

1. A recently developed description of apatite as a microporous, zeolitic material allowing systematization of crystallochemical features, that can be adapted to verify the reliability of Rietveld refined structures;

2. The characteristics of waste form apatites and solid oxide fuel cell electrolyte apatites and a comprehensive taxonomy to formulate designer apatites; and

3. Some surprising nanometric features in natural and synthetic apatites.

Tim White received his PhD in Chemistry from the ANU. He has worked at universities and national laboratories in Australia, Europe and North America as well as Singapore. The primary area of his expertise is the crystal chemistry of oxides that is explored using X-ray, electron and neutron diffraction. He is currently Head of the Materials Science Division in the School of Materials Science and Engineering at Nanyang Technological University, and Director of the Facility for Analysis, Characterisation, Testing and Simulation (FACTS) which houses the largest concentration of electron microscopes and X-ray diffractometers in Singapore. Previously, he was Director of the Centre for Advanced Research of Ecomaterials (CARE) in Singapore and prior to moving to Singapore was Professor of Environmental Technology at The Ian Wark Research Institute that served the mining and minerals processing industry in Australia. He has been involved in the design of advanced materials for more than 25 years in the fields of environmental remediation, superconductivity, hydrogen storage, catalysis and ion exchange. These studies require the application of advanced characterization methods including atomic resolution microscopy, crystal structure refinement and determination, and surface analysis for the investigation of chemical states and molecular configurations. At NTU, he is concerned with developing new pedagogies for the teaching of materials characterization to enable fresh graduates to completely exploit state-of-the-art instrumentation. He is author or co-author of over 130 papers, 3 conference proceedings, and numerous confidential industry and government reports.

MORE INFORMATION

For more Mechanical Engineering seminar information contact:

Professor Ivan Marusic
Department of Mechanical Engineering
E: imarusic@unimelb.edu.au