

Nanostructures for Catalysis and Energy Production

Frontiers in Catalysis Science and Engineering
Materials Science
Chemical Imaging

Presented by...

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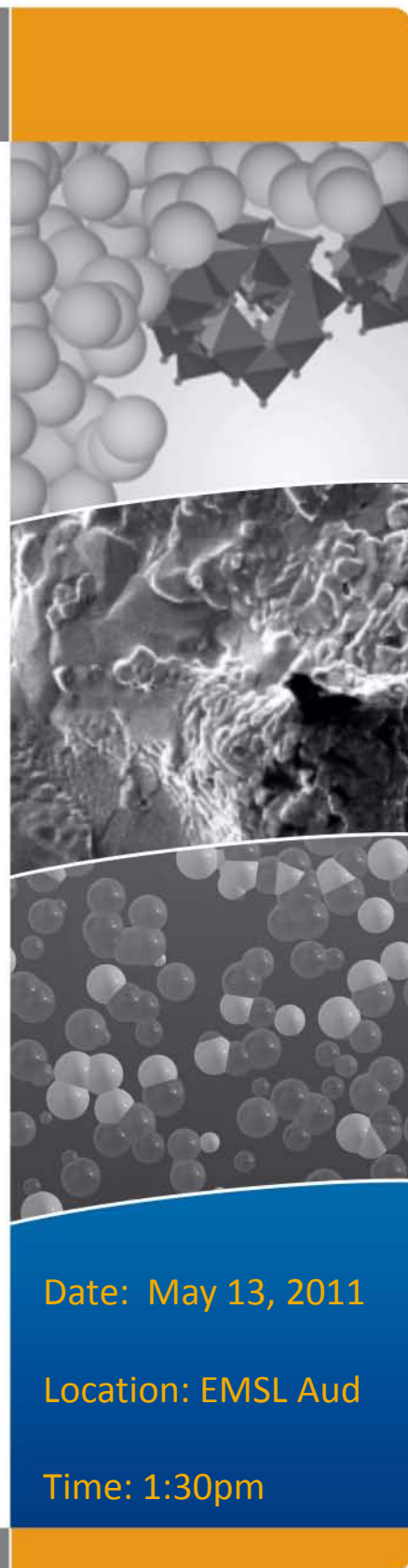
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Abstract

Energy is not only the driver for improving the quality of human life but also critical to our survival. To power the planet for a better future, it is imperative to develop new processes for effective use of energy and to develop sustainable and clean energy resources. Catalysis, the essential technology for accelerating desired chemical transformations, plays an important role to realizing environmentally friendly and economically feasible processes for producing energy carriers and for converting them into directly usable energy. Design and synthesis of controlled nanostructures can help us address some key issues encountered in understanding the fundamental processes and dynamics of catalyzed reactions. We have recently synthesized both nanostructured metal oxides and shape-controlled metal nanocrystals, and applied them to the systematic investigation of catalytic processes for steam reforming of alcohols and the oxidation of carbon monoxide on nanoscale facets. Aberration-corrected scanning transmission electron microscopy techniques have been used to elucidate the atomic structures of the active phases. The ability of sub-Ångström resolution imaging with *in situ* capabilities available in a modern aberration-corrected TEM/STEM provides us excellent opportunities to study the dynamic behavior of nanostructures and to understand their synthesis-structure-performance relationships. Recent progresses in synthesizing novel metal oxide nanostructures for energy harvest and storage will also be discussed.

More info?

See <http://www.umsl.edu/chemistry/faculty/liu.htm>



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