

T_CSUH Bi-Weekly Brown Bag Seminar

Texas Center for Superconductivity at the University of Houston

Dr. Peter Strasser

Department of Chemical and Biomolecular Engineering,
at the University of Houston



Nanostructured Pt alloy Core-Shell Fuel Cell Electrocatalysts - Synthesis, Structure, and Performance

Thursday, October 25, 2007

Room 102, University of Houston Science Center
12:00 noon – 1:00 p.m.

Abstract

The identification of more active, more cost-effective and more stable electrocatalysts for the oxygen reduction reaction (ORR) continues to be a scientific priority in low-temperature Fuel Cell catalysis research. Among all currently known electrocatalyst materials, Pt alloys have remained one of the most attractive catalyst concepts, in particular from a power density perspective.

We have recently discovered a new class of Pt core shell nanoparticle electrocatalysts which exhibit ORR activities exceeding those of conventional uniformly alloyed Pt-rich catalysts. We also have put forward a hypothesis for the enhancement mechanism which focused on lattice strain in the Pt rich Shell of the nanoparticles resulting from the electrochemical dealloying synthesis. Our experiments have been corroborated by DFT computational modeling.

We also report on recent strategies to experimentally realize the high electrocatalytic RDE activities of our new catalysts in realistic single PEM fuel cell devices.

Dr. Peter Strasser is Assistant Professor at the Department of Chemical Engineering at the University of Houston. His current work focuses on catalytic nanomaterials, electrochemical energy conversion, hydrogen and direct liquid fuel cells as well as bio electrochemistry. Research thrusts include the synthesis and the in-situ characterization of electrocatalytic reactivity as well as the size and composition dynamics of multi-metallic particle catalysts using synchrotron-based X-ray methods. Before joining the ChemE department, Dr. Strasser served as Senior Member of staff at Symyx Technologies, Inc, Santa Clara, in the Electronic Materials and Heterogeneous Catalysis Group. Symyx Technologies is the technology leader in the development and application of high throughput experimentation in Material Science. Prior to joining Symyx, he did his doctoral research work at the 'Fritz-Haber-Institute of the Max-Planck-Society', Berlin, Germany, under the direction of Professor Gerhard Ertl, and received his Ph.D. in Physical Chemistry and Electrochemistry in 1999. In the same year, he was awarded the 'Otto-Hahn Research Medal' for the 'most outstanding

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