

Invited Lecture

Ligand-Mediated Electrocatalytic Activity of Metal Nanoparticles in Oxygen Reduction

Speaker: Prof. Shaowei Chen

University of California, Santa Cruz

Date and Time: 14:30-16:00, Sep. 19, 2014

Venue: Room 308, IPE Mansion



Introduction

Shaowei Chen finished his undergraduate studies in China in 1991 with a BS degree in Chemistry from the University of Science and Technology of China, and then went to Cornell University receiving his MS and PhD degrees in 1993 and 1996 respectively. Following a postdoctoral appointment in the University of North Carolina at Chapel Hill, he started his independent career in Southern Illinois University in 1998. In summer 2004, he moved to the University of California at Santa Cruz, where he is currently a Professor of Chemistry. He is also a specially appointed professor in South China University of Technology.

One of Prof. Chen's research interests is in the areas of nanoparticle catalysts and fuel cell electrochemistry. His research group at UC, particularly focuses on preparing novel nanoparticle materials by exploiting the unique metal-ligand interactions and examining the electrocatalytic activities within the context of particle structures, arrangements, loading, as well as external fields. In this talk, a novel method was developed by which the ORR activity of Pt nanoparticles was deliberately manipulated by selective organic capping ligands. A series of Pt nanoparticles stabilized by *para*-substituted phenyl groups were synthesized. The experimental results demonstrated that the electron-withdrawing capability of the substituent moieties, as manifested by the Hammett substituent constant, plays a key role in controlling the ORR activity. These studies highlight that the electronic interactions between chemical ligands and platinum nanoparticles may serve as a powerful variable in the manipulation and optimization of the electrocatalytic activity for ORR.