NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

School of Materials Science and Engineering

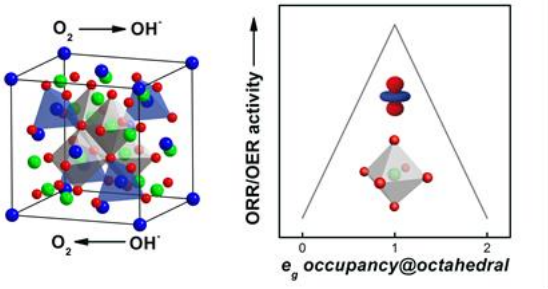
Seminar Topic:
Oxygen Electrocatalysis using Transition Metal Spinel Oxides

Associate Professor Xu Zhichuan, Jason

Abstract

Exploring efficient and low cost oxygen electrocatalysts for oxygen reduction reactions (ORR) and oxygen evolution reactions (OER) is critical for developing renewable energy technologies, such as fuel cells, metal-air batteries and water electrolyzers. This presentation will provide a systematic study on oxygen electrocatalysis (ORR and OER) using transition metal spinel oxides.

Starting with a model system of Mn-Co spinel, the presentation will correlate the oxygen catalytic activities of these oxides to their intrinsic chemical properties. The catalytic activity was measured by the rotating disk technique and the intrinsic chemical properties were probed by synchrotron X-ray absorption techniques. It was found that the molecular orbital theory is able to rationalize the findings. The effort was further extended from cubic Mn-Co spinels to tetragonal Mn-Co spinels and it was found that the molecular orbital theory is dominant in determining the catalytic activies. This mechanistic principle was further applied to explain the ORR/OER activities of other spinels containing other transition metals (Fe, Ni, Zn, Li, etc).



Biography

Dr Xu Zhichuan, Jason is an Associate Professor in the School of Materials Science and Engineering at Nanyang Technological University, Singapore. He received his Ph.D degree in Electroanalytical Chemistry in 2008 and B.S. degree in Chemistry in 2002 from Lanzhou University. His Ph.D training was received in Lanzhou University (2002 – 2004), Institute of Physics, CAS (2004 – 2005) and Brown University (2005 – 2007). Since 2007, he has worked in the State University of New York as a Research Associate. From 2009, he worked in the Massachusetts Institute of Technology as a postdoctoral researcher. Dr Xu is a member of the International Society of Electrochemistry (ISE) and The Electrochemistry Society (ECS), in addition to being a Fellow of the Royal Society of Chemistry (FRSC). He has served as a guest editor for the special issue of Electrochimica Acta, and also serves as an Associate Editor for Nano-Micro Letters, in addition to being the Vice President of the ECS Singapore Section.

Wednesday, 21 February 2018 ǁ Time: 2:00 pm – 3:00 pm
Venue: MSE Meeting Room (N4.1-01-28)
Hosted by: Professor Subodh Mhaisalkar

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