UW Chemical Engineering
Spring 2012 Seminar Series

Enabling Efficient Oxygen Electrocatalysis for Electrochemical Energy Storage

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Place: PAA A110

The development of clean and sustainable energy is one of the most important scientific challenges in the 21st century. A critical element for sustainable, renewable energy implementation is enabling efficient oxygen electrocatalysis for electrochemical energy conversion and storage reaction technologies. Oxygen electrocatalysis is central to the efficiencies of direct-solar and electrolytic water-splitting devices, fuel cells, and metal-air batteries. Probing a fundamental catalyst “design” principle” that links material structure and chemistry to the catalytic activity can guide the search for highly active catalyst that is cost effective and abundant in nature. While such an advance design concept exists for precious metal catalysts, little is known about the design principles for oxygen electrocatalysis on transition metal oxides. Recent advances in identifying the design principles and activity descriptors of transition metal oxides will be discussed. We show that these fundamental concepts can be used to tune transition metal oxide surfaces with enhanced catalytic activities.