Accelerating Catalyst Design for Sustainable Energy Future

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Abstract

Hydrogen as a clean and versatile energy carrier has the potential to decarbonize various sectors, including transportation, industry, and energy generation. It plays a crucial role in reducing greenhouse gas emissions and advancing the transition toward a more sustainable and environmentally friendly energy future. Electrocatalysis plays a central role in hydrogen energy technologies. Despite significant progress, many electrocatalytic systems, such as hydrogen fuel cells, continue to face challenges related to insufficient catalytic efficiency, poor stability, and the high cost of precious metal catalysts. Rapidly advancing beyond trial-and-error methods is imperative to address the imminent energy and climate crisis. This presentation will delve into the development of experimentally attainable descriptors capable of predicting the catalytic activity and stability of catalysts, which facilitates the accelerated discovery of more efficient catalysts. Furthermore, we will explore practical catalyst structure design, tailored to enhance both catalyst activity and stability in full-cell operation, thereby maintaining the overall performance of the device.

Short Biography:

Dr. Yu Huang is the Traugott and Dorothea Frederking Endowed Chair in Engineering and Professor of the Department of Materials Science and Engineering at University of California Los Angeles. She received her B.S. in Chemistry from University of Science and Technology of China (USTC), and her Ph.D in physical chemistry from Harvard University. She was a Lawrence Postdoctoral Fellow and held a joint postdoctoral position with Lawrence Livermore National Lab (LLNL) and Massachusetts Institute of Technology (MIT). Her research focuses on mechanistic understanding of nanoscale phenomena and on exploiting the unique properties of nanoscale materials for various applications.

Prof. Huang is Highly Cited Researcher, the elected Fellow of Materials Research Society (MRS), Fellow of Royal Society of Chemistry (RSC). Recognitions she received include the ENI Award in Energy Transition, International Society of Electrochemistry (ISE) Prize for Experimental Electrochemistry, the International Precious Metal Institute (IPMI) Carol Tyler Award, Kavli Fellow, Sloan Fellow, the Presidential Early Career Award in Science and Engineering (PECASE), the National Institute of Health (NIH) Director's New Innovator Award, the Defense Advanced Research Projects Agency (DARPA) Young Faculty Award, the World's Top 100 Young Innovators award, the International Union of Pure and Applied Chemistry (IUPAC) Young Chemist Award, and the Nano 50 Award etc.