Abstract

Solar and wind are becoming economical, aided by their rapidly declining cost and increasing efficiencies. As renewable energy gains momentum, the use of electricity to synthesize fuels and high-value chemicals represents a critical next step for energy and materials sustainability.

In this talk, I will outline the current approach for designing catalysts for these electrochemical conversion reactions. I will also discuss the limitation by presenting our test of the used assumptions by using high-fidelity well-defined-surface experiments. Our result supports a widely held view that an intermediate stabilization functions as a parameter for the catalyst design; however, this variable alone is unlikely sufficient to describe the activity of a highly active catalyst. I will discuss the implications of this finding, including new insights into the working of the electrochemical reactions. Examples of how we can explore new phases not accessible via thermochemical means as high-performance catalysts will be presented.

Biography

Dr Jin Suntivich is an Associate Professor in the Department of Materials Science and Engineering at Cornell University. Dr Jin received his doctorate in Materials Science and Engineering from Massachusetts Institute of Technology (MIT) in 2012, and bachelor’s degree in the same field from Northwestern University in 2006. Prior to joining Cornell University, he was a postdoctoral fellow at Harvard University, where he studied the connection between surface science, electrochemistry, and ultrafast spectroscopy in titanium oxides.

His research focuses on using a combination of materials science and spectroscopy to advance our understanding of electrochemical reactions. His laboratory works on using advanced deposition methods and self-assembly in connection with surface science and optical spectroscopy to study the structure-activity relations in electrocatalysis.