

Dr. Suljo Linic, University of Michigan

Catalytic Reactions Driven by Energetic Charge Carriers on Plasmonic Metal Nanoparticles: Known Knows and Known Unknowns about Hot Carrier Distribution

Abstract: It has been recognized for some time that strong interaction of electromagnetic fields with plasmonic nanomaterials offers opportunities in various technologies that take advantage of photo-physical processes amplified by this light-matter interaction. More recently, we demonstrated that in addition to photo-physical processes, optically excited plasmonic nanoparticles can also activate chemical transformations directly on their surfaces. We proposed that these transformations are driven by energetic charge carriers that are transferred from plasmonic nanoparticles to the reacting adsorbates.

Dr. Linic will discuss underlying mechanisms associated with these phenomena; including the mechanism of charge-carrier driven chemical transformations on metals as well as the mechanisms behind the plasmon-induced charge injection processes. He proposes that this new family of photo-catalysts could prove useful for in the field of selective chemical synthesis. I will show an example of such a process.

Bio: Prof. Linic obtained his PhD degree, specializing in surface and colloidal chemistry and heterogeneous catalysis, at the University of Delaware in 2003 under the supervision of Prof. Mark Barteau after receiving his BS degree in Physics with minors in Mathematics and Chemistry from West Chester University in West Chester (PA). He was a Max Planck postdoctoral fellow with Prof. Dr. Matthias Scheffler at the Fritz Haber Institute of Max Planck Society in Berlin (Germany), working on first principles studies of surface chemistry. He started his independent faculty career in 2004 at the Department of Chemical Engineering at the University of Michigan in Ann Arbor where he is currently the Class of 1983 Faculty Scholar Professor of Chemical Engineering.

Prof. Linic's research has been recognized through multiple awards including the 2014 ACS (American Chemical Society) Catalysis Lectureship for the Advancement of Catalytic Science, awarded annually by the ACS Catalysis journal and Catalysis Science and Technology Division of ACS, the 2011 Nanoscale Science and Engineering Forum Young Investigator Award, awarded by American Institute of Chemical Engineers, the 2009 ACS Unilever Award awarded by the Colloids and Surface Science Division of ACS, the 2009 Camille Dreyfus Teacher-Scholar Award awarded by the Dreyfus Foundation, the 2008 DuPont Young Professor Award, and a 2006 NSF Career Award. Prof. Linic serves as the associate editor of ACS catalysis journal.