Karthish Manthiram

Graduate Institution: University of California-Berkeley

Graduate Discipline: Chemical Engineering

Hometown: Austin, TX

Relevant SC Research: Basic Energy Sciences

Research Interest:

My research interests fall at the intersection of solid state physics and nanoscale materials. My graduate research has been focused on the identification of materials which can support tunable localized surface plasmon resonances (LSPRs). In particular, I have been examining transition metal oxides, as the unique character of their outer-d valence electrons should lead to interesting plasmonic effects. For instance, the metal-insulator transitions found in many transition metal oxides may lead to switchable LSPRs. We have recently demonstrated that nanoscale oxygen-deficient tungsten oxide supports a strong LSPR mode, based on theoretical models and experimental measurements.

About Me:

I graduated with a B.S. in Chemical Engineering from Stanford in 2010. During my first two years at Stanford, I worked with Professor Jim Swartz on the cell-free protein synthesis of luciferases with red-shifted luminescence. I then worked with Professor Yi Cui on the synthesis of nanoscale topological insulators.

I am currently a graduate student in Chemical Engineering in Professor Paul Alivisatos' group at UC Berkeley. We have published our recent work on tunable plasmons in tungsten oxide (K. Manthiram and A. P. Alivisatos, "Tunable Localized Surface Plasmon Resonances in Tungsten Oxide Nanocrystals," Journal of the American Chemical Society, 134, 2012). I presented this work at the American Chemical Society meeting in San Diego in March 2012 and at the NaNaX 5 conference in Spain in May 2012.

Given my enjoyable research and mentorship experiences, I want to become a professor so that I can continue to do cutting edge research on clean energy materials and teach future generations of engineers. In my free time, I enjoy running and woodworking.