

DS 44: Invited – Yarmoff

Time: Thursday 10:15–11:00

Location: GER 37

Invited Talk DS 44.1 Thu 10:15 GER 37
Electronic Properties of Metal Nanoclusters Measured by Low Energy Ion-Surface Charge Exchange — ●JORY YARMOFF
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Due to the quantum nature of their localized electronic states, small metal nanoclusters have great potential for use in diverse applications. We use low energy ion scattering (LEIS) to interrogate metal clusters by measuring the neutralization of backscattered alkali ions. Charge exchange during alkali ion scattering provides a unique probe of surface electronic properties and is acutely sensitive to the quantum states in nanomaterials. The sensitivity results from electrons that resonantly

tunnel between the projectile ionization level and overlapping states in the clusters.

Nanomaterials were produced by deposition of metals onto oxide substrates and by sputtering a thin metal film with noble gas ions. The shapes of the scattered energy spectra provide information on the atomic structure of the clusters, while the neutralization depends on electronic states that are a function of cluster size. The sputtering of a thin film is a novel means for nanomaterial fabrication, as the interplay between curvature dependent roughening and diffusion-induced smoothing can produce clusters with quantum confinement. Future efforts will include investigations of other supported nanocrystals, chemically synthesized nanoparticles, and nanomaterials in diverse media.