



Tuesday, February 21, 2017, 12:30 pm

Seaver Science Library, Room 150

SSC Auditorium next to the library

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Isolated Transition Metal Clusters and Complexes: Flying Surfaces

Abstract:

Clusters – in particular those of transition metals – may act like surfaces of limited size, this analogy being recognized long ago. By virtue of our tandem cryo ion trap instrument, we study the adsorption kinetics of clusters under single collision conditions, as well as the Infrared Multiple Photon Dissociation (IR-MPD) by application of optical parametric oscillator/amplifier (OPO/OPA) photon sources. Also, one and two color investigations of metal organic complexes by this technique have been published.

Our ongoing studies of N_2 and H_2 cryo adsorption on Fe, Co, and Ni clusters revealed discernible mono layer-like adsorbate shells. Beyond mere kinetics, we recorded IR-MPD spectra of dinitrogen stretching vibrations within such $[M_n(N_2)_m]^+$ cluster surface-adsorbate layer complexes by variation of their stoichiometry, n and of m alike, and in conjunction with electronic structure modelling (by DFT), and with synchrotron X-ray based studies of spin and orbital contributions to the total magnetic moments of the isolated clusters. Related studies of N_2 coordination to ligand stabilized complexes provide for certain surprises. This presentation shall elucidate the current state of cluster adsorbate studies under cryo conditions and in isolation. It aims to put into perspective the findings from adsorption kinetics, IR spectroscopy, DFT modelling and magnetic spectroscopy and concludes with an outlook onto the road ahead.

Hosted by Professor Anna Krylov

The scientific community is invited

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