

Anion Photodetachment Imaging: Probing Parent Orbitals and Electron -Molecule Interactions

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Atomic halide based clusters afford interesting opportunities to investigate interactions of free electrons with neutral molecules. Such clusters typically comprise a localized anionic moiety (the halide ion) and one or more relatively unperturbed neutral molecules. Using a photodetachment approach the anionic moiety can be employed as an in situ electron source, conceptually firing the electron at the neutral target molecule(s). In a manner of speaking, the cluster anion can function as a molecular scale electron beam instrument. Comparison of velocity mapped imaging (VELMI) results for detachment from free and clustered atomic anions clearly reveals the role of the neutral residue (either target molecule or cluster framework) as the excess electron departs. VELMI allows simultaneous measurement of the photoelectron spectrum (PES) and photoelectron angular distribution (PAD). The photoelectron spectrum reveals inelastic events such as vibrational excitation and dissociative electron attachment through the appearance of new features in the spectrum. The PAD gives a strikingly sensitive probe of processes which lead to the same (energetically indistinguishable) outcome such as elastic scattering and autodetachment pathways.

Colloquium

February 21, 2013

4:00 PM

JH 136

Refreshments in the JH

1st Floor Vending Area

at 3:30