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Velocity Map Imaging of Semiconductor-Metal Cluster Systems
S.J. PEPPERNICK, K.D.D. GUNARATNE, A.W. CASTLEMAN, The Pennsylvania State University — Recently, a Velocity map imaging (VMI) device has been constructed to investigate the electronic nature of atoms and clusters. The VMI technique takes digitized pictures of expanding electrons from a photodetachment event. These electron snapshots can then be converted to spectra from which EAs, energy gaps, and vibrational separations can be measured. Also, VMI can capture the angular distribution of the detached electrons, whereby a quantity called the anisotropy parameter can be calculated. This parameter is useful for inferring the nature of the atomic or molecular orbital the ejected electron came from. Silicon clusters can form fullerene like cages with the addition of a single or multiple endohedral metals. Elucidating both the electronic and magnetic properties of these silicon metal clusters via the VMI technique is paramount in understanding these clusters for their potential technological applications as building blocks in cluster assembled solids. The latest experimental findings will be presented. We acknowledge funding from the Department of Energy, Building Blocks: DE-FG02-02ER46009.

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