MASS-ANALYZED THRESHOLD IONIZATION SPECTROSCOPY OF METAL CLUSTERS.

SERGIY KRASNOKUTSKI, CHANGHUA ZHANG, and DONG-SHENG YANG, *Department of Chemistry, University of Kentucky, Lexington, KY 40506-0055*.

Recently, we developed an experimental setup for mass analyzed threshold ionization (MATI) spectroscopy of metal clusters. In this talk, we will first discuss the effects of scrambling and spoil fields on the lifetime of Rydberg states and on the ionization energy of molecules. We have found that a strong ac scrambling field produced by a high voltage switch removes the highest Rydberg states, but stabilizes those in lower energies. This effect allows the application of a larger spoil field for separating of prompt ions produced by direct photoionization from those produced by delayed field ionization. We will evaluate the field effect by comparing the MATI and zero electron kinetic energy (ZEKE) spectra of Sc-toluene. Moreover, we will discuss the growth processes and structures of scandium oxide clusters.