IONIZATION THRESHOLDS OF SMALL CARBON CLUSTERS: TUNABLE VUV EXPERIMENTS AND THEORY

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New, higher resolution photoionization thresholds for neutral carbon clusters have been measured using tunable vacuum ultraviolet light at the Advanced Light Source (ALS). A laser ablation cluster source with a high repetition rate vaporization laser is coupled to the quasi-continuous light from the ALS. Ionized clusters are detected as a function of photon wavelength to determine the onset of ionization. Ionization thresholds for carbon clusters up to C_{15} have been determined. Small changes in the cluster source have allowed for higher resolution measurements (0.05 eV step size) than previously reported for the smaller cluster sizes. These thresholds are compared to ionization potentials calculated from *ab initio* methods (extrapolated CCSD(T) energies computed at cc-pVTZ ROCCSD(T) optimized geometries), which allows the investigation of isomeric structures in the molecular beam for some cluster sizes. Experiments are also ongoing at the University of Georgia to measure infrared spectroscopy of small carbon cation clusters in the gas phase, and any preliminary results will be presented.