PHOTOFRAGMENTATION SPECTROSCOPY OF CARBON AND NIOBIUM CLUSTERS IN A REFLECTRON TIME-OF-FLIGHT MASS SPECTROMETER

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Clusters are aggregates of atoms ranging in size between a few and several thousand atoms. As such, they constitute the transition between individual atoms and molecules; bulk solids and liquids. The reflectron time-of-flight (TOF) mass spectrometer provides a means of investigating the size dependence of the optical properties of these species. Cluster cations of metals and carbon are produced in a laser vaporization source, and separated according to their mass in a initial linear time-of-flight stage. The cluster of interest is then fragmented with a YAG pumped dye laser, after wha reflectron TOF stagemeasures the mass and intensity othe resulting specie(s). Photofragment distributions, and power studies of carbon and niobium clusters, and the multiphoton dissociation spectrum of cooled niobium dimer cations are presented.