PROBING SEMIMETAL ATOM CHEMISTRY IN HELIUM NANODROPLETS WITH IR SPECTROSCOPY

C. MICHAEL LINDSAY and ROGER E. MILLER, *Department of Chemistry, The University of North Carolina at Chapel Hill, Chapel Hill, NC, 27599*.

A high-temperature oven has been developed to thermally evaporate germanium and silicon atoms and to dope them into helium droplets. After the subsequent pick-up of a molecule such as HCN, HCCCN, or $H_2O$, a barrierless association reaction occurs, usually resulting in the insertion of the semimetal atom into one of the bonds of the reactant molecule. After reaction, the products are characterized by high-resolution infrared beam depletion spectroscopy which can be used in conjunction with *ab initio* calculations to determine the structure of the products.