IR SPECTRA OF LARGE TAILOR-MADE Ag-MOLECULE (METHANE, ETHANE, ETHYLENE, ACETYLENE) CLUSTERS PRODUCED IN HELIUM NANODROPLETS

EVGENY LOGINOV, LUIS GOMEZ and ANDREY VILESOV, *Department of Chemistry, University of Southern California, Los Angeles, CA 90089-0482.*

Clusters of silver having up to about 10^4 atoms and molecules such as methane, ethane, ethylene and acetylene with up to 10^4 were obtained via sequential pickup of molecules by He droplets with average sizes in the range of 10^5 to 10^7 atoms. The formed clusters have been studied via infrared spectra in the C-H stretching range of the molecules. The spectra show two distinct features due to molecules on the boundary with silver atoms and those in the volume of the neat molecular part of the clusters. The relative intensities of the peaks allow obtaining of the cluster size, in good agreement with the estimates based on the known binding energies of the clusters. Experiments also suggest that selection rules for infrared transitions for molecules adsorbed on metal surfaces are also valid for silver clusters as small as 100 atoms.