HIGH RESOLUTION PHOTOELECTRON SPECTROSCOPY OF Au_2^- and Au_4^- BY PHOTOELECTRON IMAGING

IKER LEON, ZHENG YANG, and LAI-SHENG WANG, *DEPARTMENT OF CHEMISTRY, BROWN UNIVERSITY, PROVIDENCE, RI 02912, USA*.

We report high resolution photoelectron spectra of Au_2^- and Au_4^- obtained with a newly-built photoelectron imaging apparatus. Gold anions are produced by laser vaporization and the desired specie is mass selected and focused into the collinear velocity-map imaging (VMI) lens assembly. The design of the imaging lens has allowed us to obtain less than 0.9% energy resolution for high kinetic energy electrons ($>$ 1eV) while maintaining wavenumber resolution for low kinetic energy electrons. Although gold dimer and tetramer have been studied in the past, we present spectroscopic results under high resolution. For Au_2^-, we report high resolution spectra with an accurate determination of the electron affinity together with a complete vibrational assignment, for both the anion and neutral ground states, while for Au_4^-, we are able to resolve a low frequency mode and obtain accurately the adiabatic detachment energy.