PHOTOELECTRON SPECTROSCOPY AND DYNAMICS OF ICN^-

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We report the photoelectron spectrum of ICN^- and preliminary UV photodissociation studies of ICN^-. Because CN behaves like a pseudo-halogen, we compare our results to previous spectroscopic and dynamical work on dihalides, such as I_2^-, IBr^-, and ICl^-. The photoelectron spectrum of ICN^- resembles that of IBr^- with transitions to the ground electronic state and two $^3\Pi$ excited states. The transition to the ground electronic state of ICN is broad (FWHM $\approx$ 0.75 eV) and structureless which corresponds to accessing high lying vibrational states. Transitions to the excited states are narrow and spaced by 0.13 eV. A complete analysis of the photoelectron spectrum is underway to determine the structure and energetics of ICN^- and neutral ICN. In addition, preliminary nanosecond studies of ICN^- UV photodissociation are reported. In these two-photon experiments, one photon dissociates ICN^- and the second photon detects anionic products via photoelectron spectroscopy. Following excitation (λ = 260 nm) to a dissociative electronic state of ICN^-, we observe two anionic photoproducts: I^- and CN^-. The presence of both photoproducts could be a result of a non-adiabatic transition midway through photodissociation or excitation to two different anionic states which asymptotically correlate to distinct products. Currently, time-resolved photoelectron studies are underway to determine the actual dissociation pathway. This research is being funded by NSF and AFOSR.