# PHOTODISSOCIATION DYNAMICS OF A TRIATOMIC PSEUDO-DIHALIDE: ABSORPTION CROSS SECTION AND DYNAMICS OF SOLVATED $ICN^-$

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We report the photoabsorption cross section and photoproduct branching ratios of mass-selected bare $ICN^-$ and $ICN^-(CO_2)$ following excitation to the $A'\,^2\Pi_{1/2}$ electronic excited state. Previous studies of $CO_2$ solvated-heteronuclear dihalides, $IX^-(CO_2)_n$ (X=Cl, Br), reported three excited state selective classes of photoproducts: $I^-$, $X^-$, and $IX^-$ based clusters. Photoabsorption of bare $ICl^-$ and $IBr^-$ that leads to population in the $A'\,^2\Pi_{1/2}$ state have maxima near 680 nm and 740 nm, respectively, and result in $I^-$ photoproducts exclusively over the entire band corresponding to $A'\,^2\Pi_{1/2} \leftarrow X^2\Sigma_{1/2}$ excitation. Interestingly, following excitation of bare $ICN^-$ to the comparable state (430-650 nm, maximum at 490 nm), $I^-$ is the dominant ionic photoproduct, but $CN^-$ photoproducts are observed as well. When a single $CO_2$ solvent molecule is added to $ICN^-$, the same $A'\,^2\Pi_{1/2} \leftarrow X^2\Sigma_{1/2}$ excitation results in apparent charge transfer within the complex. Therefore, the observed ionic photoproducts are not just the expected $I^-$ and $I^-(CO_2)$, but $CN^-$ and solvated $CN^-(CO_2)$ photoproducts are also significant products. Analysis of the experimental results using calculated potential energy curves of $ICN^-$ reveals intriguing dynamics of the photoexcited triatomic pseudo-dihalide. Supported by NSF and AFOSR.

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