ION IMAGING STUDIES OF CH$_2$I$_2$ PHOTODISSOCIATION AT 248 NM

JULIA H. LEHMAN, HONGWEI LI and MARSHA I. LESTER, Department of Chemistry, University of Pennsylvania, Philadelphia, PA 19104-6323.

CH$_2$I$_2$ plays an important role in atmospheric chemistry as a significant natural source of organohalide compounds. The photodissociation dynamics of CH$_2$I$_2$ in the ultraviolet range of 277-305 nm via the two lowest B$_1$ excited states has been well studied using one-color velocity map ion imaging (VMI) and photofragment translational spectroscopy. In this two-color experimental study, CH$_2$I$_2$ is photodissociated by 248 nm via the B$_2$ or A$_1$ excited states to give rise to CH$_2$I and I ($^2P_3/2$) or I$^*$ ($^2P_1/2$). The iodine atoms are then state selectively ionized using a (2+1) resonance-enhanced multiphoton ionization process near 310 nm and detected by VMI. Preliminary results show about 85% of the available energy is being funneled into the internal energy of the CH$_2$I fragment, consistent with prior infrared emission results of Baughcum and Leone.\textsuperscript{a} The anisotropy parameter derived from the image indicates this is a fast dissociation process and reflects the character of the electronic transition. The internal energy distribution of the CH$_2$I fragment is of particular interest because of its subsequent reaction with O$_2$ in a near thermo-neutral reaction to produce the smallest Criegee intermediate, CH$_2$OO. We anticipate that the internal energy contained in CH$_2$I will likely be carried into CH$_2$OO.