FLUORESCENCE EMISSION AND EXCITATION SPECTRA OF PHOTO-FRAGMENTED NITROBENZENE.

CHRISTOPHER J. LUE, CHAKREE TANJAROON, J. BRUCE JOHNSON, SUSAN D. ALLEN, SCOTT W. REEVE, *Arkansas Center for Laser Applications and Science and Department of Chemistry and Physics, P.O. Box 419 State University, AR 72467*.

Upon absorption of a UV photon, nitrobenzene readily dissociates into C_6H_5, NO_2, C_6H_5NO, O, C_6H_5O, and NO through three different channels.[a] We have recorded high resolution emission and excitation spectra of the NO resulting from photo-fragmented nitrobenzene using a pulsed picosecond tunable laser and a nanosecond dye laser. Specifically, the lasers probed the $A^2\Sigma^+ \rightarrow X^2\Pi_{(1/2,3/2)}$ NO band system between 225-260 nm using an one or two color process. In a one color process, the same energy (wavelength) photon is used to dissociate nitrobenzene and excite NO. In a two color process, photons of a particular energy are used to dissociate the nitrobenzene while photons of a different energy are used to probe the resultant NO. We have determined the rotational and vibrational temperatures of the nascent NO. And, we have examined the effect of the relative timing of the two photons on the fluorescence spectra to extract information about the photodissociation dynamics.

[a] Lin, M.-F.; Lee, Y. T.; Ni, C.-K.; Xu, S. and Lin, M. C. J. Chem. Phys., AIP, 2007, 126.