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UV Single Photon Dissociation of Furazan Based Energetic Materials: DAAF ATANU BHATTACHARYA, YUANQING GUO, MARGO GREENFIELD, ELLIOT BERNSTEIN, Colorado State University — The new series of furazan-based energetic materials is characterized by low sensitivity to impact and friction. They have broad application as fuels and propellants; however, extra nitro functional groups attached to the furazan ring (e.g. 4,4′-dinitro-3,3′-azoxyfurazan) adversely impact the thermal stability of these energetic materials. In order to evaluate the effect of nitro functional groups on furazan-based energetic materials the decomposition of 4,4′-diamino-3,3′-azoxyfurazan (DAAF), from excited electronic states, has been investigated by UV excitation (8 ns duration) and time of flight mass spectroscopy. The NO molecule is observed as an initial product. Three vibronic transitions of NO are characterized. Simulation of the NO [A $^2\Sigma$ (v′=0)←X $^2\Pi$ (v′=1)] transition and fitting to the intensity ratios among NO vibronic transition yields rotational and vibrational temperatures of 30 K and 1265 K, respectively. Compared with NO gas spectra, under comparable condition, the NO from decomposition of DAAF is vibrationally hot and rotationally cold.

Atanu Bhattacharya
Colorado State University

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