

Abstract Submitted
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Observation of N_4^+ recombination at near atmospheric pressure¹

S.F. ADAMS, C.A. DEJOSEPH, JR., Air Force Research Laboratory, Wright-Patterson AFB, OH 45433, J.M. WILLIAMSON, Innovative Scientific Solutions, Inc., Dayton, OH — We previously reported our initial modeling results of the $N_4^+ + e^-$ recombination observed by monitoring the time-resolved N_2 emission (GEC03, paper SRP 24). The N_2 2nd positive ($C^3\Pi_u - B^3\Pi_g$) and $N_2^+ 1^{st}$ negative ($B^2\Sigma_u^+ - X^2\Sigma_g$) emission was measured following laser resonance-enhanced multi-photon ionization (REMPI) of N_2 at near-atmospheric pressure. N_4^+ is produced by the three-body association reaction of $N_2^+ + N_2$ which occurs rapidly at these pressures. Two types of fluorescence are observed following irradiation of N_2 by the laser pulse. A “prompt” fluorescence composed primarily of emission from the $N_2^+ 1^{st}$ negative system ($B^2\Sigma_u^+ - X^2\Sigma_g$) followed by a “delayed” fluorescence from the aforementioned N_2 (C-B). The preliminary modeling presented previously has been extended to include other key N_2 neutral and ionic species as well as the important loss channel of N_4^+ by laser photodissociation which had been neglected. The improved model along with additional N_2^+ LIF and N_4^+ UV photolysis results will be presented.

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Charles DeJoseph
U. S. Air Force

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