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Branching fraction for radiating products of the dissociative recombination of N_2H^+, HCO^+, HOC^+, and HNC^+.. R. JOHNSEN, M.F. GOLDE, University of Pittsburgh, R. ROSATI, Smithsonian Astrophysical Observatory, D. PAPPAS, Army Research Laboratory, M. SKRZYPKOWSKI, Prometheus Energy Company — We present the results of a series of flowing-afterglow studies of the emission spectra produced by dissociative electron-ion recombination (DR) of the ions N_2H^+, HCO^+, HOC^+, and HNC^+. Yields of product states were determined by comparing emission band intensities to model calculations of the afterglow. We find that DR of N_2H^+ results in emission of the N_2(B-A) 1st positive system (yield of (19±8)%), but the vibrational distribution indicates that the B-state, in part, is populated by collisional and radiative coupling from other triplet states. DR of HCO^+ forms the long-lived CO($a^3\Pi$) state with a yield of (23 ± 12)% while DR of HOC^+ populates the triplet states CO($a' \quad {}^3\Sigma^+$) and CO($d \quad {}^3\Delta$) with a combined yield of > 40%. Observations of the red and violet CN bands show that DR of HNC^+ results in CN(B) and CN(A) with yields of (22±8)% and (14±5)%, respectively. The vibrational distributions of the product electronic states do not seem to follow a simple pattern: In some cases, a monotonic decline with increasing v' is observed that can be understood on the basis of Bates" impulse model, but other distributions are partially inverted and extend to very high vibrational quantum numbers.

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