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The C(^{3}P) + NH_3 reaction in interstellar chemistry. FABIEN GOULAY, Department of Chemistry, West Virginia University, JEREMY BOURGALAIS, MICHAEL CAPRON, University of Rennes, UMR CNRS 6251, Rennes, France, RANJITH KAILASANATHAN, Department of Chemistry, West Virginia University, Morgantwon, WV, DAVID OSBORN, Sandia National laboratories, Livermore, CA, KEVIN HICKSON, JEAN-CHRISTOPHE LOISON, University of Bordeaux, UMR 5255, Talence, France, VALENTINE WAKELAM, University of Bordeaux, UMR 5804, Floirac, France, SEBASTIEN LE PICARD, University of Rennes, UMR CNRS 6251, Rennes, France — The kinetics and product formation channels of ground state carbon atoms, C(^{3}P), reacting with ammonia, NH_3, have been investigated using two complementary experiments and electronic structure calculations. Reaction products are detected in a gas flow tube experiment (330 K, 4 Torr) using tunable vacuum-ultraviolet photoionization coupled with time of flight mass spectrometry. Temporal profiles of the species formed and photoionization spectra are used to identify primary products of the C + NH_3 reaction. In addition, C(^{3}P) decay and H-atom formation are monitored by laser induced fluorescence from room temperature to 50 K in a supersonic gas flow. The combination of experiments supported by theoretical calculations indicates that in the temperature and pressure range investigated, the H + H_2CN production channel represents 100% of the product yield for this reaction. The effects of the new rate constants on interstellar nitrogen hydride abundances using a model of dense interstellar clouds are discussed.

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