DESTRUCITON OF PYRIDINE BY PROTON IRRADIATION IN LOW-TEMPERATURE H_2O AND CO_2 ICES.
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Prebiotic molecules, including nitrogen heterocycles, are thought to be processed in both interstellar and planetary ices by galactic cosmic ays and Solar energetic particles. Of particular significance to astrobiology are the nitrogen heterocycles, of which pyridine is the simplest. In recent work, we have studied the synthesis of complex organic compounds derived from pyridine under low-temperature radiation environments relevant to interstellar ices and comets [1, 2].

We have also examined the kinetics of the radiolytic destruction of glycine diluted in H_2O ice and in frozen carbon dioxide [3-5]. In that work, significant differences in the destruction rate constants were found for variations in both overall ice composition and irradiation temperature.

Here, we present a kinetic study for pyridine following our laboratory methods developed previously for glycine. Rate constants for pyridine destruction were measured *in situ* with infrared spectroscopy, without additional sample manipulation. Irradiations temperatures ranged from 20 to 100 K, and all ices were irradiated with 0.8-MeV protons. Ices were prepared with pyridine diluted in either H_2O or CO_2. Differences in measured rate constants will be discussed, along with implications for the lifetimes of pyridine in various icy environments relevant to both the interstellar medium and to the outer Solar System.

References: [1] Smith K. E. et al. (2014) *Geochim. Cosmochim. Acta*, 136, 1-12. [2] Smith K. E., Gerakines P. A. and Callahan M. P. (2015) *Chem. Comm.*, 51, 11787-11790. [3] Gerakines P. A., et al. (2012) *Icarus*, 220, 647-659. [4] Gerakines P. A., and Hudson R. L. (2013) *Astrobiology*, 13: 647-655, [5] Gerakines, P. A. and Hudson R. L. (2015) *Icarus*, 252: 466-472.