UV Irradiation of Aromatic Nitrogen Heterocycles in Interstellar Ice Analogs

Jamie Elsila
NASA Astrobiology Institute/National Research Council Research Associate
NASA AMES Research Center
MS 245-6, Moffett Field, CA 94035-1000
USA
jelsila@mail.arc.nasa.gov

Max Bernstein
Astrophysics Branch
NASA AMES Research Center
USA

Aromatic molecules are thought to be ubiquitous in the interstellar medium and among the most common organic compounds in the universe.[1] The infrared spectra and possible interstellar ice chemistry of polycyclic aromatic hydrocarbons (PAHs) have been investigated, and it has been shown that a variety of side groups can be added to PAHs under simulated interstellar conditions.[2,3] However, there is little information on the corresponding properties of aromatic nitrogen heterocycles (ANHs). ANHs are of astrobiological interest both because of the central role that they play in biochemistry on Earth (e.g., nucleobases, flavins) and because several ANHs have been identified in the Murchison meteorite.[4]

Here, we present information on the properties of the ANH quinoline frozen in interstellar water-ice analogs. Quinoline is a two-ring compound structurally analogous to the PAH naphthalene. In this work, binary mixtures of water and quinoline were frozen to create interstellar ice analogs, which were then subjected to ultraviolet photolysis. We will present the infrared spectra of the resulting ices at various temperatures, as well as chromatographic analysis of the residues remaining upon warm-up of these ices to room temperature.

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[3] M.P. Bernstein *et al*. *Astrophys. J*. **576**, 1115-1120 (2002).

[4] M.A. Sephton, *Nat. Prod. Rep.* **19**, 292-311 (2002).