

Cyanamide (NH_2CN) and interstellar ices : Thermal and Photochemical study

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Cyanamide, an interstellar molecule, is a relevant molecule in prebiotic chemistry. Carbodiimide is well-known as an aminoacid condensing agent. It can be converted into urea in liquid water. From FTIR monitored experiments, we show that cyanamide is photochemically converted into carbodiimide (HNCNH), at low temperature (10 K), in argon matrix, in water matrix, or in solid film. We observe cyanamide isomerization into carbodiimide when it is condensed at low temperature (40-140 K) on an amorphous water ice surface, or when it is trapped in the water ice. The water ice acts as a catalyst. This isomerization reaction occurs at low temperature ($T < 100$ K), which agrees with those expected in the interstellar clouds or comets in which water is a most predominant compound. Finally, the hydrolysis reaction of cyanamide or carbodiimide leading to urea (NH_2CONH_2) or isourea ($\text{NH}_2\text{C}(\text{OH})=\text{NH}$) formation is not observed under our experimental conditions.

Keywords. ISM: molecules, molecular processes

References

- Duvernay F., Chiavassa T., Borget F., Aycard J.P. 2005, *J. Phys. Chem. A* 109, 603
Duvernay F., Chiavassa T., Borget F., Aycard J.P. 2004, *J. Am. Chem. Soc.* 126, 7772