

# Laboratory investigation of formation and isomerization processes of HNCO in interstellar ice analogues

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The detection of isocyanic acid (HNCO) and its isomers in different astrophysical environments is difficult to explain with current gas phase models. New models suggest that these species could be formed in ice mantles and desorb. In ice processing experiments the formation of HNCO-isomers by thermal processing was reported recently by Theule et al. [1] The formation of HNCO has been observed in UV-irradiation experiments of a H<sub>2</sub>O:NH<sub>3</sub>:CO ice mixture by van Broekhuizen et al. [2]

We attempted to study the formation of HNCO and its isomerization by vacuum-UV photoprocessing of interstellar ice analogues containing different mixture of H<sub>2</sub>O; CO; CH<sub>3</sub>OH; NH<sub>3</sub>; and HCN followed by warm-up, under astrophysically relevant conditions. The ice photo- and thermal chemistry has been monitored by Fourier transform infrared using the ISAC set-up at CAB. HNCO is the most stable form of four possible isomers, being the more energetic species cyanic acid (HOCN), fulminic acid (HCNO) and isofulminic acid (HONC). The possible isomerization of HNCO to its tautomers due to ice warm-up has been scrutinized. The molecular products arising from the thermal desorption have been monitored by quadrupole mass spectrometry.

## References

- [1] P. Theule, F. Duvernay, A. Ilmane, T. Hasegawa, O. Morata, S. Coussan, G. Danger, T. Chiavassa, *A&A* **530**, A96 (2011)
- [2] F. A. van Broekhuizen, J. V. Keane, W. A. Schutte, *A&A* **415**, 425 (2004)