

P125c **Formamide (NH₂CHO) in star-forming regions: A crucial precursor of pre-biotic material**

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One of the major questions regarding the origin of life on Earth is whether the original chemical mechanism that led from simple molecules to life was connected to metabolism or to genetics, both intimately linked in living beings. Formamide (NH₂CHO) has recently been proposed as a pre-biotic precursor of both metabolic and genetic material, suggesting a common chemical origin for the two mechanisms. The present work sheds light on the formation of this key molecule in interstellar conditions.

While formamide has been observed in space, most of its detections correspond to high-mass star-forming regions. Motivated by this lack of investigation in the low-mass regime, we have searched for formamide in 10 solar-type star-forming regions. The present work is part of the IRAM Large Programme ASAI (Astrochemical Surveys At IRAM), which makes use of unbiased molecular spectral surveys at 1, 2, and 3 mm with the IRAM 30-m telescope (Spain). We detect multiple spectral lines of formamide in half of our targets. We analyse their abundances and, through comparison with those of isocyanic acid (HNCO), we conclude that these two molecules are chemically related. Our results suggest that NH₂CHO forms most efficiently on the mantles of dust grains at cold temperatures, where it remains frozen until the temperature rises enough to sublimate the icy grain mantles. We propose hydrogenation of HNCO as a likely formation route leading to NH₂CHO.