

TOWARDS UNRAVELLING THE FORMATION OF ICE GRAINS: THE PHENANTHRENE-WATER COMPLEX

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Polycyclic aromatic hydrocarbons (PAHs) are believed to act as catalysts in ice grains formation. The formation of interstellar ice can thus be described as an aggregation process of gaseous water starting on PAH surfaces.

The structural investigation of PAH-H₂O clusters, therefore, represents a first and important step to undertake in order to shed light on potential ice grains formation pathways. Previous studies have focused on mimicking the initial stage of this aggregation process in laboratories by forming complexes between PAH and water molecules in the gas phase and investigating them by microwave spectroscopy. As the outcome of these studies, precise information on the structure and intermolecular interactions were obtained [1,2].

Herein we take this approach further and present preliminary data on the structural investigation of the complex of phenanthrene, a PAH molecule featuring three fused benzene rings, and water. Its pure rotational spectrum was recorded using a chirped pulse Fourier transform microwave spectrometer (CP-FTMW) operating in the region 2-8 GHz, and structural information on the respective water clusters can be obtained.

[1] Pérez, C.; Steber, A. L.; Rijs, A. M.; Temelso, B.; Shields, G. C.; Lopez, J. C.; Kisiel, Z.; Schnell, M., *Phys. Chem. Chem. Phys.* 2017, 19, 14214-14223. [2] Steber, A. L.; Pérez, C.; Temelso, B.; Shields, G. C.; Rijs, A. M.; Pate, B. H.; Kisiel, Z.; Schnell, J. *Phys. Chem. Lett.* 2017, 8, 5744-5750.