

From Interstellar Ices to PAHs

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INVITED TALK

Review of PAHs in Ice: From the Lab to the Space

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Polycyclic aromatic hydrocarbons (PAHs) are found in a variety of interstellar and circumstellar environments, recognized through their characteristic infrared emission that was also known as unidentified infrared (UIR) bands (Tielens et al. 2000). Similarly, water-ice, one of the most predominant solid forms, is present in the coldest reaches of the Universe (Gudipati & Castillo-Rogez 2013; van Dishoeck, Herbst, & Neufeld 2013), in the dense molecular clouds (DMCs), circumstellar regions, protoplanetary disks, on evolved solar system planets, moons, small bodies, and clouds. Thus, it is logical to expect that PAHs and water-ice should coexist in various parts of the Universe. However, so far PAHs were not unambiguously detected in the space environment coexisting with water in the condensed ice form (Hardegree-Ullman et al. 2014), though several detections under planetary conditions are cited in the literature (Cruikshank et al. 2008; Ore et al. 2011).

At the turn of the 21st century laboratory work has begun to understand the spectroscopic and radiation-induced properties of PAHs trapped in water-rich ices (Bernstein et al. 1999; Gudipati & Allamandola 2003). Over the past decade several laboratories undertook systematic studies (Bouwman et al. 2011; Cook et al. 2015; Malley & Kahan 2014; Yang & Gudipati 2014). This talk will give an overview of the research being carried out to understand and detect PAHs in icy environments.

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