

# From Interstellar Ices to PAHs

A symposium to honor Lou Allamandola's Contributions to the Molecular Universe  
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## INVITED TALK

### PAH Clusters and the Interstellar Infrared Emission Bands

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Polycyclic aromatic hydrocarbons (or PAHs) are the leading candidate for the emitters of the interstellar aromatic infrared emission bands. PAH clusters could contribute to these emission bands, but a lack of data on their infrared properties has made this hypothesis difficult to evaluate. To fill this critical data need, we have measured infrared absorption spectra of a series of homogeneous and heterogeneous PAH clusters using matrix isolation spectroscopy in solid argon and computed their infrared spectra. Our theoretical calculations show that the spectral shifts observed in the experimental absorption spectra as a function of the PAH concentration can be related to preferred cluster structures forming in the argon matrix, which in turn depend on the topology of the monomer PAH molecule. Based upon our results, we predict that the large PAHs present in the interstellar medium are likely to have clusters with redshifted absorption bands in the C-H out-of-plane bending region. These clusters could contribute to a well-known red-shading observed in the profile of the interstellar 11.2 micron emission band.