

From Interstellar Ices to Polycyclic Aromatic Hydrocarbons

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

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Laboratory Investigations of Titans Stratospheric Ice Clouds

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New laboratory measurements of thin films of nitrile and hydrocarbon ices necessary for the identification of the composition of observed ice emission features in Titans far infrared spectrum are currently underway in the Spectroscopy for Planetary ICes Environments (SPICE) laboratory at NASA GSFC. This new experimental setup is designed to measure the spectra of Titan-relevant organic ices by 1) taking advantage of the full far to near infrared spectral range (200 to 0.8 μm), 2) obtaining spectra and optical constants of a suite of mixtures of nitrile and hydrocarbon ices, as well as the pure ices, 3) studying the ices by depositing the compounds at a broad range of Titan-relevant temperatures, and 4) investigating both amorphous and crystalline phases.

Pure and mixed samples of C_2N_2 , C_4N_2 , HCN, HC_3N , $\text{CH}_3\text{CH}_2\text{CN}$, and C_6H_6 were deposited onto a cryogenically cooled infrared window under vacuum, where the far and mid infrared spectra of thin amorphous and crystalline films were obtained using our Nicolet is50R FTIR spectrometer. The beam splitter changes automatically so the purge is never broken between spectral regimes. Spectra were acquired at a resolution of 4 cm^{-1} . The thin film thickness ranged from 1 to 5 μm , and the deposition temperature varied between 60 and 150 K. The transmittance spectra in the far infrared will be compared to published-Cassini CIRS observations.