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VUV SPECTROSCOPY OF CARBONACEOUS DUST ANALOGUES

Abstract

At the IAS and ISMO laboratories (Université Paris Sud, France), we produce analogues to carbonaceous interstellar dust encountered in various phases of the interstellar medium: amorphous hydrogenated carbons (a-C:H) and soots. The a-C:Hs were produced using an R.F. plasma reactor at low pressures, and their structure is dominated by an aliphatic skeleton¹. The soots have been produced in an ethylene (C₂H₄) flame and provide samples dominated by a polyaromatic carbon skeleton². We have measured thin films (>100 nm) of these analogues in transmission in the far ultraviolet (190 - 250 nm) and in the vacuum ultraviolet (50 - 190 nm) regions using the DISCO/APEX beamline of the SOLEIL synchrotron. These materials were also characterized via infrared microscopy on the SMIS beamline. These measurements enable the derivation of optical constants and photo cross-sections used to improve models of the photochemistry of these materials in astrophysical environments. The relation between the IR and UV spectral properties of these materials and their astronomical counterparts will be discussed.