V Reunión de Ciencias Planetarias y Exploración del Sistema Solar (CPESS5)

Ethane and ethylene physical properties: relevance for TNOs

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Introdución: We report the density and refractive index, at 633 nm, of ethane and ethylene ices at temperatures from 13 to 65 K, measured by double laser interferometry and a cryogenic quartz crystal microbalance in a high vacuum chamber. Both quantities rise with the temperature of deposition from 13 K up to a plateau, 40 K for ethane and 22 K for ethylene. Below and above these temperatures amorphous and crystalline structures respectively, are suggested. Ethylene results deviate from the linear growing between 25 and
35 K, where a metastable structure is reported in the literature. Density values increase from about 0.40 to 0.60 g cm^{-3} for ethane and from about 0.45 to almost 0.65 g cm^{-3} for ethylene. The real part of the refractive index changes from about 1.27 to 1.45 for ethane and from about 1.30 to almost 1.48 for ethylene. Results are relevant especially to TNOs, where the presence of these molecules is reported, and for experiments involving them.