Physicæ Proceedings

Seção
Abstracts

Photolysis and radiolysis: using different techniques for the study of astrophysical ices

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DOI: https://doi.org/10.5196/physicae.proceedings.XIYRM.28

Resumo

In these work we study the effects resulting from the action of electron beams (similar to the solar wind, 650-1500 eV) reaching methanol ice, and highly energized particles (58Ni11+, 46 MeV, similar to cosmic rays), reaching formic acid ice, so we can analyze the chemical evolution of these ices, and obtain certain parameter, once some organic molecules found in interstellar medium, such as methanol and formic acid, are of great interest for understanding the mechanisms of origin of life, since they are important precursors of prebiotic species, like glycine, the simplest aminoacid. Methanol and formic acid are found abundantly in many astrophysical environments, such as comets, protostars, chondritic meteorites and regions associated with formation of stars. These environments are often subjected to the action of ionizing particles and photons. Thus, the study of photodissociation/ photofragmentation processes, induced by impact of electrons, ions or photons, and consequent formation of more complex molecules, are very important for understanding the chemical evolution of these environments. The experiments were conducted in two different laboratories: Laboratory of Surface Chemistry of Federal University of Rio de Janeiro (Laquis / UFRJ) for electron's beam in methanol ice, and the Grand Accélérateur National d'Ions Lourds (GANIL – France), for 58Ni11+ beam in formic acid ice. The spectra of desorbed ions were obtained from the technique of time-of-flight mass spectrometry (TOF – MS) for methanol, and Fourier Transform Infrared Spectrometry (FTIR), for formic acid. The magnitudes analyzed were: desorption yield (for methanol ice), and cross-sections of the destruction and formation of molecules in the ice of formic acid, as well as desorption yields and half life of this molecule in Earth's atmosphere.