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Laboratory Simulation on Euv Photolysis of Naphthalene and Ammonia in H_2O ice

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Mixture icy samples at 15K were photo-irradiated by strong extreme ultraviolet (EUV) radiation in this work. The components of the ice mixture were the most common cosmic molecules H_2ONH_3 and $C_{10}H_8$. $C_{10}H_8$ is one of the polycyclic aromatic hydrocarbons (PAHs) which are gradually accepted as common molecules distribute over outer space.

we employed an ultra-high vacuum chamber equipped with a closed- cycle helium cryostat to simulate the environment of the space beyond the atmosphere. A Fourier-transform infrared (FTIR) spectrometer was mounted to detect what products were produced during EUV photolysis period and a quadrupole mass spectrometer (QMS) is used for particle desorption measurement during thawing period after EUV photolysis of ice mixture. The necessary intense simulation of solar radiation is provided by a synchrotron beam at National Synchrotron Radiation Research Center (NSRRC) in Hsinchu, Taiwan. After about 10^{20} total photon dose, the mixture icy samples were warmed up under dynamic vacuum to room temperature, then the residues were removed from the substrate and analyzed by a high performance liquid chromatography (HPLC).

Evolution of species during photolysis period and interesting large molecules found in the residue will be presented.

Keywords: Mixed ices; photolysis; EUV; H_2O; NH_3; Naphthalene.

References

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