STUDIES OF THE FORMATION OF CARBONYL SULFIDE IN ION-IRRADIATED ICES

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Infrared absorptions near 2040 cm^{-1} have been detected in observations of young stellar objects embedded in dense molecular clouds and have been attributed to solid carbonyl sulfide, OCS, in icy grain mantles along the line of sight. The low abundances of gas-phase OCS in such regions imply that the material must be formed by active grain chemistry. We are investigating possible solid-state pathways to OCS through experimental studies of proton-irradiated ices containing simple precursors such as CO, CO_2, CS_2, SO_2, H_2S and H_2O. Infrared spectra, dose-related production and decay rates, and thermal effects will be discussed. This is the first systematic study of radiolysis routes to and stability of OCS in relevant cosmic ices. Implications of these results for both interstellar and cosmic ices will also be discussed.