INFRARED SPECTRUM AND PHOTOCHEMISTRY OF GLYOXAL ADSORBED ON ALKALI HALIDE FILMS

JAMES COLLINS, JOHN TELECHOWSKI, and C. A. BAUMANN, *Department of Chemistry, University of Scranton, Scranton, PA 18510-4626*.

The infrared spectrum of glyoxal ($C_2H_2O_2$) adsorbed onto sublimated films of alkali halides was observed. The infrared active CH stretching mode is blue-shifted relative to the gas phase value, while the asymmetric carbonyl stretch is red-shifted. Surface-induced splitting has been observed in the CH bending mode. A number of combination bands have been observed, allowing assignment of some of the infrared inactive modes, most notably the symmetric carbonyl stretch. The vibrational shifts and splittings will be used, along with desorption kinetics, to determine the mode of adsorption for this molecule.

The adsorbed glyoxal was irradiated in the region 400-190 nm. Infrared spectroscopy was used to determine the photolysis efficiency and to characterize the photoproducts. The most noticeable of these is CO, but an additional carbonyl compound appears after prolonged irradiation. The quantum efficiency was determined as a function of irradiation wavelength and surface temperature. Excitation into the S_1 state resulted in no observable photoproducts, while excitation into higher states was very efficient in generating photoproducts.