ULTRAVIOLET PHOTOLYSIS OF CONDENSED-PHASE ACETYL CHLORIDE: VERIFICATION OF A CONCERTED ELIMINATION REACTION

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Ultraviolet photolysis of condensed-phase acetyl chloride (CH_3COCl) produces ketene (H_2C=C=O) and HCl in a 1:1 dimer complex. The reaction mechanism sharply differs from the photodissociation of gas-phase molecules which produces chlorine and acetyl radical (CH_3CO) that further dissociates to CH_3 and CO. Two mechanisms of photodissociation of condensed-phase acetyl chloride have been proposed; concerted elimination and the caged abstraction. Thermodynamic analysis, polarized IR studies, and general spectroscopic observations of the photoproducts are used to show that the photodissociation of condensed acetyl chloride follows a concerted elimination mechanism.