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

BRAD ROWLAND, and WAYNE HESS, Battelle Pacific Northwest National Laboratories, PO Box 999, Richland, WA, 99352, Mail Stop K2-14.

Ultraviolet photolysis of condensed-phase acetyl chloride (CH\textsubscript{3}COCl) produces ketene (H\textsubscript{2}C=\textsubscript{2}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\textsubscript{3}CO) that further dissociates to CH\textsubscript{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.