

ULTRAVIOLET PHOTODISSOCIATION DYNAMICS OF THE 1-PROPENYL RADICAL

MICHAEL LUCAS, *Department of Chemistry, University of California at Riverside, Riverside, CA 92521*; YU SONG, *Department of Chemistry, University of California at Davis, Davis, CA 95616*; JINGSONG ZHANG ^a, *Department of Chemistry, University of California at Riverside, Riverside, CA 92521*; CHRISTOPHER BRAZIER, *Department of Chemistry and Biochemistry, California State University, Long Beach, Long Beach, CA 90840*.

Ultraviolet (UV) photodissociation dynamics of jet-cooled 1-propenyl radical (C_3H_5) were studied in the photolysis wavelength region of 224 to 248 nm using high-n Rydberg atom time-of-flight (HRTOF) and resonance enhanced multiphoton ionization (REMPI) techniques. The 1-propenyl radical were produced from 193-nm photolysis of 1-chloropropene and 1-bromopropene precursors. The H-atom photofragment yield (PFY) spectra have a broad peak centered around 230 nm. The H + C_3H_4 product translational energy distributions, $P(E_T)$'s, peak near ~ 10 kcal/mol, and the fraction of average translational energy in the total excess energy, $\langle f_T \rangle$, is nearly a constant of ~ 0.14 from 224 to 248 nm. The $P(E_T)$'s along with recent theoretical calculations indicate that H + propyne dissociation is the predominant H-atom product channel. The H-atom product angular distribution is isotropic, with the anisotropy parameter $\beta \sim 0$. The dissociation mechanism is consistent with unimolecular dissociation of hot 1-propenyl radical after internal conversion from the electronically excited state.

^aCorresponding author.