H-ATOM ELIMINATION CHANNEL IN UV PHOTODISSOCIATION OF N-PROPYL AND ISO-PROPYL RADICALS: THE ROLE OF CONICAL INTERSECTIONS

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The H-atom elimination channels in the UV photodissociation of jet-cooled n-propyl and iso-propyl radicals are studied in the region of 237 nm using the high-n Rydberg-atom time-of-flight technique. Upon excitation to the 3p state by the UV photolysis radiation, n-propyl radical and iso-propyl radical dissociate into the H atom and propene products. The product center-of-mass translational energy release of both n-propyl and iso-propyl radicals have bimodal distributions. The H-atom product angular distribution in n-propyl is anisotropic (with beta ~ 0.5), and that in iso-propyl is isotropic. The overall average translational energy release is E_{trans} ~ $0.27E_{avail}$ for n-propyl and E_{trans} ~ $0.21E_{avail}$ for iso-propyl. The bimodal translational energy distributions indicate two dissociation pathways: (i) a unimolecular dissociation pathway from the ground-state propyl after internal conversion from the 3p state, and (ii) a repulsive pathway directly connected with the excited state of the propyl radical. Isotope labeling experiments have also been carried out. The possible photodissociation mechanisms and the role of conical intersections will be discussed.