HIGH-RESOLUTION THRESHOLD PHOTOIONIZATION AND PHOTOELECTRON SPECTROSCOPY OF PROPENE AND 2-BUTYNE

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The high-resolution photoionization and pulsed-field ionization zero-kinetic energy (PFI-ZEKE) photoelectron spectra of propene and 2-butyne and their perdeuterated isotopologues have been recorded in the vicinity of the first adiabatic ionization energy following single-photon excitation from the neutral ground state using a narrowband vacuum ultraviolet laser system. The spectral resolution of better than 0.1 cm^{-1} achieved in these spectra has enabled us to partially resolve the rotational structure of the photoelectron spectra and to obtain information on the internal rotation/torsional vibration of the methyl groups in the cationic ground state. The intensity distributions observed in the photoelectron spectra will be discussed in terms of rovibronic photoionization selection rules and Franck-Condon factors for transitions between the neutral and ionized molecules.