DECOMPOSITION OF VIBRONIC AND RENNER-TELLER STRUCTURE IN C_2H AND C_2D FROM ANION HIGH-RESOLUTION PHOTOELECTRON IMAGING

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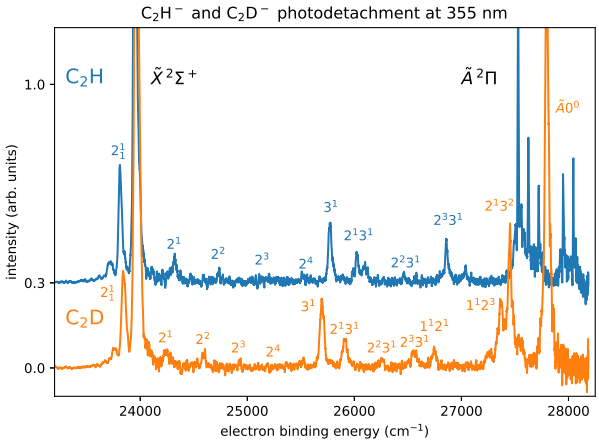
The ethynyl radial, C_2H, has a complex spectral structure due to vibronic coupling between the ground $\tilde{X}\,^2\Sigma^+$ and low-lying $\tilde{A}\,^2\Pi$ electronic states, and a Renner-Teller interaction within the Π state.

A good understanding of the low-lying rovibrational structure has come from measurements, including slow electron velocity-map imaging of anion photoelectron spectra[a], and *ab initio* calculations[b], that give wavefunction character.

In this work, high-resolution photoelectron velocity-map imaging of C_2H^- and C_2D^- photodetachment (the 355 nm wavelength illustrated), provide a quantitative comparison over an extended energy range, to reveal unassigned structure, anomalous intensities, and illustrate the dramatic difference between isotopologues in the region of the A-state. These measurements, together with the measured photoelectron angular distributions, provide new insight into the non-adiabatic couplings of ethynyl.



[a] J. Zhou *et al. J. Chem. Phys.* **127**, 114313 (2007).

[b] R. Tarroni and S. Carter, *J. Chem. Phys.* **119**, 12878 (2003).

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