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Quantum dynamics and photochemistry of negative ions via photoelectron imaging and photofragment spectroscopy. ANDREI SANOV, EMILY GRUMBLING, RICHARD MABBS, TEREFE HABTEYES, KOSTYA PICHUGIN, LUIS VELARDE — Photochemistry of molecular and cluster anions is studied using photoelectron imaging and photofragment spectroscopy. Photoelectron imaging is used to observe interference effects in electron photoemission and monitor the transformations of the electronic structure in chemical reactions. The transformations of electronic energy levels and the corresponding wavefunctions are studied in the solvent and reaction-coordinate domains. Time-resolved results reflect the electron emission dynamics, establishment of the reaction product electronic identity and provide dynamical tests of the anion electronic potentials and exit-channel interactions in chemical reactions. Photofragment spectroscopy in the solvent domain reveals solvent-enabled and solvent-controlled bond dissociation and ion-molecule association reactions in anionic environments, including state-crossings and Renner-Teller interactions.

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