LOW-ENERGY PHOTOELECTRON IMAGING SPECTROSCOPY OF ANIONS

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We report on photoelectron emission from nitroalkane anions using low-energy velocity map photoelectron imaging. The excess electron of these radical anions is weakly bound with adiabatic electronic affinities around 1500 cm^{-1} with relatively benign sensitivities to the length of the alkane chain. In addition to conventional photoelectron spectroscopy, we use vibrational excitation of the CH stretching vibration (2700-3000 cm^{-1}) to induce vibrational autodetachment. We have obtained an improved value for the adiabatic electron affinity (172$\pm$ 6 meV), and definitively assigned the vibrational features in the photoelectron spectrum of the nitromethane anion. In addition, the vibrational autodetachment spectrum offers insight into vibrational modes involved in vibrational autodetachment.