

PROBING THE TWO-PHOTON DETACHMENT MECHANISM OF THE CRYOGENICALLY-COOLED DEPROTONATED 2-HYDROXYTRIPHENYLENE ANION USING PHOTOELECTRON IMAGING AND PHOTODETACHMENT SPECTROSCOPY

JISOO KANG, EDWARD BREWER, G. STEPHEN KOCHERIL, LAI-SHENG WANG, *Department of Chemistry, Brown University, Providence, RI, USA.*

Deprotonated 2-Hydroxytriphenylene anions are known to be crucial precursors for synthesizing polycyclic diaryl ethers, which are commonly applied in antibiotics. Here, we report our investigation on photodetachment via two-photon resonant absorption of cryogenically-cooled deprotonated 2-Hydroxytriphenylene anions utilizing photodetachment spectroscopy and high-resolution photoelectron imaging. The electron affinity was measured as 2.629 ± 0.001 eV (21200 ± 10 cm⁻¹) from the high-resolution photoelectron spectrum acquired near threshold. The existence of low-lying electronic states below threshold essentially allowed anion absorption spectroscopy to be performed through the lens of photodetachment spectroscopy. In brief, forty-six vibrational levels of the anion first excited singlet (S_1) state were resolved via photodetachment spectroscopy and six vibrational levels for the neutral ground electronic state (N_0) were resolved via above threshold photoelectron spectroscopy. Furthermore, direct experimental evidence for the S_0 to T_N transition was acquired from the photodetachment spectrum. Finally, characterization of the two-photon resonant detachment mechanism below threshold for this anion is also provided and discussed in great detail.