

Photoelectron spectroscopy of multiply-charged anions

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Multiply charged anions (MCAs) are common in condensed phases but are challenging to study in the gas phase. An experimental technique, coupling photoelectron spectroscopy (PES) with electrospray ionization (ESI), has been developed to investigate the properties of free MCAs in the gas phase [1]. Figure 1 shows the schematic layout of the setup, which mainly includes three parts, the ESI ion source, time of flight mass-spectrometer (TOF-MS) coupled to a Paul trap and magnetic-bottle photoelectron analyzer. This presentation reviews the principles of this technique and some initial findings about the intrinsic properties of MCAs [2]. Examples include the observation of the repulsive Coulomb barrier that exists universally in MCAs and its effects on the dynamic stability and PES of MCAs. The solvation and solvent stabilization of MCAs have been studied in the gas phase and are also discussed.

Furthermore, replacing the original magnetic-bottle photoelectron analyzer with a velocity map imaging (VMI) system has been developed in our lab, which provides additional angular distribution information of the photodetached electrons. New results from the VMI are also reviewed, including a series of linear dicarboxylate dianions [3] and the diphenyl disulfonate dianion [4].

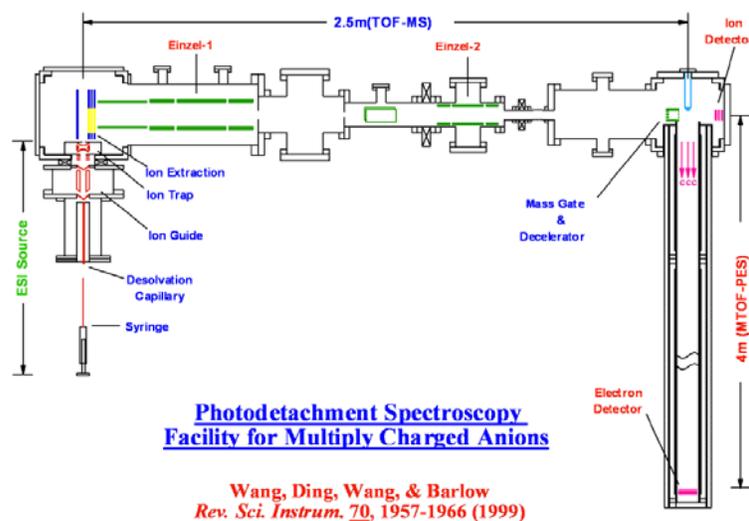


Figure 1. Schematic layout of the photoelectron spectroscopy (PES) with electrospray ionization (ESI).

References

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