Adventures in Anion Photoelectron Spectroscopy

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Negative ion photoelectron spectroscopy is a powerful technique for studying atomic, molecular, and cluster anions. Its fruits include electron affinities, electronic and vibrational splittings, geometrical structures, and thermochemical values. Anion photoelectron spectroscopy is a rather general technique; it has been used to study many topics in chemistry as well as several in biophysics, materials science, and condensed matter physics. Today's talk will sample some of the topics we have studied recently using this technique. These include electron-promoted activation of molecules, solvent-induced stabilization of otherwise unstable molecular anions, electron-induced proton transfer, ligation of metal clusters, cluster catalysis, and/or the characterization of highly diffuse electron states, such as dipole bound, quadrupole bound, and double Rydberg anions. The study of several of these systems was only possible because of the development of unique ion sources, some of which will also be discussed.