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PHOTOELECTRON SPECTROSCOPY OF EXCESS ELECTRONS IN AROMATIC MOLECULAR CLUSTER

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Excess electron binding to prototypical aromatic molecular clusters was investigated by anion photoelectron spectroscopy and *ab-initio*calculations. Electron binding was found to occur by various intriguing mechanisms. For benzene and naphthalenewhose monomer anions are known to be unstable, they were found to accommodate an electron to form a stable monomeric anion in clusters by solvation via π-hydrogen bonding. In contrast, in anthracene anion clusters, the excess electron was found to delocalize over a few molecular moieties in the clusters to form anion cores. In the clusters, the nature of anion core changes depending on the cluster size, indicating that it strongly relies on the solvation environments. For pyridine, a N-containing molecule, the dipole bound electron state and valence electron state were simultaneously observed in its tetramer cluster. While larger pyridine anion clusters do not have a dipole-bound character in the ground state, their excited states are likely to possess a dipole-bound electron capture characters. In all the above clusters, solvation was found to play an important role in the formation of anion clusters by accommodating an excess electron.