THE SOLVATION OF AROMATIC SYSTEMS BY WATER: AN ANION PHOTOELECTRON SPECTROSCOPIC STUDY

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We will consider the following aromatic systems: naphthalene, pyridine, pyrimidine, indole, and phenol. All of these molecules form temporary anions. Some have slightly negative electron affinities (EA's), while others exhibit much more negative values of their EA's. In the case of naphthalene, pyridine, and pyrimidine, with EA values of -0.19, -0.62, and -0.26 eV respectively, we have found their intact anions to be stabilized by varying numbers of water molecules, i. e., 1, 3, 1, respectively. In the case of indole, where the EA is -0.9 eV, we did not observe the solvent-stabilization of its anion. Instead, we saw the formation of dipole-bound indole/water anions. Lastly, in the case of phenol (EA = -1.0 eV), we also did not observe the solvent-stabilization of its anion, but interestingly, solvent destabilization of the phenoxide anion was observed. We will discuss the likely reason for this in our talk.