NONRADIATIVE DECAY PATHWAYS OF THE FIRST EXCITED ELECTRONIC STATES OF 1:1 HYDROGEN BONDED COMPLEXES OF 7-AZAINDOLE WITH PHENOL AND FORMAMIDE

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On UV excitation, the monomer and doubly hydrogen-bonded homodimer of 7-azaindole decay via two radically different photophysical pathways. While the monomer emits intense UV fluorescence, the dimer undergoes ultrafast nonradiative relaxation to a tautomeric configuration and emits green fluorescence. The latter channel is also preferred by the complexes of 7-azaindole with aliphatic alcohols, and the propensity of the tautomerization process is determined by acidity of the alcohols. In contrast, we report here that in spite of being a stronger acid the aromatic alcohol phenol hinders the said tautomerization in a 1:1 complex environment, and the excitation energy is funnelled through a new nonradiative decay channel. We also have measured the medium effect on the process, and propose a mechanism for relaxation of the locally excited state in terms of electronic energy transfer coupled with proton transfer between the two dimer moieties. On the other hand, in case of 7-azaindole-formatide 1:1 complex, sharp bands in the gas phase fluorescence excitation spectrum are displayed only for excitations with about 200 cm^{-1} excess vibronic energy. The medium effect of the onset of the nonradiative decay process has been probed by performing the measurement in a cyclohexane solution at room temperature. The details of the finding will be presented in the talk.