THE ROLE OF THE RING NITROGEN AND THE AMINO GROUP IN THE SOLVENT DEPENDENCE OF THE EXCITED STATE DYNAMICS OF 3-AMINOQUINOLINE

DEBASHIS PANDA and ANINDYA DATTA, *Department of Chemistry, Indian Institute of Technology-Bombay, Powai, Mumbai, INDIA.*.

The nonradiative rate in 3-aminoquinoline is found to exhibit anomalous solvent dependence, being rather fast in nonpolar solvents and remarkably slower in more polar and especially, more protic ones. The cause of such behavior is investigated by studying the dependence of fluorescence spectral and temporal parameters on the solvent properties such as polarity and hydrogen bonding ability. Complementary quantum mechanical calculations have been performed and the picture that emerges from these studies is that of an excited state with a short radiative lifetime due to the flipping of the amino group. This state is selectively populated in nonpolar, nonhydrogen bonding solvents, but is destabilized with respect to themore polar intramolecular charge transfer (ICT) state in polar solvents and even more so in protic solvents and dimethylsulfoxide. The slower nonradiative rates in the ICT state is attributed to the more restricted motion of the amino group in this state. The role of hydrogen bonding of the amino group and the ring nitrogen instabilization/destabilization of the ICT state and therefore on the nonradiative rate is also explored[a].

[a] D. Panda and A. Datta *J. Chem. Phys.* **125**, 054513, 2006.