Evidences of Conformational Fluctuations of 2-methylaminofluorenone and 2-dimethylaminofluorenone in Polar Solvents

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The absorption and fluorescence spectra of 2-methylaminofluorenone (2MAFl) and 2-dimethylaminofluorenone (2DMAFl) were determined at 293 K in a variety of solvents with different polarities. The spectral data were used, in combination with the 2MAFl and 2DMAFl ground state dipole moment \((\mu_g)\), to evaluate \(\mu_e\) of the \(S_1\) state, to determine the outer-sphere solvent reorganization energy \(\lambda_{\text{outer}}\), and the intramolecular reorganization energies: \(\lambda^*_i\) (associated with vibrations for which \(hv < kT\)) and \(\lambda_i(hv > kT)\). At 77 K the fluorescence spectra in a non-polar solvent are shifted to longer wavelengths. In polar solvents, for both molecules the behavior is opposite. The fluorescence decay data for 2MAFl and 2DMAFl in non-polar solvents are very well fitted by one-exponential functions, while in polar solvents by two-exponential functions. The spectroscopic data distinctly show that both studied molecules in polar solvents form an inhomogeneous emitting system.

Key words: 2-methylaminofluorenone; 2-dimethylaminofluorenone; Inhomogeneous Broadening; Reorganization Energy.