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

M. Józefowicz[a], J. R. Heldt[a], and J. Heldt[a,b]

[a] Institute of Experimental Physics, University of Gdańsk, ul. Wita Stwosza 57, 80-952 Gdańsk,Poland
[b] Institute of Physics, Pomeranian Pedagogical Academy, ul. Arciszewskiego 23A, 76-200 Słupsk, Poland

Reprint requests to Dr. J. H.; E-mail: fizjh@julia.univ.gda.pl

Z. Naturforsch. **59a,** 105 – 112 (2004); received July 8, 2003

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 (μ_g), to evaluate μ_e of the S_1 state, to determine the outer-sphere solvent reorganization energy λ_{outer}, and the intramolecular reorganization energies: λ_i^* (associated with vibrations for which $h\nu < kT$) and $\lambda_i (h\nu > kT)$. 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.