E2-04 : THE EFFECT OF THE MEDIUM ON THE INTRAMOLECULAR ELECTRON-TRANSFER OF NAPHTHYLMETHYL BENZOATE ESTERS

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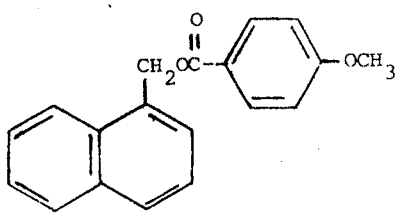
The fluorescence quantum yield of ester(1) is quenched by an intramolecular charge-transfer. This is believed to occur by the internal electron-transfer from the excited napthalene chromophore to the benzoalate chromophore. The efficiency of quenching would thus be dependent on the substituents and the medium. The effect of medium on this electron-transfer has not been investigated so far. We now report the medium effect on the efficiency of the intramolecular electron-transfer in the ester(1). In this work we have measured the relative quantum yields of fluorescence of ester(1) in a series of solvents. It was found that polar solvents reduce the fluorescence, thus indicating higher efficiencies for intramolecular electron transfer. This can be explained by the stability of the polar exciplex formed as an intermediate in the electron transfer process. A linear Hammett plot between the fluorescence quantum yields and E_T (30) values in different solvents is obtained in this work. This is strong evidence for an intramolecular electron transfer process.

Solvent	*Relative Quantum Yield of Fluorescence
hexane	0.201
diethylether	0.196
chloroform	0.194
methylene chloride	0.188
acetonitrile	0.165
methanol	0.132
ethanol	0.108
l-butanol	0.100
ethano/water	
(90)	0.047
(80)	0.034
(70)	0.024

* Quantum yield relative to naphthalene (0.23)



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