

Preliminary Note

Effect of solvents on the intensity of exciplex emission

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(Received July 11, 1985)

For exciplex emission, increasing the solvent polarity results in a spectral shift to the red, with a concomitant decrease in the intensity to the extent that in highly polar solvents such as acetonitrile or dimethylformamide (DMF) no exciplex emission can be detected. According to the Onsager model the red shift of the emission band in polar solvents is attributed to the effect of solvent dielectrics while the intensity decreases because of the formation of dissociated radical ions [1]. If this contention is justified it is expected that the electrical conductivity of exciplexes in polar solvents will increase with increasing solvent dielectric constant. In Table 1 the results of such measurements for the systems pyrene-dimethylaniline, pyrene-

TABLE 1
Increases in photoconductivity in polar solvents

<i>Solvent</i>	λ_{\max} (nm)	<i>Relative intensity</i>	<i>Conductance increase</i> ΔC (Ω^{-1})
<i>Pyrene-dimethylaniline</i>			
Propanol	515	364	0.35×10^{-5}
Acetone	525	21.6	0.757×10^{-5}
DMF	—	—	2.081×10^{-5}
<i>Anthracene-dimethylaniline</i>			
Propanol	535	3.12	0.10×10^{-5}
Acetone	540	19.2	0.25×10^{-5}
DMF	—	—	0.48×10^{-5}
<i>Pyrene-diethylaniline</i>			
Propanol	510	53	0.784×10^{-6}
Acetone	520	50	0.1017×10^{-6}
DMF	—	—	1.72×10^{-5}
<i>Anthracene-diethylaniline</i>			
Propanol	530	35	0.087×10^{-6}
Acetone	538	28	0.684×10^{-6}
DMF	—	—	1.07×10^{-5}

diethylaniline, anthracene-dimethylaniline and anthracene-diethylaniline are summarized.

It was found that the photoconductivity increased in proportion to the lowering of the exciplex intensity and the increase in the solvent dielectric constant. This lends support to the proposed theory.

- 1 Beddard, Carlin and Lewis, *J. Chem. Phys.*, 47 (1967) 1184.