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UMBRELLA SUBSTITUENTS FOR THE PROTECTION OF
FLUORESCENT AGENTS

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Optical brighteners(2) and fluorescent dyes are examples of fluorescent agents which are currently used on a large scale. When these agents are used under tropical light intensities photodecomposition is a problem which leads to a shortening of their useful life. This is at least partly due to the bimolecular processes which the excited fluor molecule can undergo with various species present in the environment. As a model for this interaction, we have studied the fluorescence of some 1.3 diphenyl pyrazoline derivatives which are representative of optical brighteners, in the presence of certain organic halides. These halides act as quenchers by a collisional electron transfer which leads to photodecomposition(1). We find that extrachromophoric substituents considerably inhibit such fluorescence quenching by blocking some approach trajectories of the quencher. This is therefore a steric shielding or umbrella effect of substituents. Quantitation of such effects by Stern-Volmer methods and the failure of additivity of these steric effects will be exemplified.

References

1. Birks, J. B., *Photophysics of Aromatic Molecules*, New York, Wiley, 1970, Chap. 9.
2. Dorlars, A., Schellhammer, C. W. and Schroeder, J., *Angewandte Chemie Int. Ed.*, 14, 665 (1975).