



MICROCOPY RESOLUTION TEST CHART NATIONAL BUREAU OF STANDARDS 1963 A

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	REACTIONS OF PORPHYRINS IN SURFACTANT ASSEMBLIES, MICROEMULSIONS
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AD-/	FINAL REPORT
	DAVID G. WHITTEN
	JUNE 25, 1987
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solute either contained at a different site in the assembly or present in a contacting aqueous or mixed aqueous-organic solution. While we have found that these interfacespanning reactions can be quite efficient in certain cases, we have also investigated extensively environmental factors which can retard or eliminate them. Most of the reactions that we have investigated thus far originated by sensitization of singlet oxygen, a highly reactive but relatively short-lived reagent. Singlet oxygen has been found to migrate with relative ease through a number of different media, although we find that penetration of highly condensed or compressed films clearly retards the migration of the active oxygen, at least during its excited state lifetime. Although we have used a variety of lightabsorbing molecules to initiate these reactions, most of our studies have focused on some synthetic porphyrins which absorb relatively strongly in the visible and near ultraviolet regions. These porphyrins have been specifically designed and synthesized due to their excellent film-forming abilities.

The synthetic porphyrins that we have used exist as various stereoisomers; the third part of our studies has been an investigation of the reactivities of these various stereoisomers of synthetic porphyrins at interfaces. We have been particularly interested in the relative ability of these porphyrins to be incorporated in or pass through an interface such as that formed when phospholipids are dispersed in water. We have found that the reactivity of different porphyrin stereoisomers at interfaces differs dramatically from that observed in solution. For example, we find the porphyrins are much stronger bases at anionic interfaces and undergo metal ion incorporation, in some cases, several orders of magnitude more rapidly than in solution. Preliminary results suggest that the different behavior of porphyrin stereoisomers can be largely associated to different differential orientation at charged interfaces. This should result in pronounced differences in the ability of the porphyrins to act as photosensitizers in a number of different photochemical reactions.

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