

A fluorescent probe study of the effect of size on the properties of dioctadecyldimethylammonium chloride vesicles

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Fluorescence techniques are used to study the effect of size on the properties of dioctadecyldimethylammonium chloride vesicles. The solubilization site and the deactivation rates of excited pyrene by bromide counterions and oxygen are markedly dependent on vesicle size at low temperature and strongly affected by the gel-liquid crystalline phase transition. The results obtained are accounted for by considering the structural differences between large and small vesicles. It is shown that the temperature dependence of the interaction rate between the probe and oxygen can be used to monitor the changes in vesicle fluidity accompanying the gel-liquid crystalline phase transition and the sensitivity of the fluidity and phase transition temperature to the incorporation of additives (n-octanol). The effect of vesicle size upon the capacity to incorporate n-alkanols (from hexanol to nonanol) and carbon tetrachloride was also examined. From the measurement of the partition constants in both vesicle