Anomalous Dependence of Pyrene Spectra and Lifetimes with Temperature in Large Unilamellar Vesicles from Dioctadecyldimethylammonium Chloride and Dipalmitoylphosphatidylcholine

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Lifetimes of pyrene incorporated into large unilamellar vesicles of dipalmitoylphosphatidylcholine and dioctadecyldimethylammonium chloride increase when the temperature increases prior to the melting temperature of the bilayers. These changes are paralleled by a decrease in the vibronic bands intensity ratio II/IIII of the fluorescence spectra, indicative of water expulsion and/or a deeper penetration of the probe prior to the bilayer phase transition. In DPPC vesicles, both pyrene lifetimes and the II/IIII ratios show at the phase transition temperature changes that are indicative of increased water penetration.