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EVOLUTION AND MORPHOLOGY OF 2D CHIRAL STRUCTURES OF QUINOLINE DERIVATIVES AT THE AIR-WATER INTERFACE.

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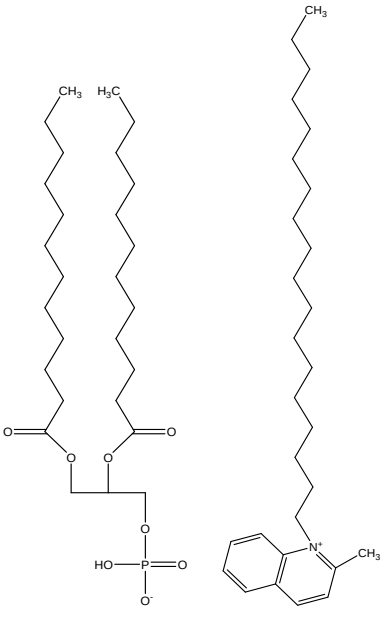
The development of methods to build well-ordered assemblies of molecules into larger structures is a current objective of supramolecular chemistry. In this sense, the air-water interface is an ideal model for these purposes, as it is easy to prepare in a pure state and also because the surface coverage can be smoothly adjusted by using the Langmuir trough technique. However, Langmuir monolayers are interesting not only in a fundamental way but also as a means to build an ordered system on mesoscopic length scales. The domains observed in Langmuir monolayers at high surface pressures indicate the formation of large structures. To design well-defined structures in which the lateral organization is controlled, the geometry of the structures formed depends crucially on a proper balance between the vertical sections of the hydrophobic and hydrophilic groups.

The method used here, under the condition of a suitable balance between the sizes of the hydrophobic and polar groups, is based on the following: if ac is the interfacial area occupied by the hydrophobic group when alkyl chains are fully extended, and a0 is the minimum interfacial area occupied by the headgroup, dyes to be selected should obey ac ≥ a0. In this way, the domain structure depends on the ability of the dye to fill the available area excess (ac - a0). This fact stabilizes the monolayer and enables the domains growth to mesoscopic sizes. Therefore, mixed DMPA:S10A 1:1 monolayers were prepared at the air-water interface. The evolution of the domains to a supramolecular lattice were directly observed by BAM and chiral structures were determined in Langmuir-Schaeffer films.



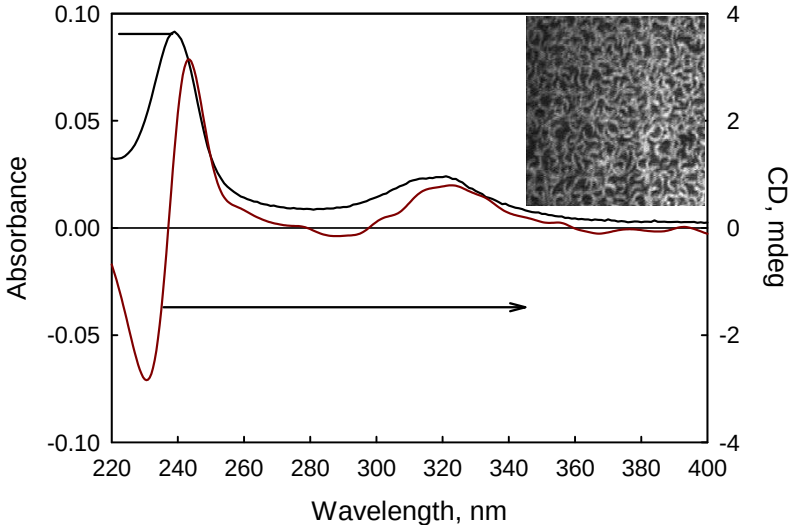


Fig.1. Absorbance and CD spectra of Langmuir Schaefer films containing quinolein derivative in mixture with DMPA. BAM image of the mixed DMPA:S10A 1:1 monolayer at the air-water interface.