

$^3\text{P}$ and $^2\text{H}$ NMR SPECTRA OF SOME LIYOTROPIC LIQUID CRYSTALS

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Abstract

Two different lyotropic mesophases have been prepared. The first one was composed of an anionic surfactant, sodium n-dodecyl sulphate, SDDS, orthophosphoric acid monodecylester, PDE, and heavy water, $D_2O$. The second mesophase was composed of a cationic surfactant, $n$-decylammonium chloride, DACL, PDE and $D_2O$.

The optical appearance(texture) of both mesophases was determined by a polarizing microscope to be lamellar-like, and conoscopic measurements showed that these systems possess a negative diamagnetic anisotropy.

$^3\text{P}$ NMR chemical shift of PDE in these systems was a symmetrical singlet which was broadened at the bottom. However, if these systems contained a minute amount of free $\text{H}_3\text{PO}_4$, the $^3\text{P}$ NMR spectra of both systems consisted of a hump and a sharp line which were found to arise from PDE and $\text{H}_3\text{PO}_4$, respectively. Nevertheless, the position of the hump with respect to the isotropic peak of $\text{H}_3\text{PO}_4$ is different in both mesophases. This has been interpreted to arise from the different shape of micelles in both mesophases.

The quadrupolar splitting of the heavy water($^2\text{H}$-NMR) of both mesophases at $20^{\circ}\text{C}$ was a doublet with broad lines, indicating imperfect alignment of the director of the phases. As the temperature increased, the distance between the doublet lines, i.e. the quadrupolar splittings increased which is suggested to result from increase of binding sites in these systems.