



Effect of the presence of strong and weak electrolytes on the existence of the uniaxial and biaxial nematic phases in lyotropic mixtures

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Abstract:

Lyotropic mixture of potassium laurate/decanol/water presenting only the uniaxial nematic calamitic phase was doped with KCl, DL-mandelic acid, benzoic acid, DL-phenyllactic acid, phenylacetic acid, phenol, phenylmethanol, benzene, RS-hexahydromandelic acid, cyclohexanecarboxylic acid, cyclohexaneacetic acid, cyclohexanol, cyclohexylmethanol and cyclohexane, separately. The nematic phase sequences were investigated as a function of the dopant molar concentration and temperature. Laser conoscopy was used to characterize the nematic phases. Weak electrolytes having -COOH group as polar part were shown to be very effective in stabilizing the three nematic phases (two uniaxial and the biaxial). Guest molecules

with only the -OH group did not show any effect on the stabilization of other nematic phases. There is no direct relation between the solubility of the guest molecule in water and its effectiveness to stabilize the different nematic phases. We observed that the guest molecule acidity constant pK_a was shown to be an important parameter. These dopants were shown to be more effective in the stabilization of the three nematic phases when comparing to strong electrolytes. We interpreted the results in terms of the location of dopant molecules at the micelle surfaces and their effectiveness of screening the polar head repulsion. This situation favors the relaxing of curved surfaces in the micelle, increasing the flat micellar surfaces. These flat surfaces are perpendicular to the main amphiphilic bilayer. The increase of the micellar dimensions in this plane favors the orientational fluctuations characteristic of the nematic discotic phase, as observed in our experimental results.

Biography:

Antonio Martins Figueiredo Neto concluded in Physics The DPA [SP-CAPITAL] by Sao Paulo University in 1981. Currently, he is Professor at Sao Paulo University. He has published over 100 journal articles and more than 20 papers in event proceedings. He published a book about the Physics of Crystals Liquids by Oxford University Press and Co-edited "Another World" for SCI. He has 3 chapters published in books and 4 product technological registered. He guided more than two Master's dissertations and PhD theses in Physics and received one prize and/or tribute. He worked extensively in physics, with emphasis in physics of fluids complex.