Lyotropic liquid crystal doped with luminescent polystyrene nanospheres studied by Electrical Impedance Spectroscopy

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Interaction between liquid crystals and inorganic nanoparticles is a common subject, however is still of great interest because of their potential applications. Additions of functional nanoparticles can improve the electro-optical performance of liquid crystal display or even cause induction effect alignment [1,2]. Modification of the structure and properties of organic functional materials, particularly liquid crystals, can be achieved by doping with inorganic nanoparticles. Because of the possible applications in technology, almost all interest in this line of work are intended to thermotropic liquid crystals, in this sense, this work was focused on investigations of possible amendments in a lyotropic nematic. The intention was to study the behavior of the electrical impedance of a lyotropic liquid crystal doped with small concentrations of luminescent polystyrene nanospheres. In this work, samples of lyotropic liquid crystal in the calamitic nematic phase were doped at concentrations ranging from 0.01 % to 0.2 % of nanospheres diluted in distilled water. In this case the lyotropic liquid crystal was a mixture of potassium laurate (KL), decanol (DeOH) and distilled water had a nematic phase between two isotropic phases. The commitment was to examine the effect of by analyzing the changes in the impedance response in the frequency range from 1Hz to 32MHz. The nature of these changes are discussed as a consequence of the experimental data and compared with other nematic phases.

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