

Electroptic response of PDLC doped with MWCNT.

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The dielectric measurement has been a useful technique in characterizing molecular interaction and molecular ordering. The valuable information about the nature and strength of interactions in Liquid Crystal (LC) solutions over a range of mole fractions can be obtained using dielectric studies. It measures how strongly the electronic charge in the material can adjust to shield an external electric field. Larger the dielectric constant, more effective is the screening and hence the insulation.

In the last few years it was revealed that the inclusion of carbon nanotubes has substantially changed the technical parameters such as controlling voltage, response time, electrical conductivity, dielectric constant of LC layers; hence affecting the physical, chemical and mechanical properties of LC. Thus emphasizing the need to study it in the context of further improvement.

In the present paper we have used Temperature Induced Phase Separation (TIPS) method to form Polymer Dispersed Liquid Crystal (PDLC) using Nematic Liquid Crystal TL205 (Halogenated bi-tri phenyls with aliphatic tails of length of 2-5 Carbons) and Pre-polymer PN393 (mixture of acrylate monomer that form a crossed link network) in the ratio 80:20. In this mixture we dispersed sonicated Multi walled Carbon Nanotube (MWCNT) in very small concentrations using the magnetic stirring method. The Frequency response of the doped and undoped samples are studied for Dielectric Constant, Electric conductivity and Capacitance using LCZ meter for applied parallel and perpendicular electric field. Results of this study shall be presented.

References:

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