

Comparative study of FPSS and Refractive Index of liquid crystals doped with nano particles /nanotubes.

Bhakti S. Yadav^a Pradnya Prabhu^b Gupta Sureshchandra J.^c

K. G. College of Engg. University of Mumbai bhaktisyadav@rediffmail.com
Department of physics University of Mumbai pradnya.prabhu@gmail.com
Department of physics University of Mumbai gupta1947@rediffmail.com

The liquid crystal state is a distinct phase of matter observed between the crystalline (solid) and isotropic (liquid) states. There are many types of liquid crystal states, depending upon the amount of order in the material. The phases of liquid crystals are: Smectic Cholesteric and nematic.

In the present work we used E7 liquid crystals (LCs) which is eutectic mixture of nematic liquid crystals: 4 n 4' pentyl Cyano biphenyl (5CB), Octyloxy-4 Cyano biphenyl (80CB), 4- Cyano-4-pentyloxybiphenyl. We doped E7 with MWCNT and Zno nano particles. Liquid crystals doped with nano tubes /nano particles show enhancement of the director axis orientation and enhancement of its nonlinear optical properties. The change in refractive index is studied with the help of Abbe Refractometer. We also studied FPSS (Fabry Perot Spectrometer study) of E7 doped with MWCNT / nano particles, Diameter of FPSS rings of our samples were measured .We found close relation between Refractive Index and FPSS rings diameter for the same sample. The result of this study with appropriate conclusions shall be elaborated in the presentation.

References:

- (1) Gupta Sureshchandra J, Journal of Optics, (2000) 29 53-62
- (2) Gupta Sureshchandra J., Liquid Crystals: Chemistry, Physics and Applications, (Proceedings of SPIE, Poland), (2000) 4147 23.
- (3) I. C. Khoo Liquid Crystals: Physical Properties and Nonlinear Optical Phenomena. New York, NY: Wiley Inter science, 1994.
- (4) W. Lee and C. S. Chiu, "Observation of self-diffraction by gratings in nematic liquid crystals doped with carbon nanotubes," (2001) Opt. Lett.26, 521-523.