

# Electro-optical properties of synthesized TiO<sub>2</sub> nanorods doped with Nematic Liquid Crystals

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## Abstract

The most prominent liquid crystal phase, nematic phase, is widely known for its optically anisotropic properties. These optical properties can be enhanced with the help of doping of nanomaterials. In this investigation, we made use of commercially available TiO<sub>2</sub> nano powder (P25) for synthesizing TiO<sub>2</sub> nanorods using the hydrothermal method. These TiO<sub>2</sub> nanorods were then dispersed in nematic liquid crystal E7. Various characterization techniques were employed to study the optical response of the nanorods, which included Photoluminescence (PL) spectroscopy, UV–visible spectroscopy, Fourier transform infrared (FTIR) spectroscopy and Dielectric characteristics. The FTIR investigations shows the effect of TiO<sub>2</sub> nanorods dispersion on the behavior of molecular dynamics of nematic liquid crystals. The steady rise in PL intensity was observed for TiO<sub>2</sub> nanorods doped systems but no change in the emission peak was observed. By analyzing the TiO<sub>2</sub> nanorods at different concentrations, notable UV absorption peak was observed. These findings conclude that the dispersion of TiO<sub>2</sub> nanorods formed by hydrothermal method can be used consistently to study optical characteristics of nematic liquid crystals.

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## References

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