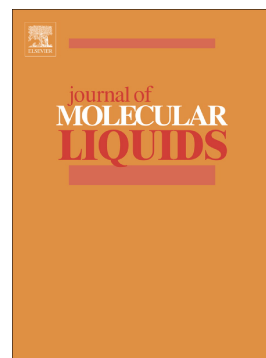


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Dielectric and spectroscopic study of nano-sized diamond dispersed ferroelectric liquid crystal

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Abstract

In the present work, a small concentration of nano-sized ($d < 10$ nm) diamond particles (NSDPs) were dispersed in the ferroelectric liquid crystal (FLC) and the dielectric and optical studies such as UV absorbance and photoluminescence (PL) spectra of pure FLC as well as FLC-NPs composite were performed. The polarizing optical micrographs (POM) show aggregation of NSDPs in the FLC-NPs composite system which also affects the alignment of the FLC slightly. We have found that the dispersion of NSDPs into the FLC material strongly influences the various properties of dispersed systems. Due to NSDPs dispersion, a rapid decrease in relative permittivity, dielectric loss and ac conductivity has been observed for FLC-NPs composite at lower frequencies. The absorbance and PL emission of FLC-NPs composite has been reduced and a blue shift in PL emission was detected. The possible applications of the composite system have also been suggested in this study.

Keywords: diamond nanoparticles; FLC; dielectric permittivity; ac conductivity; photoluminescence.

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