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Negative Resistance Behaviour and Molecular Reorientation Properties of Zinc Oxide Nanoparticles Based Liquid Crystals for High Image Quality Liquid Crystal Displays

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Abstract

The octylcyanobiphenyl (8CB) liquid crystal was doped by ZnO nanoparticles to improve the dielectric anisotropy parameters, as the image quality of liquid crystal displays (LCDs) is strongly dependent on the dielectric anisotropy of the liquid crystal. The dielectric anisotropy parameters of the liquid crystals have been determined. The magnitude of dielectric anisotropy of the 8CB liquid crystal was increased with nano-nematic composite liquid crystal system. The current voltage characteristics of 8CB and ZnO doped 8CB liquid crystals were determined using current voltage characteristics. The liquid crystals exhibited a voltage-controlled differential negative resistance behaviour (VCNR). The obtained results indicate that the ZnO nanoparticles increase the dielectric anisotropy parameters of the 8CB liquid crystal.

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