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Preparation of Liquid Crystal Doped with Nanomaterials and Studying of Electrical and Dielectric Properties

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Abstract

The effects of multiwall carbon nanotube on dielectric anisotropy and molecular reorientation properties of 4-heptyl-4'-cyanobiphenyl liquid crystal have been investigated. The 4-heptyl-4'-cyanobiphenyl liquid crystal exhibits the negative resistance effect at higher voltages (3.5 V), whereas multiwall carbon nanotube doped 4-heptyl-4'-cyanobiphenyl liquid crystal shifts it to the lower voltages (0.3 V). The 4-heptyl-4'-cyanobiphenyl and multiwall carbon nanotube doped 4-heptyl-4'-cyanobiphenyl liquid crystals indicate a p-type dielectric anisotropy behaviour. The multiwall carbon nanotube dopant increases the dielectric anisotropy Delta epsilon of 4-heptyl-4'-cyanobiphenyl as the dopant-used facilitates the reorientation of the molecules in liquid crystal. It has shown that the negative resistance effect and molecular reorientation properties of the 4-heptyl-4'-cyanobiphenyl are changed with multiwall carbon nanotube dopant.

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