Isotropic-Nematic Phase Transition in Liquid Crystal doped with magnetic particles

N. Tomašovičová,[1] V. Gdovinová,[1] V. Závišová,[1] M. Timko,[1] J. Jadzyn,[2] and P. Kopčanský[1]

[1] *Institute of Experimental Physics, Slovak Academy of Sciences, Kosice, Slovakia*

[2] *Institute of Molecular Physics, Polish Academy of Sciences, Poznan, Poland*

Recently a mean-field theory has been developed to describe the influence of embedded nanoparticles on the orientation order and on the isotropic–nematic (I-N) phase transition of the host liquid crystal. It was shown that spherically isotropic nanoparticles effectively dilute the liquid crystal medium and decrease the isotropic–nematic transition temperature. On the contrary, anisotropic nanoparticles become aligned by the nematic host and, reciprocally, improve the liquid crystal alignment. The influence of the anisotropy of magnetic particles on the I-N phase transition was studied in nematic liquid crystal 4-(trans-4-n-hexylcyclohexyl)-isothiocyanato-benzene doped with spherical and rod-like magnetic particles. The I-N phase transitions was observed by polarizing microscope as well as by capacitance measurements that demonstrate an influence of the concentration and the shape anisotropy of the magnetic particles on the I-N phase transition in liquid crystal.

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