

Confinement effects on blue phase transitions

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A detailed high-resolution calorimetry has been carried out in the vicinity of the cholesteric to blue phase I, blue phase I to blue phase III, and blue phase III to isotropic phase transitions of liquid crystals CE8, confined in silica aerosil networks and CdSe nanoparticle mixtures. A strong suppression of the cholesteric to blue phase I and blue phase I to blue phase III phase transition temperatures has been observed in comparison to blue phase III to isotropic phase transition temperature in case of CdSe nanoparticle mixtures. Much stronger suppression and smearing of the heat capacity anomalies have been found in case of CdSe mixtures than in aerosil mixtures of the same nanoparticle concentration. This surprising result, since CdSe particles do not form rigid network in our liquid crystal mixtures like aerosils [1-3], seems to be related to polymeric coating of the CdSe nanoparticles, which has significant impact on liquid crystal ordering.

References

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