Phase transition from blue phase III to blue phase I under different boundary conditions

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Anisotropic surface boundary condition is one of the promising techniques in controlling the self-organization soft materials. It has presented several distinct self-organized structures in liquid crystal (LC) system \cite{1,2}. Among the self-organized structures in LC system, the blue phases (BPs) that appear between chiral nematic (N*) and isotropic phases (Iso) have been highlighted due to its advanced display applications. LC molecules organize and form double-twisted cylinders under strong chirality, in which there are three BPs depending on its packing symmetry: cubic BP I, BP II and amorphous BP III. Herein, the sample prepared in the planar aligned glasses showed only amorphous BP III between Iso and N*, while the other placed on anisotropic boundary condition of planar and homeotropic anchoring surfaces showed phase transition to cubic BP I. This totally different phase transition behaviour with same molecules was investigated by polarized optical microscope, fluorescent confocal microscope and selective reflection spectra.

References:

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