

Photo-manipulation of the director field in nematic and twist-bend nematic droplets

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Photo-switchable surfactants enable manipulation of the anchoring conditions at water/LC and glass/LC interfaces using exposure to UV light. The anchoring condition can be reversibly switched from the orthogonal to a degenerated planar one. In our previous studies, we demonstrated light-driven reconfiguration of the director field and even the light-driven motion of the inclusions in a 5CB liquid crystal. Here, we investigate the behaviour of LC droplets of compound M (a mixture provided by Merck GmbH) exhibiting the nematic (N) and the twist-bend nematic (NTB) phases. We demonstrate that in contrast to 5CB, the droplets of M prefer a disclination loop to a hedgehog defect in the nematic state with an orthogonal anchoring condition. In the NTB phase a weak modulation of the director is observed which can be removed by changing to the planar condition under UV. We discuss these observations in the light of differences in the elastic anisotropy of 5CB and compound M. We also discuss and compare the NTB materials with bent-core nematics. Adjusting the anchoring energy by balancing the UV and VIS exposure opens new opportunity for fine tuning the optical properties of the LC droplets in LC emulsions.

References

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