

Self-assembled optical gratings with banana-shaped liquid crystals

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We have demonstrated that banana-shaped liquid crystals can assemble themselves into diffraction gratings when the melt of the banana-shaped compound, which was sandwiched between two pieces of glass substrates, is cooled to room temperature. Polarizing optical microscopic characterization shows that a pattern of periodic modulation of the refractive index can be developed in the thin films formed by the banana-shaped compound. Despite the gratings are groove free, they can diffract light as classically ruled gratings. Our work provides an alternative method for manufacturing diffraction gratings by harnessing the self-assembly of banana-shaped molecules.



Figure 1. Polarizing optical microscopic texture formed by banana-shaped liquid crystals.

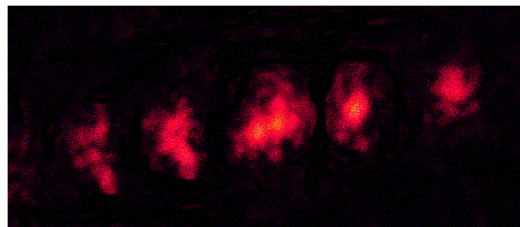


Figure 2. Typical photograph of the diffraction patterns of the self-assembled optical gratings formed by the banana-shaped molecules. The wavelength of the incident light was 633 nm.