

High birefringence liquid crystals with wide temperature range and low viscosity

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ABSTRACT

High birefringence liquid crystals have been widely investigated in various photonics, which are importance of prospective applications for detections and communications. High birefringence in a rod-like molecule requires large conjugation along the long axis of the molecules, in which the terphenyl skeleton by an insertion of triple bonds should be the reasonable choice for the molecular design. Comprehensive investigation revealed that all of these liquid crystals existed in high melting points and viscosities with poor stability under UV radiation, which arises out of problems for practical applications. The presentation will report our efforts to overcome above obstacles involving in the effect of lateral fluorine substitutions on the phase behavior and photo-stability and tail moieties on the phase range, birefringence and viscosities. Formulation trials have been proved that a mixture with temperature range from -40°C to +109.7°C and birefringence of 0.275 as well as viscosity of 95.4mPa.s was realized from our synthesized liquid crystals components.