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Wide temperature range and hysteresis free blue phase liquid crystals doped with bent-core compound JIE XIANG, OLEG TWIEG, OLEG LAVRENTOVICH, Kent State University — We explore an approach to widen the temperature range of the liquid crystalline blue phases based on mixtures of calamitic (rod-like) and bent-core mesogens. The calamitic component has a relatively low value of the bend elastic constant that is further reduced by adding the bent-core component. The mixtures exhibit the blue phase state in a wide temperature range, about 5°C in the regime of heating and 40°C (including the room temperature) upon cooling. We present a phenomenological model to illustrate the link between the temperature range of the blue phase and the bend elastic constant that is based on Kleman's model of double twist in liquid crystals. We also study the electro-optic properties of the mixtures. The electrooptic switching is reversible in the upper temperature range of the blue phase, but once the temperature decreases below a certain level, the electrooptic switching shows a hysteresis associated with phase separation of the components. The work was supported by NSF grant DMR 11212878.

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