

Synthesis and Characterization of Naphthalene-Based Banana-Shaped Liquid Crystals for Photoswitching Properties

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ABSTRACT

A series of banana-shaped monomers containing naphthalene as central units, azobenzene in side arms with terminal alkenes were synthesized and characterized. Polarizing optical microscopy, DSC and X-ray diffraction measurements reveal that one compound processes a nematic phase while other four compounds exhibit B6 phase. The absorption spectrum of trans-azobenzene displays high-intensity $\pi\text{-}\pi^*$ transition at 365 and low-intensity $n\text{-}\pi^*$ transition at 450 nm. These molecules exhibit strong photoisomerisation behaviour in solutions in which trans to cis isomerisation takes 55 seconds whereas reverse process takes about 32 hours. Such a long thermal back relaxation is useful for creation of optical image storage devices.

KEYWORDS: Naphthalene; Azobenzene; Isomerisation; Photoswitching; Optical image storage.

DOI: [10.1002/jccs.201300191](https://doi.org/10.1002/jccs.201300191)