Molecular Crystals and Liquid Crystals ›
Volume 596, 2014 - Issue 1: Optics of Liquid Crystals 2013

Original Articles

Thermally and Optically Fixable Shape Memory in Azobenzene-Functionalized Glassy Liquid Crystalline Polymer Networks

Jeong Jae Wie, Kyung Min Lee & **Timothy J. White**

Pages 113-121 | Published online: 30 Sep 2014

Download citation https://doi.org/10.1080/15421406.2014.918336

Full Article Figures & data References Citations Metrics

Reprints & Permissions Get access

Abstract

Thermally and optically fixed shape memory is examined in glassy, azobenzene-functionalized liquid crystalline polymer networks (azo-LCN) in the twisted nematic (TN) geometry. The thermal and optical responses of two materials with a large difference in crosslink density are contrasted. The crosslink density was reduced through the inclusion of a monoacrylate liquid crystal monomer RM23. Reducing the crosslink density decreases the threshold temperature of the thermally-induced shape change and increases the magnitude of the deflection. Surprisingly, samples containing RM23 also allows for retention of a complex permanent shape, potentially due to differentiated thermal response of the pendant and main chain mesogenic units of the azo-LCN material.

Keywords: Liquid crystal polymer shape memory azobenzene

Acknowledgments

This work was completed at Air Force Research Laboratory (AFRL) at Wright-Patterson Air Force Base with funding from Materials and Manufacturing Directorate as well as Air Force Office of Scientific Research.