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Free-Standing and Circular-Polarizing Chirophotonic Crystal Reflectors: Photopolymerization of Helical Nanostructures

Dae-Yoon Kim[†], Changwoon Nah[†], Shin-Woong Kang[‡], Seung Hee Lee[‡], Kyung Min Lee[§], Timothy J. White[§], and Kwang-Un Jeong[*†]

Hide Author Information

[†]BK21 Plus Haptic Polymer Composite Research Team & Department of Polymer-Nano Science and Technology, and
[‡]Department of BIN Convergence Technology, Chonbuk National University, Jeonju 54896, Korea
§ U.S. Air Force Research Laboratory, Wright-Patterson Air Force Base, Ohio 45433-7750, United States

*E-mail: kujeong@jbnu.ac.kr

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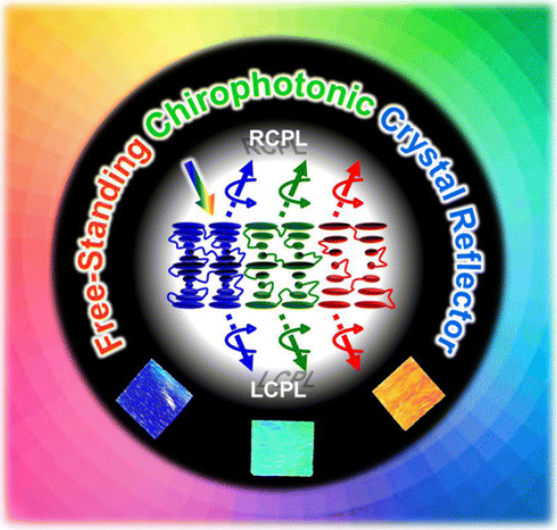
Abstract



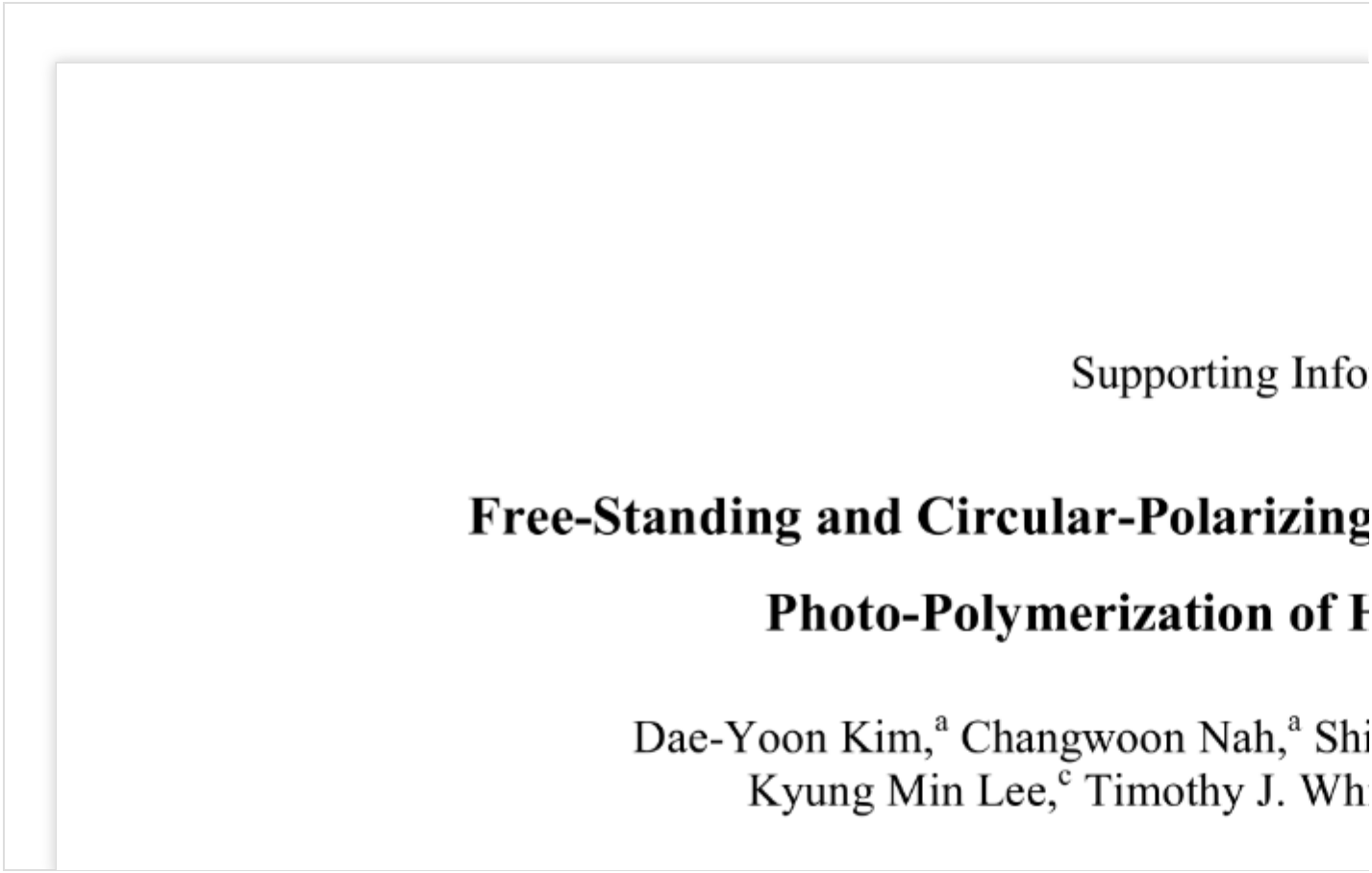
The preparation of materials exhibiting structural colors has been intensively studied in biomimetic science and technology. Utilizing a newly synthesized cholesteric liquid-crystal (CLC) monomer (abbreviated as BP_1CRM), we have prepared CLC films. Photoinitiated copolymerization of this monomer with a common achiral liquid-crystalline monomer produced free-standing films with homogeneous and nanoscale pitch distributions. Employing the thermal sensitivity of the CLC monomer, chirophotonic crystal reflectors were prepared exhibiting a range of colors. The free-standing and circular-polarizing chirophotonic crystal films maintain excellent thermal, mechanical, and chemical stabilities, and the composition can readily be applied as polarized optical films and smart paints.

KEYWORDS: photonic crystal, helical nanostructure, free-standing, circular-polarizing

The Supporting Information is available free of charge on the ACS Publications website at DOI: 10.1021/acsnano.6b04949.

- Synthesis of BP_1CRM, sample preparation for optical and morphological studies, and characterization methods (PDF)

Free-Standing and Circular-Polarizing Chirophotonic Crystal Reflectors: Photopol



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