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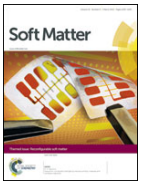
Previous Next



From the journal:
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Design of polarization-dependent, flexural–torsional deformation in photo responsive liquid crystalline polymer networks†

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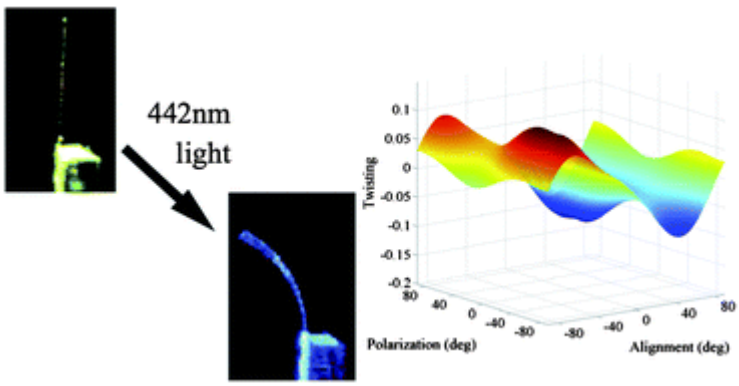
Abstract

Light responsive materials that exhibit wirelessly actuated, multidimensional deformation are excellent candidates for programmable matter applications such as morphing structures or soft robotics. A central challenge to designing adaptive structures from these materials is the ability accurately predict three dimensional deformations. Previous modeling efforts have focused almost exclusively on pure bending. Herein we examine key material parameters affecting light driven flexural–torsional response in

azobenzene functionalized liquid crystal polymer networks. We show that a great deal of control can be obtained by specifying material alignment and actuating the material with polarized light. Insight gained from the theoretical framework here lays the foundation for more extensive modeling efforts to combine polarization controlled flexural–torsional deformations with complex geometry, boundary conditions, and loading conditions.



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