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Track 12-29 Soft Materials Mechanics, IMECE 2011

"Controlling Surface Patterns in Light-Activated Polymer Films Via Photo-Induced Eigenstrains"

Light-activated polymers undergo photo-chemically induced deformation in response to material specific wavelengths. This capability is potentially attractive for use in sensing, actuating, and phononic meta-material applications since light is an excellent stimulus to locally, and without contact, alter the state of deformation in the material down to submicron lengths. Previous work of the authors has focused on developing and validating multi-physics constitutive models to represent this phenomenon in an effort to provide a useful design tool to take advantage of light-actived deformation. With this tool in place, the focus of this talk is to explore elements of the vast design space available to such materials such as the tunable buckling of thin films and the formation of trenches and other features on film surfaces. Experimental and simulated results will be presented along with a brief discussion of future research efforts.