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Electro-Optic Polymer Films for Reconfigurable Photomask Applications ADAM FONTECCHIO, ANNA FOX, Drexel University — Holographically formed polymer dispersed liquid crystal (H-PDLC) films have unique electro-optic properties including the ability to selectively reflect or transmit a particular wavelength as a function of bias applied to the film. The proposed application formed in this medium is a real-time dynamically reconfigurable mask for the UV exposure step in the photolithographic process. Current photolithography technology requires a static mask to prevent UV exposure of selected areas on the patterning surface in order to form structures in photoresist. The exposure process must be repeated several times with different masks to fabricate 3D structures. A real-time reconfigurable mask allows simple generation of 3D structures including peaks, valleys, and grades in the resist substrate. The H-PDLC photomask consists of a film array with independent control over each pixel. Bias is applied across the selected pixels to allow UV exposure in that region. Change in applied bias allows transmission, reflection, and grayscale during a single UV exposure. Proof of concept is shown for a 9-pixel array with passive-matrix style control over each pixel. Samples of cured photoresist in several configurations using the 9-pixel mask are evaluated.

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