Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Photopatterned surface relief gratings in azobenzene-amorphous polycarbonate thin films[1] MORTEN VOLLMANN, Technical University Berlin, PETER GETEK, University of Applied Sciences Berlin, KELLIE OLEAR, CODY COMBS, BENJAMIN CAMPOS, EDMUND WITKOWSKI, The College of New Jersey, ERIN CAIN, Temple University, DAVID MCGEE, The College of New Jersey — Photoinduced orientation of azobenzene chromophores in polymeric host materials has been broadly explored for optical processing applications. Illumination of the chromophore with polarized light rotates the trans isomer perpendicular to the polarization, resulting in spatially modulated birefringence. The photoinduced anisotropy may also drive mass transport, with surface relief patterns being observed in a wide variety of systems. Here we report photoinduced birefringence in a guest-host system of Disperse Red 1- amorphous polycarbonate (DR1-APC). Birefringence was induced with a 490 nm laser and probed at 633 nm, with typical values of Δn = 0.01 in 2 micron thick films. Illumination of DR1-APC with intensity and/or polarization gratings also resulted in sinusoidal surface relief patterns with periodicity 1- 3 micron as controlled by the interbeam crossing angle of the 490 nm writing beams; the surface modulation was +/- 20 nm as measured by atomic force microscopy. Photopatterned DR1-APC is advantageous for applications given the ease of thin-film fabrication and the high glass transition temperature of APC, resulting in robust optically-induced surface gratings.

[1]We acknowledge support from NSF-DMR award No. 1138416

David McGee
The College of New Jersey

Date submitted: 05 Nov 2015 Electronic form version 1.4