Abstract Submitted
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Fabrication and Theoretical Evaluation of Microlens Arrays on Layered Polymers[1] TOM ODER, MICHAEL MCMASTER, COREY MERLO, CAMRON BAGHERI, CLAYTON REAKES, JOSHUA PETRUS, DINGQIANG LI, MICHAEL CRESCIMANNO, JAMES ANDREWS, Youngstown State University — Arrays of microlens were fabricated on nano-layered polymers using reactive ion etching. Semi hemispherical patterns with diameters ranging from 20 to 80 micrometers were first formed on a thick photoresist film that was spin-coated on the layered polymers using standard photolithographic process employing a gray scale glass mask. These patterns were then transferred to the polymers using dry etching in a reactive ion etching system. The optimized etch condition included a mixture of sulfur hexafluoride and oxygen, which resulted in an etch depth of 5 micrometers and successfully exposed the individual sub-micron thick layers in the polymers. Physical characterization of the microlens arrays was done using atomic force microscope and scanning electron microscope. We combine basic physical optics theory with the transfer matrix analysis of optical transport in nano-layered polymers to address subtleties in the chromatic response of microlenses made from these materials. In particular this method explains the len's behavior in and around the reflection band of the materials.

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