

Poly (styrene-ran-glycidyl methacrylate) as Low-Shrinkage Photoresist for Holographic Lithographically Fabricated 3D Photonic Crystal

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SU-8, which is commercially available negative-tone photoresist, has been widely used to fabricate micro and submicro-scale structure via photolithography. However, SU-8 templates often suffer from large volumetric shrinkage during post-exposure baking (PEB) and development. This can lead to dimensional distortion, causing photonic crystals (PhC) structures different from the original design and incomplete photonic bandgaps (PBG). Therefore, the fidelity of the final PhC structure is critically dependent on the polymer template. In this study, we reported new photoresist, poly(styrene-ran-glycidyl methacrylate), having low-volumetric shrinkage for fabricating 3D PhC. In our work, 3D PhC was created by holographic lithography using top-cut pyramid prism to prove lower shrinkage than conventional SU-8.