

Abstract Submitted  
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**Orthogonal gradient networks via post polymerization reaction**

PANDIYARAJAN CHINNAYAN KANNAN, JAN GENZER, North Carolina State University — We report a novel synthetic route to generate orthogonal gradient networks through post polymerization reaction using pentafluorophenylmethacrylate (PFPMac) active ester chemistry. These chemoselective monomers were successfully copolymerized with 5 mole% of the photo (methacryloyloxybenzophenone) and thermal (styrenesulfonylazide) crosslinkers. Subsequently, the copolymers were modified by a series of amines having various alkyl chain lengths. The conversion of post polymerization reaction was monitored using Fourier Transform Infrared Spectroscopy (FT-IR) and noticed that almost all pentafluorophenyl moieties are substituted by amines within in an hour without affecting the crosslinkers. In addition, the incorporation of photo and thermal crosslinkers in the polymer enabled us to achieve stable and covalently surface-bound polymer gradient networks (PGN) in an orthogonal manner, i.e. complete control over the crosslink density of the network in two opposite directions (i.e. heat vs photo). The network properties such as wettability, swelling and tensile modulus of the gradient coatings are studied and revealed in the paper.

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