

Condensation of maleic anhydride with a diol produces an unsaturated polyester resin (UPR). UPR are brittle and must be commercially reinforced with fillers. One approach to improve the mechanical properties of the resin is to modulate the macromolecular interactions between the polymer strands; research steps have been taken that involve incorporation of aryl co-monomer units, the tethering of aryl groups to the UPR backbone through multi-step syntheses or polymer curing through Michael reactions, photochemical reactions, or dipolar cycloadditions. However, these efforts fall short of supplying an easily mouldable plastic that possesses the desired mechanical properties. This proposal suggests an orthogonal set of reactions on a polyester backbone through two chemoselective reactions with commercially available materials, or materials that are readily synthetically accessible. The maleate double bonds of MAn are readily reactive to Michael reactions. When condensed with *cis*-2-butene-1,4-diol, the resulting UPR is MAn-*co*-Butene diol; the alkene of the diol units is reactive to 1,3-dipolar cycloaddition via the Prato reaction. Using these two chemoselective synthetic handles, we propose a series of covalent and non-covalent schemes to enhancing the mechanical properties of the UPR polymer. Our goal is to create a library of UPR in which the polymer properties are catalogued before and after enhancement by supramolecular interactions or polymer curing. The data will provide valuable insight into the fundamental relationship between structure and property of these thermosets.