Facile Synthesis of Unsaturated Polyester-Based Double-Network Gels via Chemoselective Cross-Linking using Michael Addition and Subsequent UV-Initiated Radical Polymerization

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Figure S1. $^1$H NMR spectrum of poly(MAn-alt-MPD).

Figure S2. $^1$H NMR spectrum of poly(FA-alt-MPD) (after isomerization of poly(MAn-alt-MPD) in DMF for 12 h.)
Figure S3. $^1$H NMR spectrum of poly(IAn-alt-MPD).

Figure S4. $^1$H NMR spectra of poly(IAn-co-MA-MA-co-MPD)(upper, $[\text{IAn}]_0:[\text{MA}]_0=1:8$; lower, $[\text{IAn}]_0:[\text{MA}]_0=1:4$).
Figure S5. $^1$H NMR spectrum of poly(IA$n$-co-MA$n$-co-TEG).

Figure S6. SEC curves of maleate polyester (blue line) and fumarate polyester after isomerization in DMF for 12 h (red line).
Figure S7. Mechanism of isomerization of maleate double bonds to fumarate double bonds.

Figure S8. $^1$H NMR spectrum of product from reaction of poly(FA-\textit{alt}-MPD) and \textit{n}-butylamine at room temperature for 20 min (Table 3, entry 1).
Figure S9. $^1$H NMR spectrum of product from reaction of poly(IAn-alt-MPD) and $n$-butylamine at room temperature for 20 min (Table 3, entry 2).

Figure S10. $^1$H NMR spectrum of poly(amino-ester) prepared by Michael addition of poly(MAn-alt-MPD) with $n$-butylamine at room temperature.
Figure S11. $^1$H NMR spectrum of poly(amino-ester) prepared by Michael addition of poly(MAn-alt-MPD) with isobutylamine at room temperature.

Figure S12. $^1$H NMR spectrum of poly(amino-ester) prepared by Michael addition of poly(MAn-alt-MPD) with benzylamine at room temperature.
Figure S13. $^1$H NMR spectrum of dimethyl 2-(butylamino)butanedioate synthesized by Michael addition of dimethyl maleate with $n$-butylamine.

Figure S14. $^1$H NMR spectrum of model reaction. Dimethyl 2-(butylamino)butanedioate reacted with dimethyl maleate for 24 h, and only 4% of $cis$ double bonds isomerized to $trans$ double bonds.
Figure S15. FT IR spectra of poly(MAn-alt-MPD) before (red) and after (blue) cross-linked by 1,2-ethanediamine. The peaks at 1377-1408 cm$^{-1}$ ascribed to cis double bonds and the peaks at 1261-1298 cm$^{-1}$ assigned to trans double bonds.