

Supporting Information

Super Tough Bilayer Actuators Based on Multi-Responsive Hydrogels

Crosslinked by Functional Triblock Copolymer Micelle Macro-Crosslinkers

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Characterization of F127DA

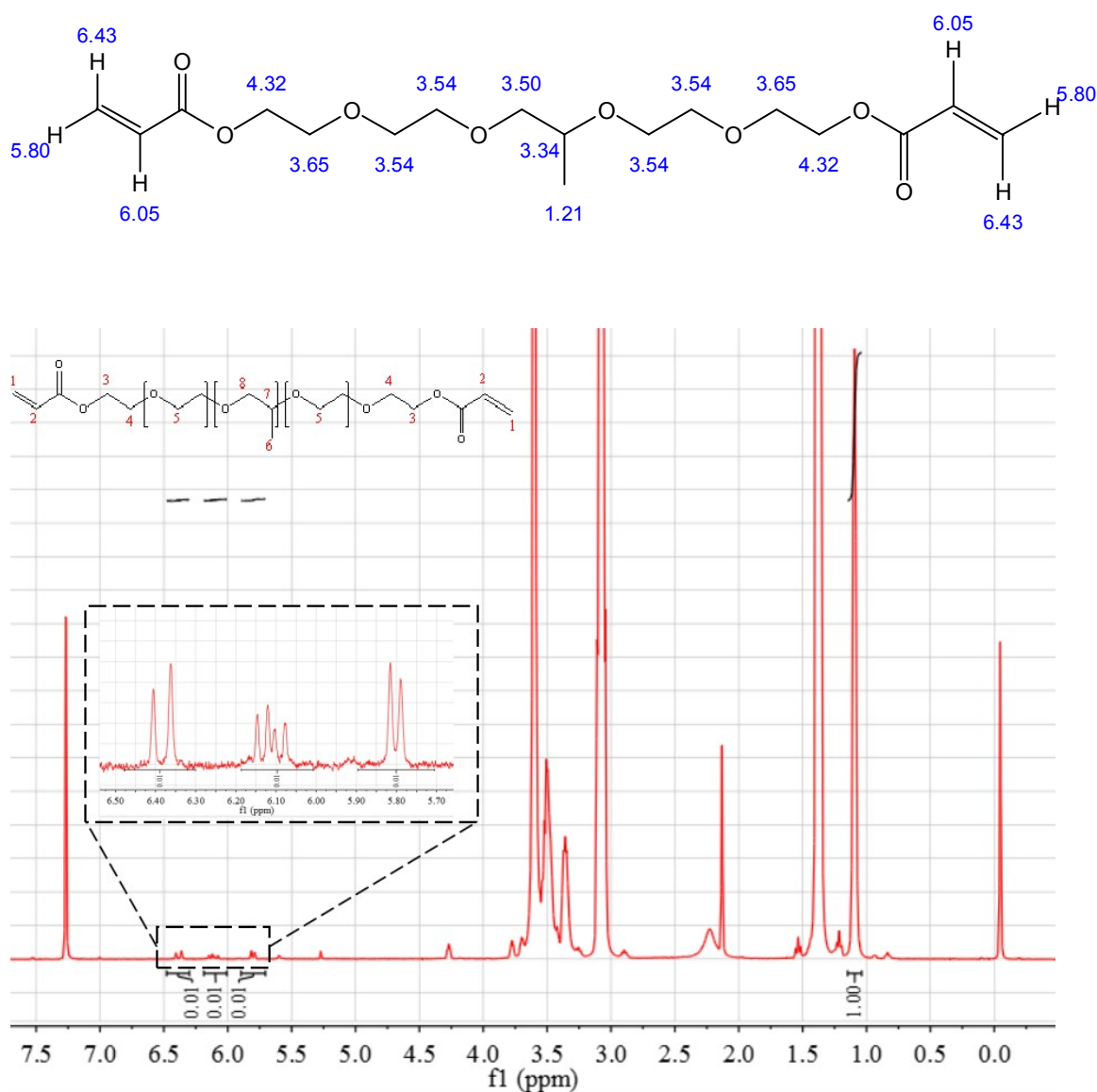


Figure S1. Structure of F127DA and its ^1H NMR spectrum.

Figure S1 shows the ^1H NMR spectrum of the synthesized F127DA. The peak of 1.21 ppm is attributed to the proton of $-\text{CH}_3$ at the PPO unit, and the peaks of 5.8-6.4 ppm are attributed to the proton of $-\text{CH}=\text{CH}_2$ in the acryl unit. The ratio of the relative peak areas of 5.8-6.4 ppm to 1.1 ppm in ^1H NMR spectrum is 0.03. The theoretical value of the fully acrylated F127DA molecule is 1/32.5. Therefore, the conversion ratio of F127 to F127DA is 97.5% by calculating the ratio of the actual value to the

theoretical value.

Formulations for Hydrogel Preparation

Table S1 Contents of monomers used for preparation of different hydrogel samples

Sample	NIPAM (mol/L)	AAm (mol/L)	F127DA (mol/L)	KPS (mg)	TEMED (μ L)	Deionized water (ml)
N ₂	2	0	6×10^{-3}	10	10	5
N ₄	4	0	6×10^{-3}	10	10	5
N ₆	6	0	6×10^{-3}	10	10	5
N ₈	8	0	6×10^{-3}	10	10	5
N ₁₀	10	0	6×10^{-3}	10	10	5
N ₂ A _{0.4}	2	0.4	6×10^{-3}	10	10	5
N ₂ A ₂	2	2	6×10^{-3}	10	10	5
N ₂ A ₁₀	2	10	6×10^{-3}	10	10	5
N ₂ A ₂₀	2	20	6×10^{-3}	10	10	5
N ₄ A ₄	4	4	6×10^{-3}	10	10	5
N ₆ A ₆	6	6	6×10^{-3}	10	10	5
N ₈ A ₈	8	8	6×10^{-3}	10	10	5
N ₁₀ A ₁₀	10	10	6×10^{-3}	10	10	5