Electronic Supplementary Material (ESI) for Polymer Chemistry.

Supporting Information for

Dual-faced borax mediated synthesis towards self-healable hydrogels merging dynamic covalent bonding and micellization

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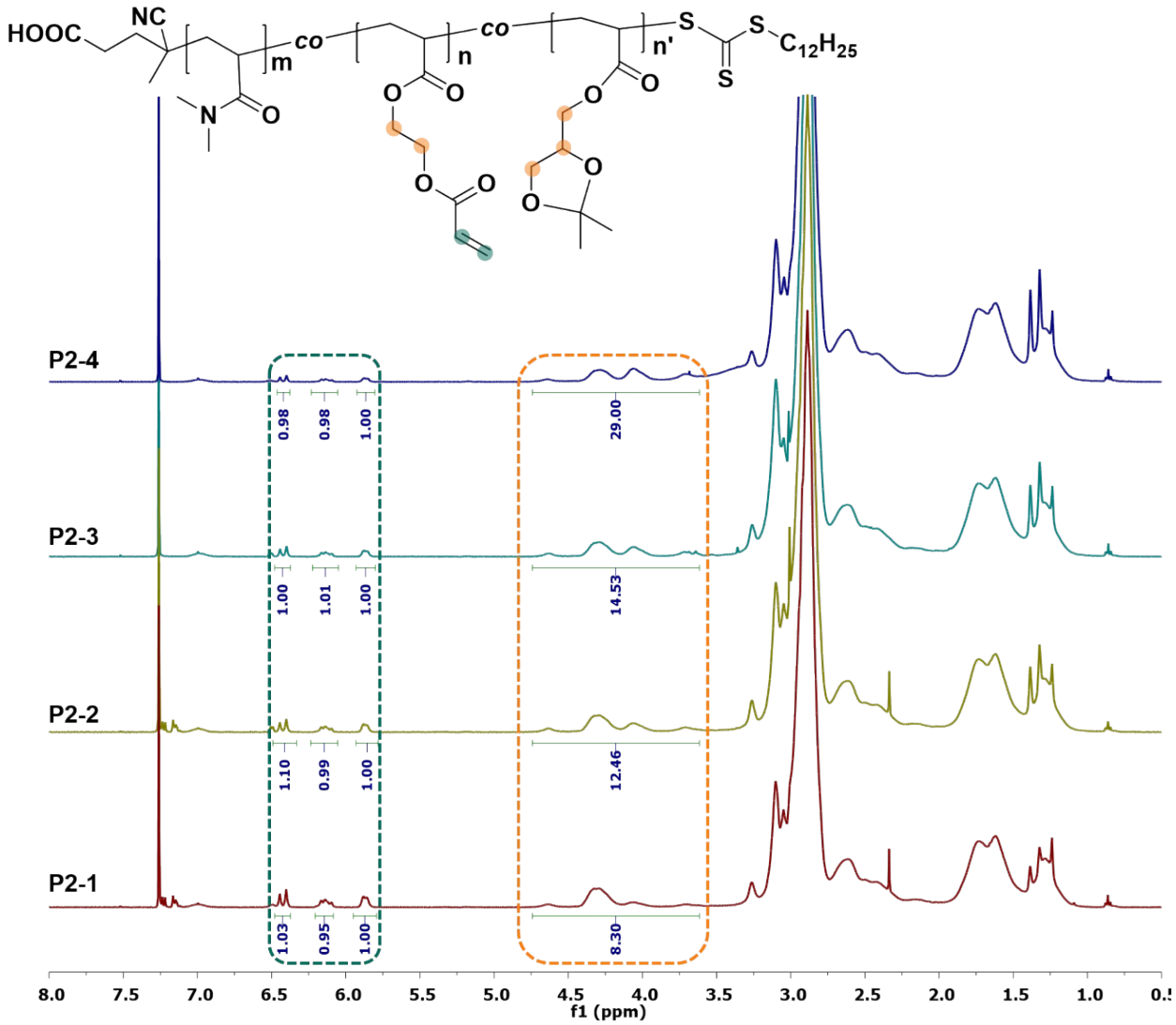


Figure S1. ^{1}H-NMR spectra (400 MHz) of P(DMA-*co*-EDA-*co*-IPA), i.e. P2, with different ratios of EDA: IPA in $CDCl_3$, respectively P2-1, P2-2, P2-3 and P2-4.

Table S1 The molar ratios of EDA : IPA as determined by ^{1}H-NMR spectra in Figure S1 for P2, respectively P2-1, P2-2, P2-3 and P2-4

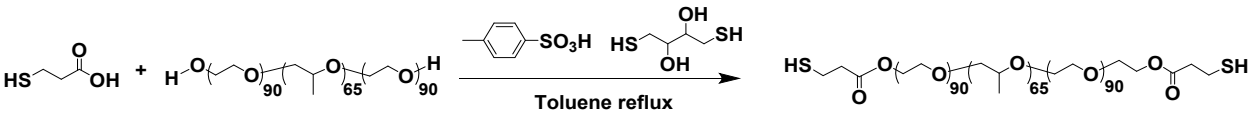
Copolymer	Feeding molar ratio (EDA:IPA)	Actual molar ratio[a] (EDA:IPA)
P2-1	**60:40**	**60:51 (1:0.86)**
P2-2	**40:60**	**40:67 (1:1.69)**
P2-3	**30:70**	**30:63 (1:2.11)**
P2-4	**20:80**	**20:100 (1:5.00)**

[a] Determined by ^{1}H-NMR spectra in Figure S1

Table S2 Formulations for different specimens containing (P(DMA-co-EDA-co-DHA)) (P3) with different molar ratios of EDA : DHA (P3-1, P3-2, P3-3 and P3-4 are the deprotection products of P2-1, P2-2, P2-3 and P2-4, respectively) and their corresponding gelation time.

Specimen	Copolymer	Acrylate: diol: SH: borax[a]	Solid Content	Gelation time
S3-1	**P3-1**	**1:0.86:1:0.17**	**20%**	**30"**
S3-2	**P3-2**	**1:1.69:1:0.33**	**20%**	**58"**
S3-3	**P3-3**	**1:2.11:1:0.42**	**20%**	**1'50"**
S3-4	**P3-4**	**1:5.00:1:1**	**20%**	**No gelation**

[a] Molar ratio between the acrylate and diol groups was determined by ^{1}H-NMR spectra in Figure S1, and molar ratio of diol and borax was fixed at 5 : 1.



Scheme 1. The synthesis route of thiol-terminated Pluronic F127 (PF127-SH).

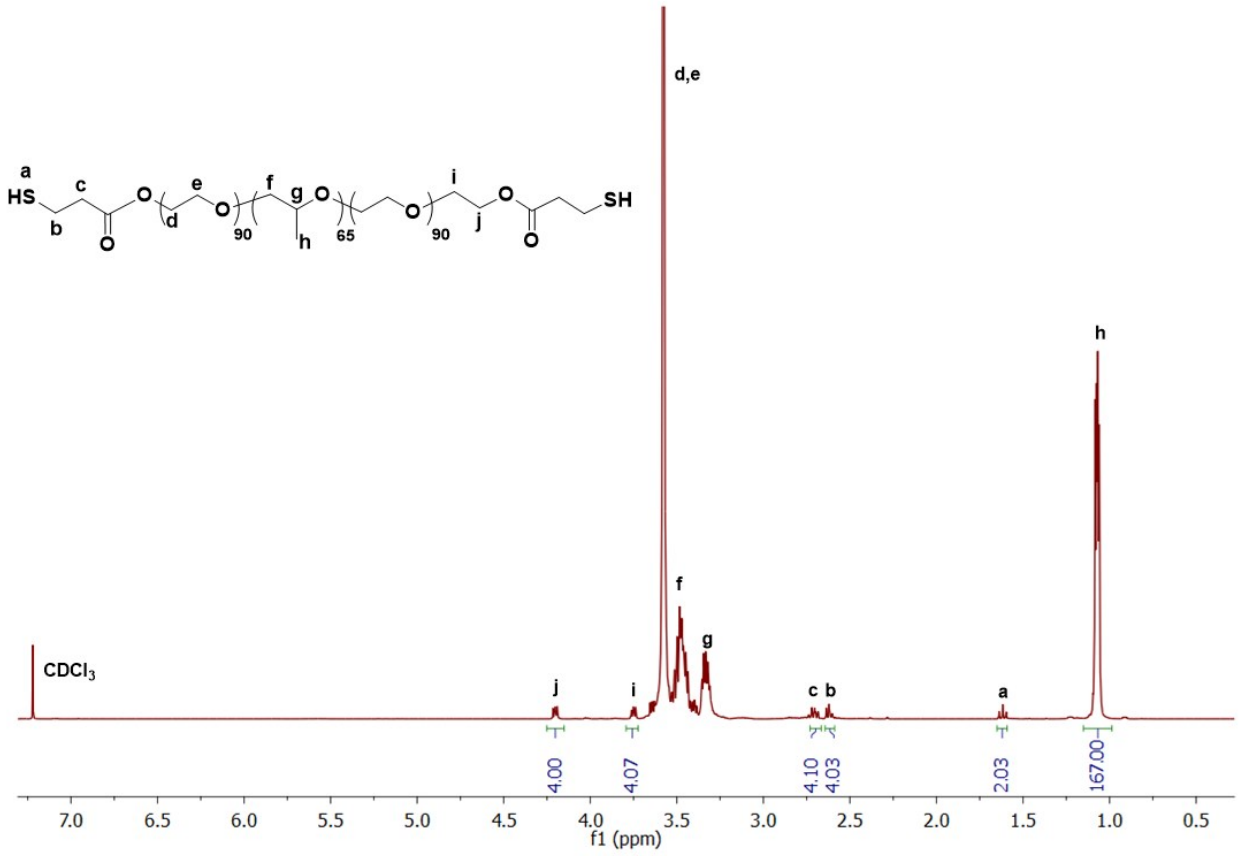


Figure S2. ^{1}H-NMR spectra (400 MHz) thiol-terminated Pluronic F127 (PF127-SH) in $CDCl_3$ with detailed integral information.

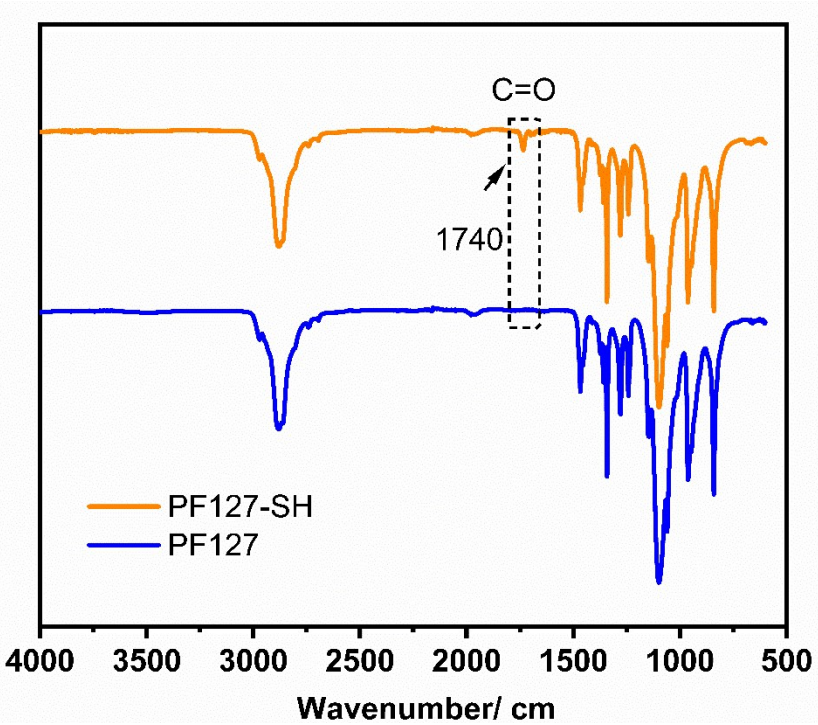


Figure S3. FT-IR spectra of thiol-terminated Pluronic F127 (PF127-SH, upper yellow line) and Pluronic F127 (PF127, bottom blue line).

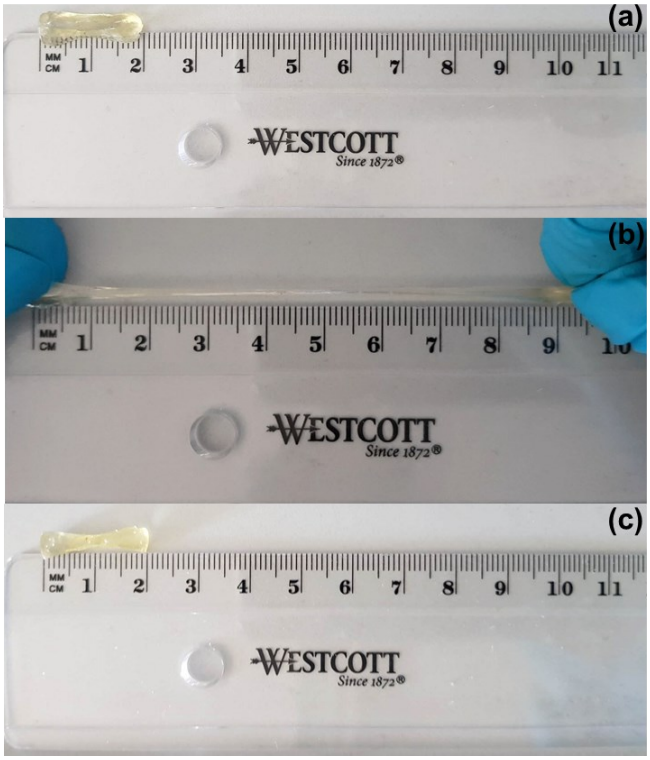


Figure S4. Photograph showing the shape recovery of the hydrogel sample: original sample (a); stretched to around 330 %; (c) after releasing the load for 30 min.

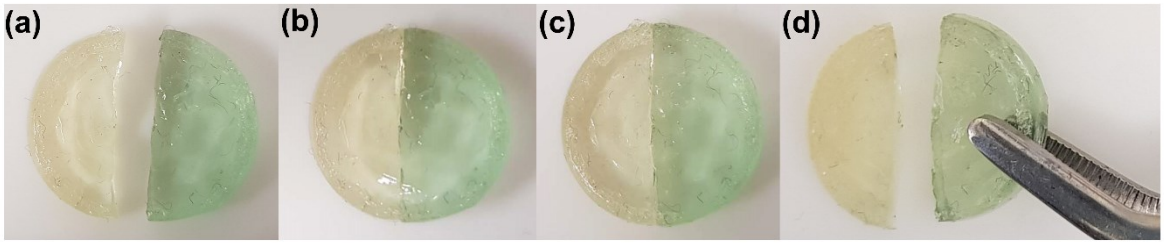


Figure S5. Photograph showing the cut-and-heal tests on P(DMA-*co*-EDA-*co*-IPA) (P2, with designated molar ratio of EDA / IPA =30 : 70) based hydrogel. (a) disk-shaped samples with and without dye were prepared and cut into pieces; (b) two pieces were put into contact; (c) self-healing for 24 h; (d) the two segments failed to integrate into one after 24 h.