

Electronic Supplementary Information (ESI)

Gelatin based dynamic hydrogels via thiol-norbornene reactions

M. Mario Perera and Neil Ayres*

Address: Department of Chemistry, The University of Cincinnati, Cincinnati, OH 45221

*Corresponding Author: Phone +01 513 556 9280; Fax +01 513 556 9239; E-mail Neil.Ayres@UC.edu

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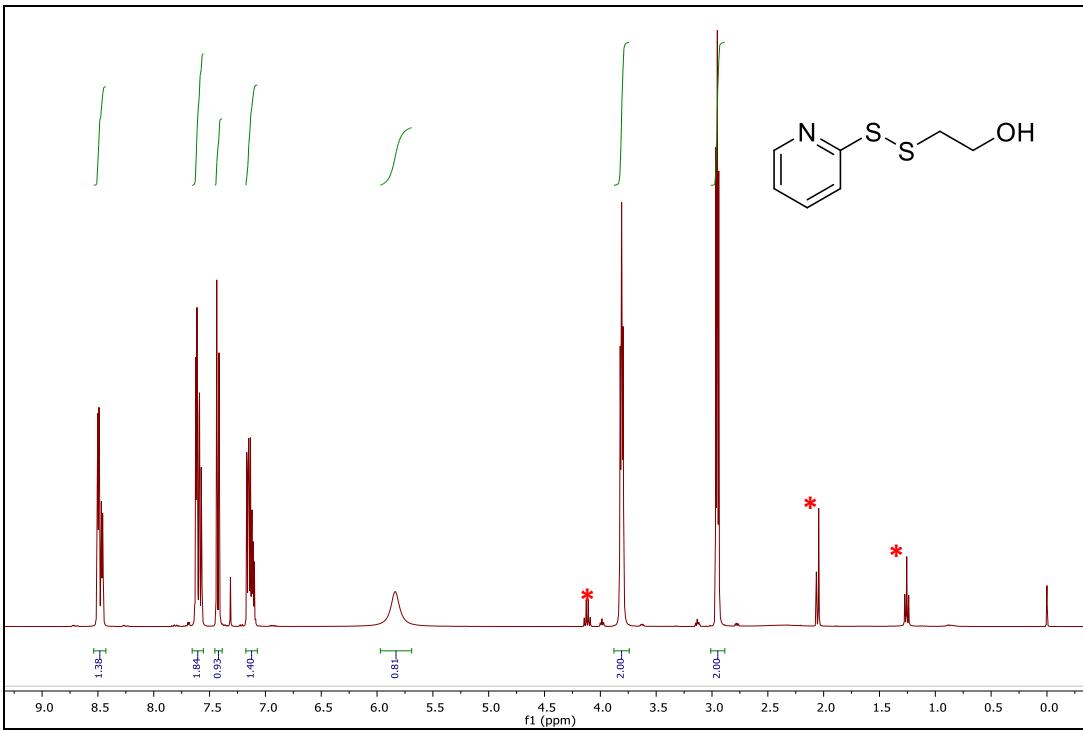


Figure S1. ^1H NMR spectrum of hydroxyethylpyridyl disulfide (HPDS). (* Solvent- Ethyl acetate).

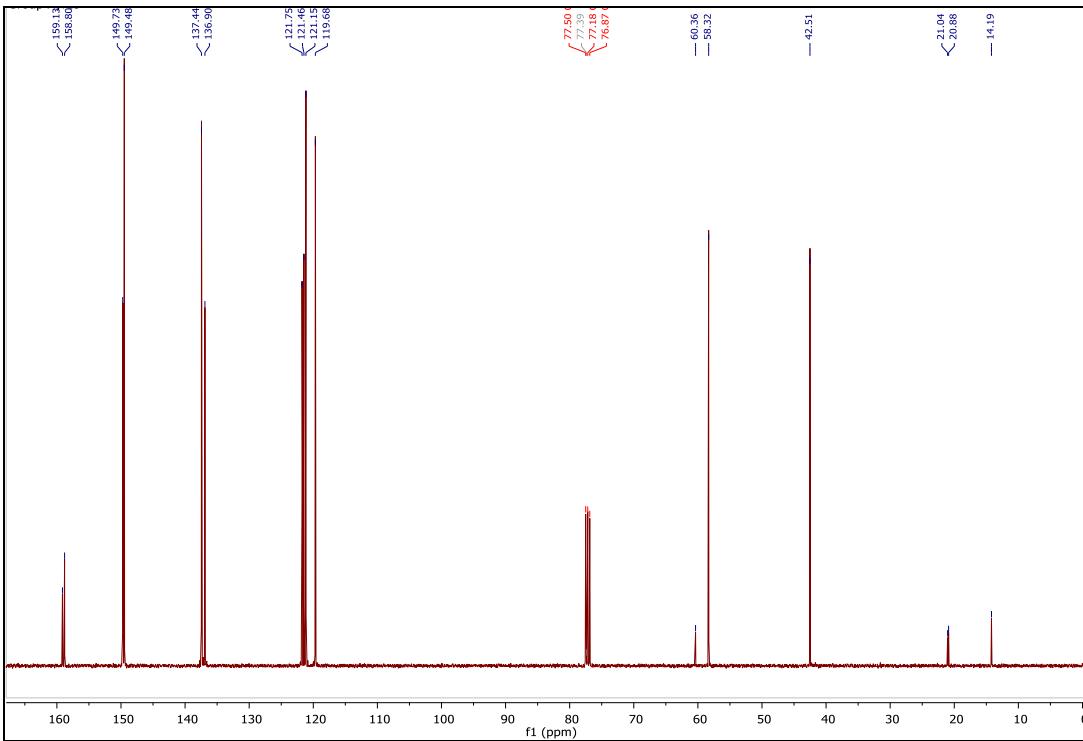


Figure S2. ^{13}C NMR spectrum of HPDS.

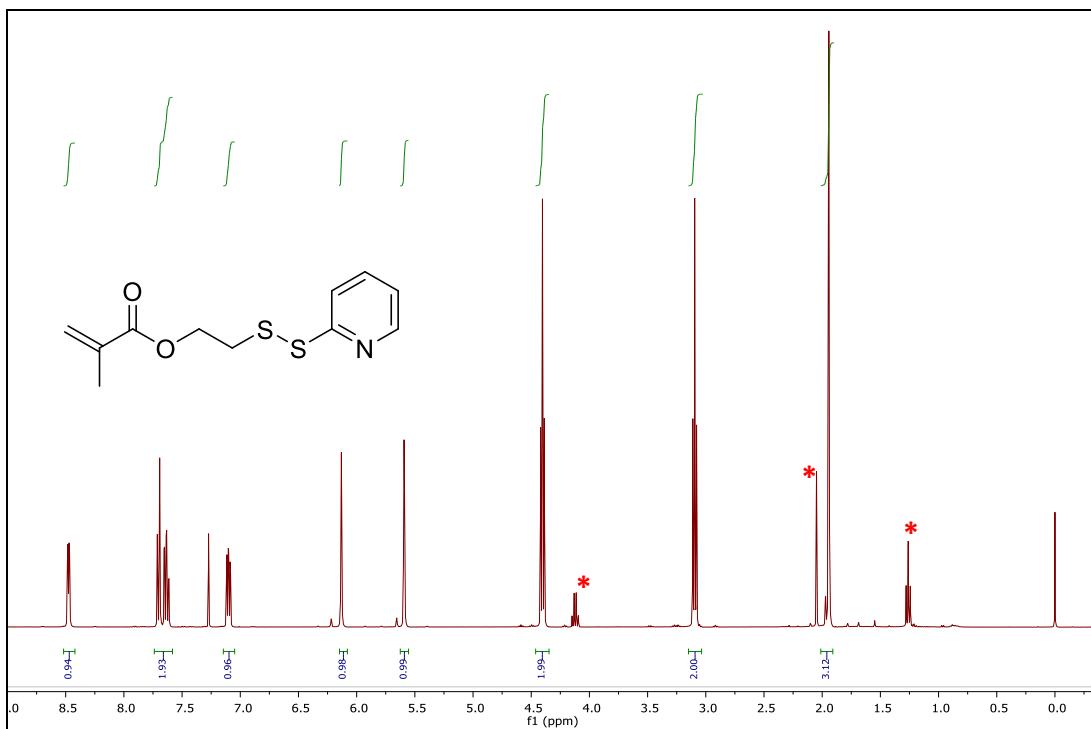


Figure S3. ^1H NMR spectrum of pyridyl disulfide ethylmethacrylate (PDSEMA). (*) indicates the ethyl acetate solvent).

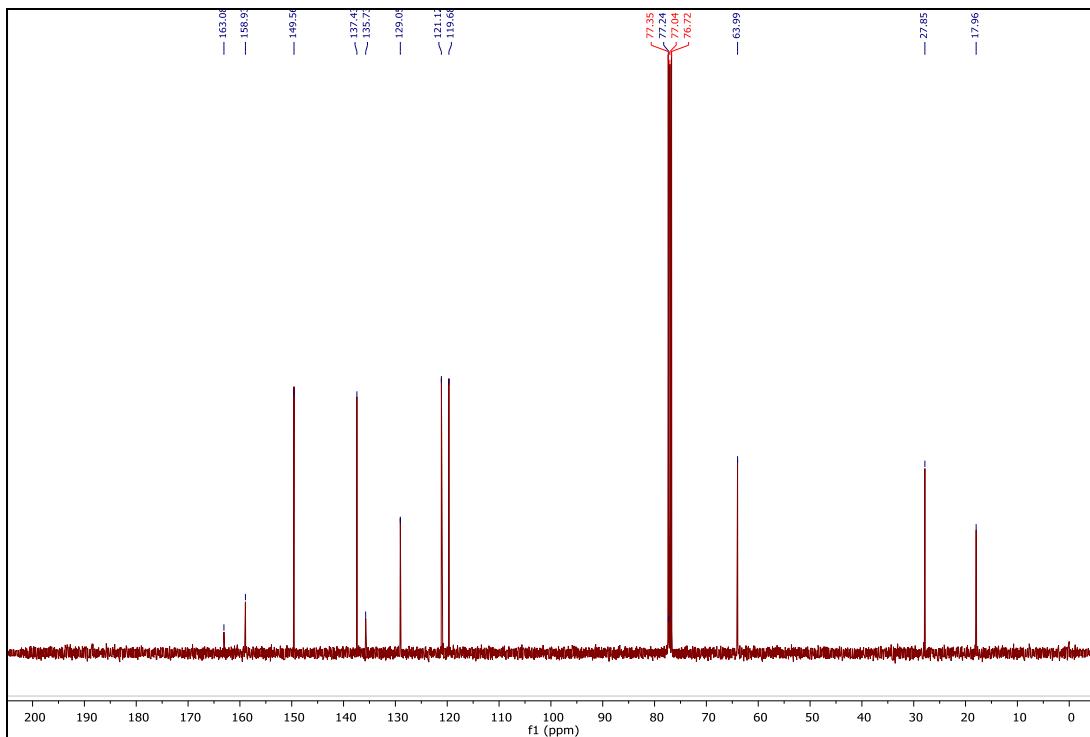


Figure S4. ^{13}C NMR spectrum of PDSEMA.

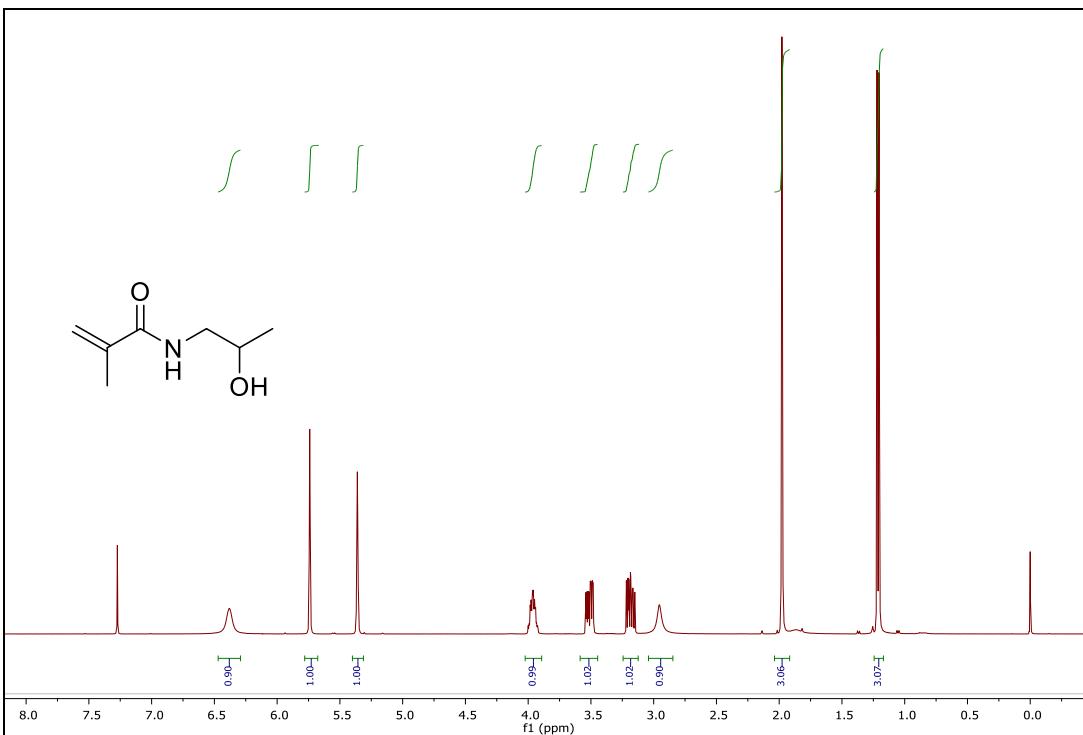


Figure S5. ^1H NMR spectrum of 2-hydroxypropyl methacrylate (HPMA).

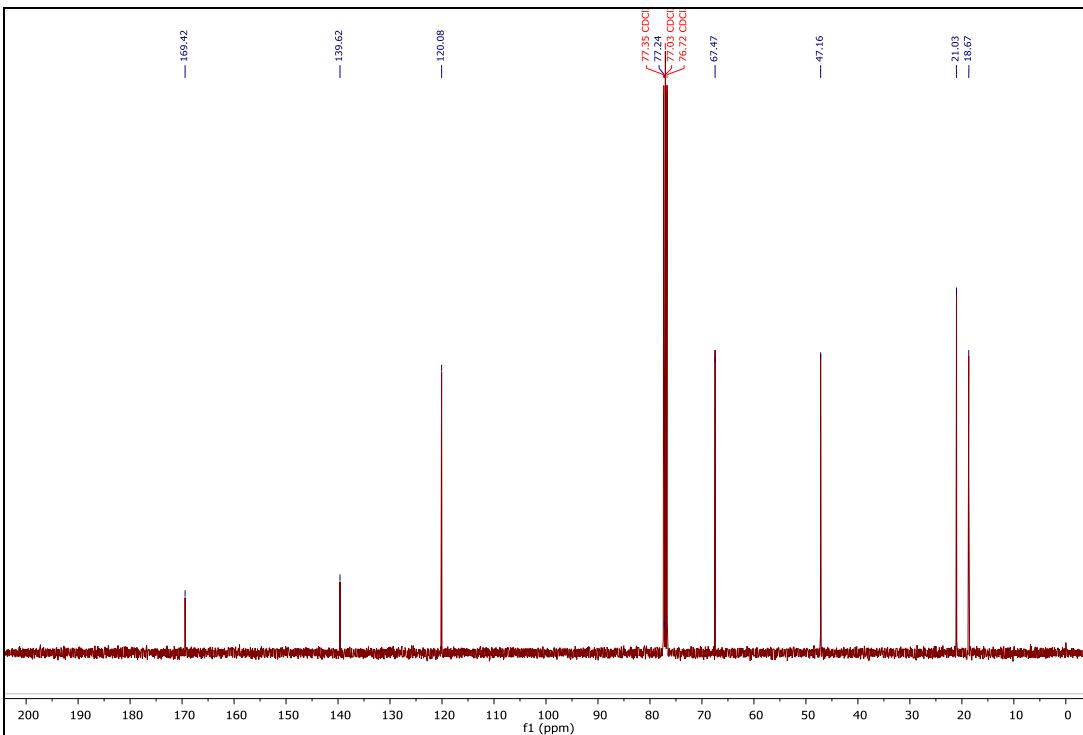


Figure S6. ^{13}C NMR spectrum of HPMA.

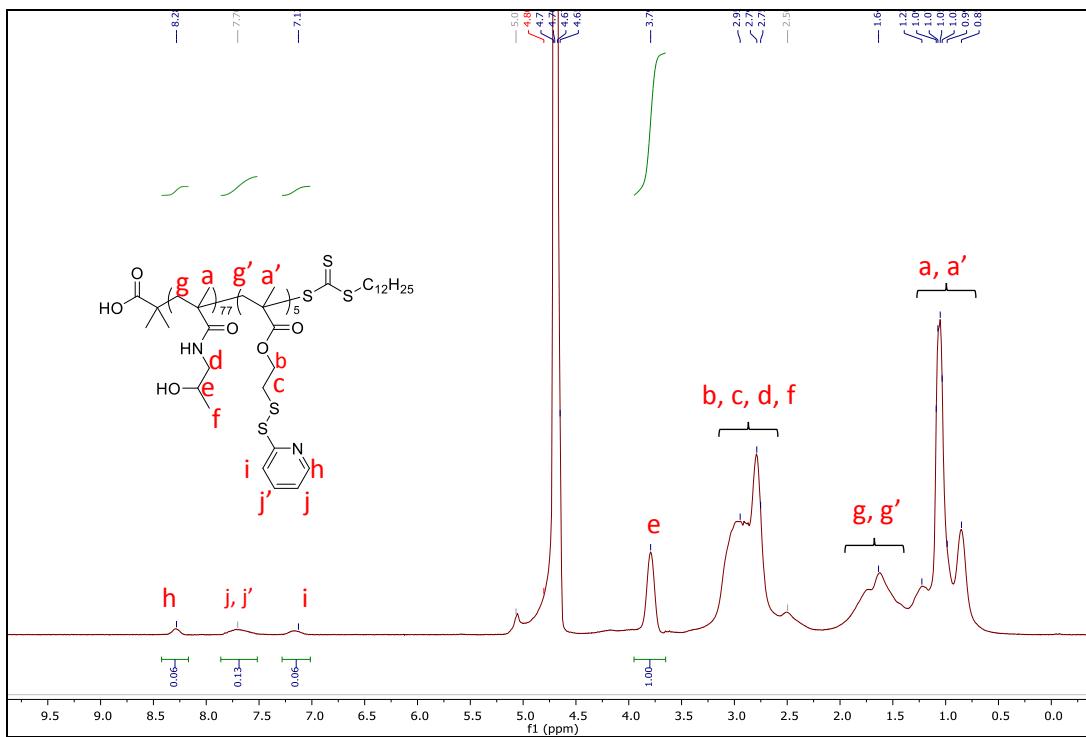


Figure S7. ¹H NMR spectrum of poly(HPMA₇₇-s-PDSEMA₅).

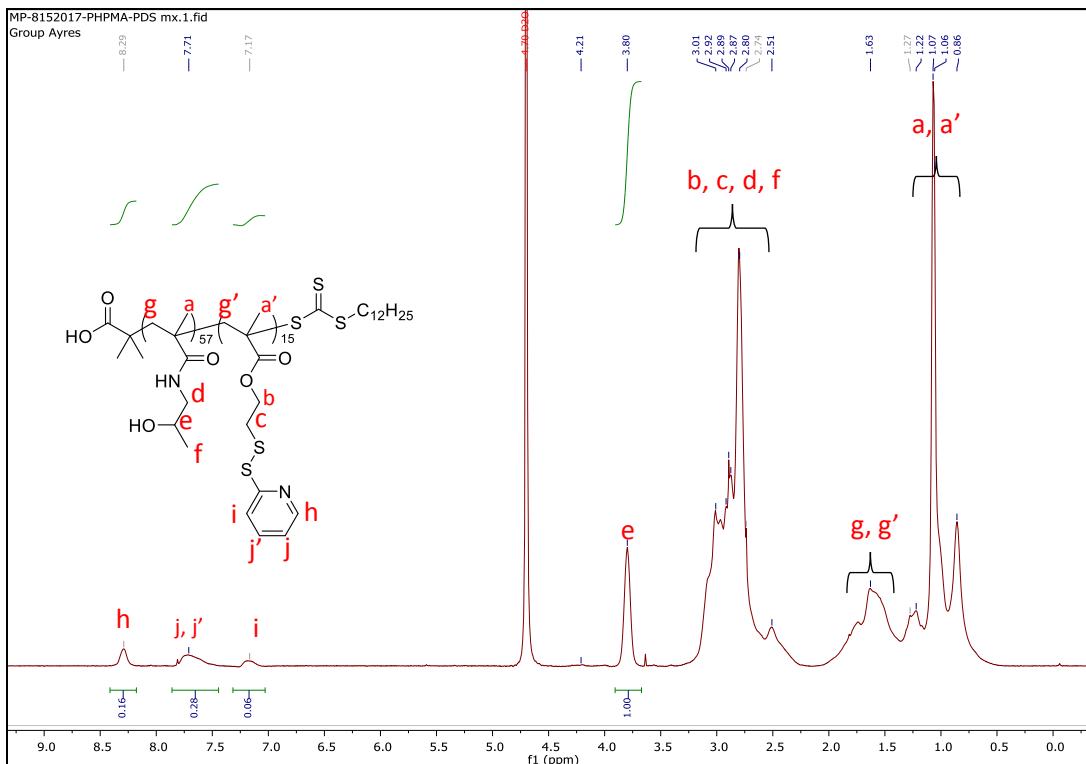


Figure S8. ¹H NMR spectrum of poly(HPMA₅₇-s-PDSEMA₁₅).

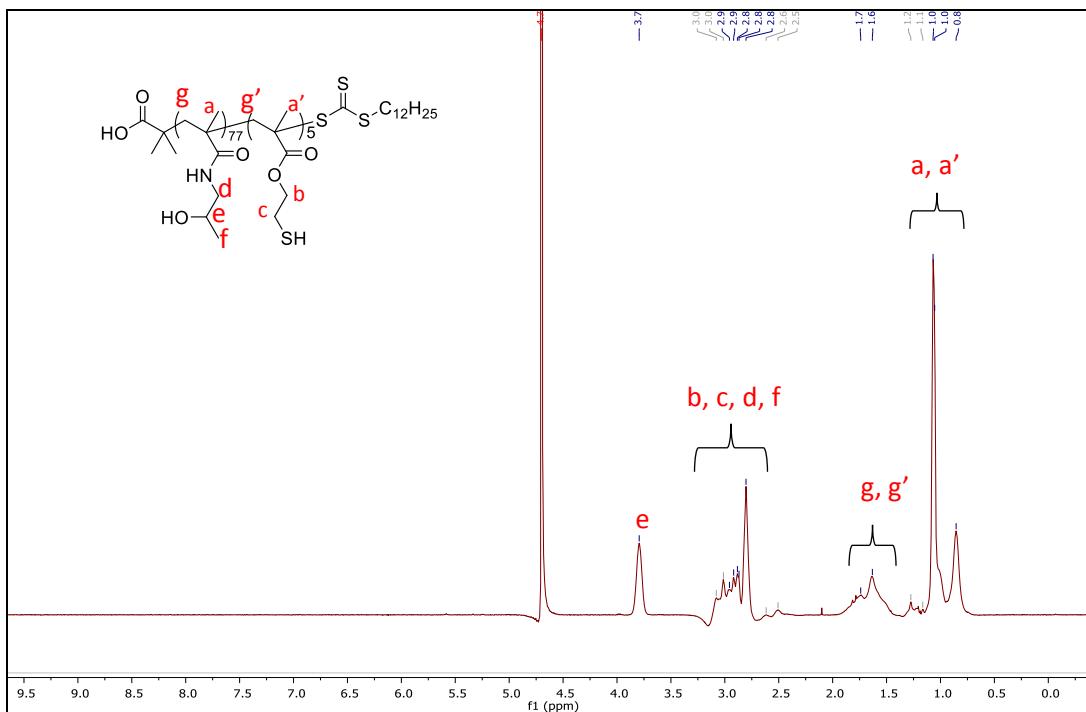


Figure S9. ^1H NMR spectrum of poly(HPMA₇₇-s-MEMA₅).

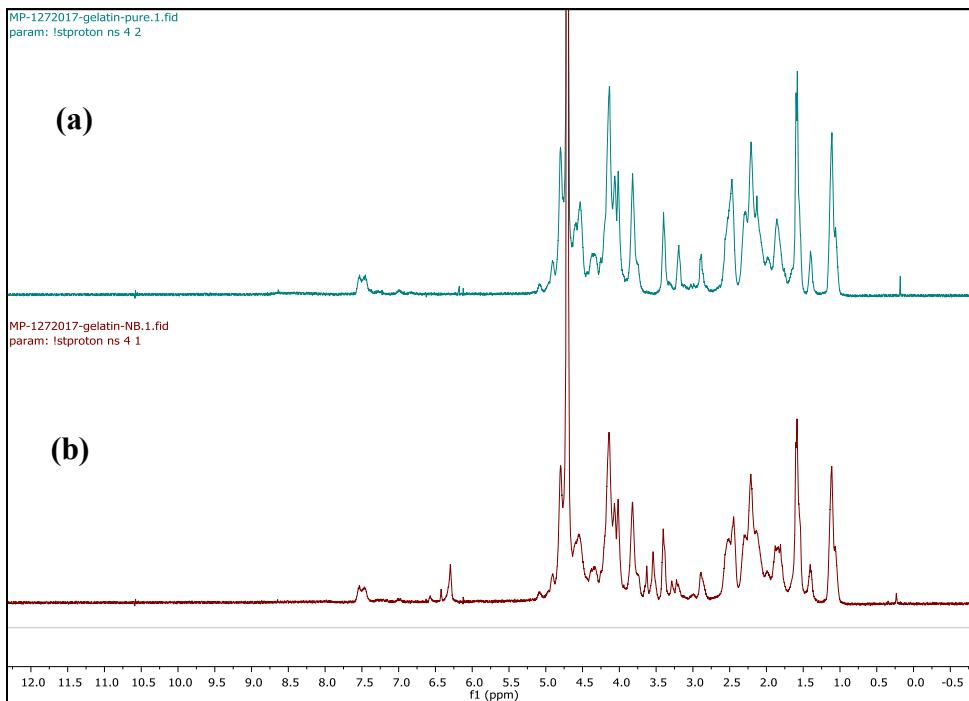


Figure S10. ^1H NMR spectrum of (a) pure gelatin, (b) Norbornene modified gelatin (GelNB).

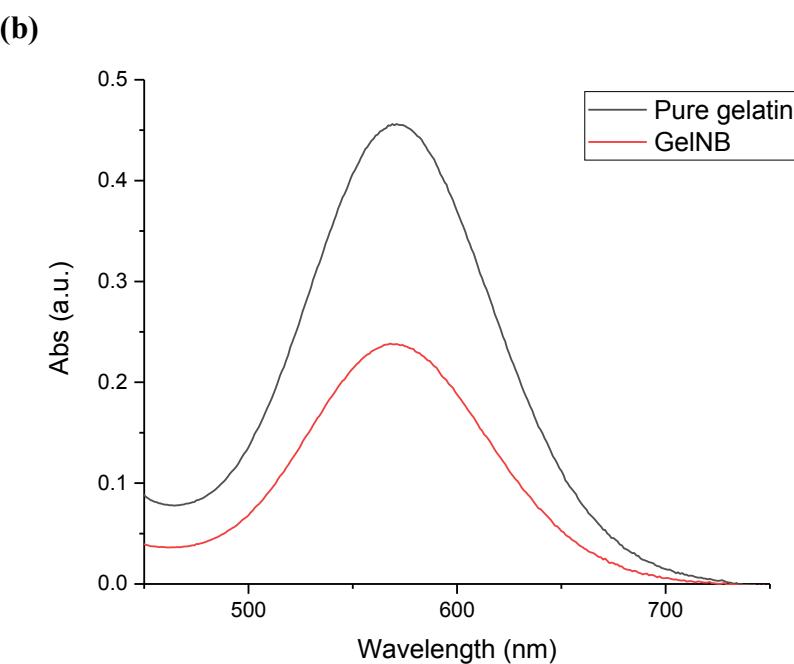
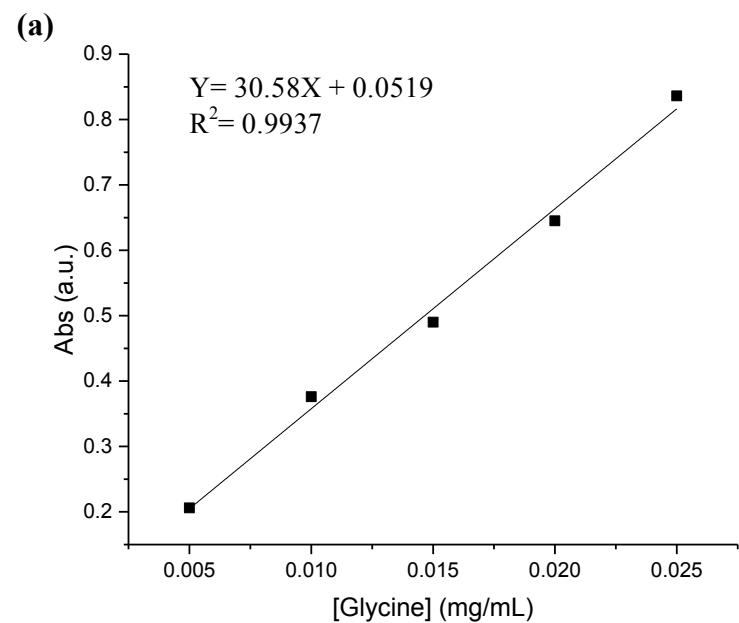


Figure S11. (a) Standard calibration curve of ninhydrin test using glycine. (b) UV-VIS absorbance curves for pure gelatin and GelNB.

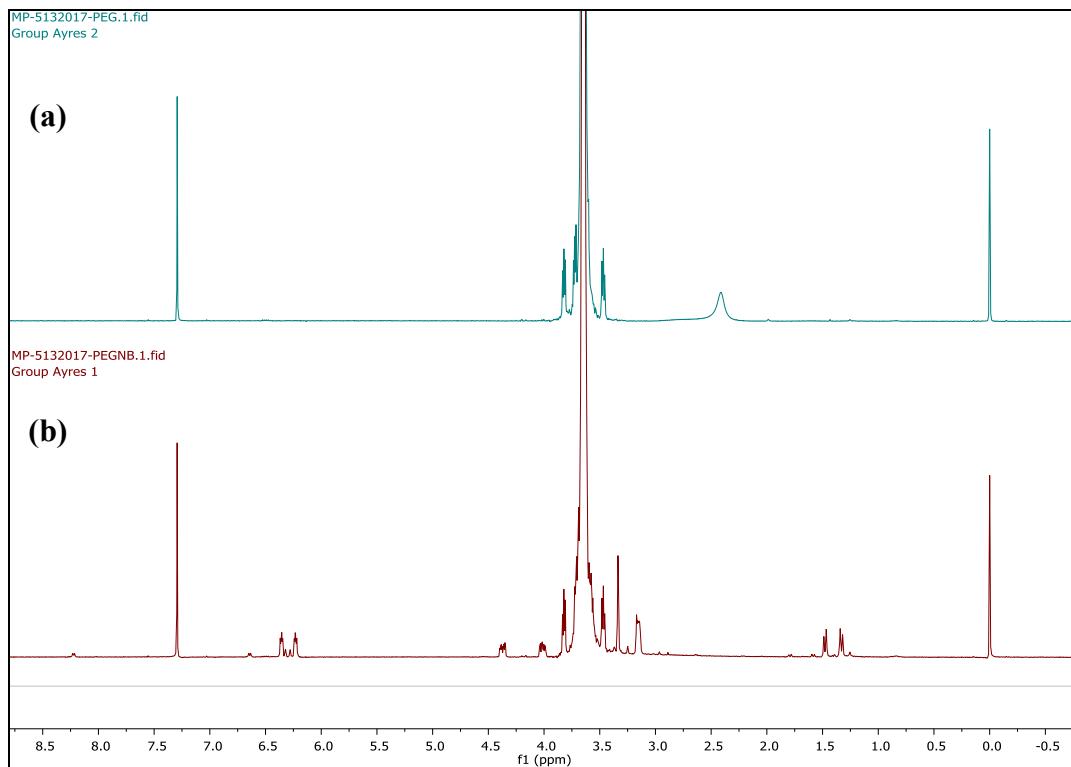


Figure S12. ^1H NMR spectrum of (a) poly(ethylene glycol) (PEG), (b) PEG-diNB.

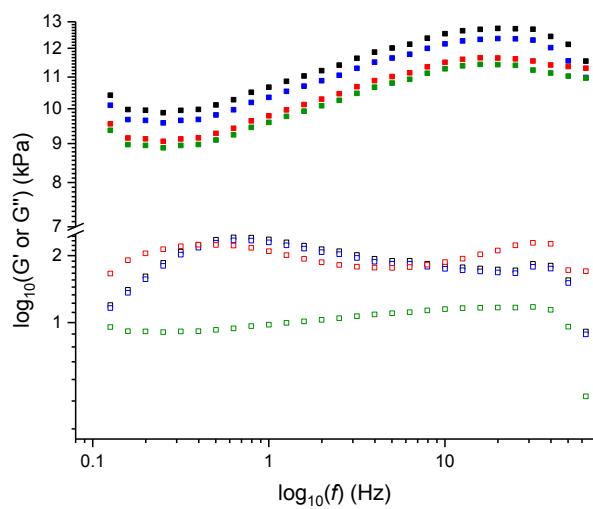


Figure S13. $\log_{10}G'$ (storage moduli, closed symbols) and $\log_{10}G''$ (loss moduli, open symbols) of HG_{3:1} swollen in different concentration solutions of 2-mercaptopropanoic acid in pH 8 PBS. Black: 2-mercaptopropanoic acid, Blue: 0.1 M 2-mercaptopropanoic acid, Red: 1 M 2-mercaptopropanoic acid, Green: 2 M 2-mercaptopropanoic acid. (f - Oscillation frequency).

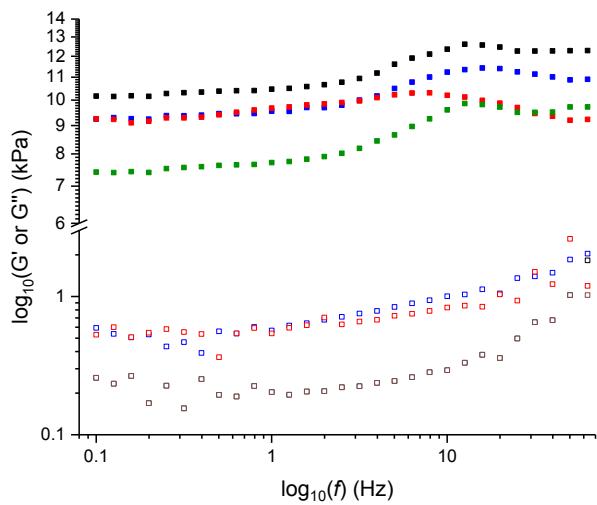


Figure S14. $\log_{10}G'$ (storage moduli, closed symbols) and $\log_{10}G''$ (loss moduli, open symbols) of HG_{2:1} swollen in different concentration solutions of 2-mercaptopropanoate in pH 8 PBS. Black: 2-mercaptopropanoate, Blue: 0.1 M 2-mercaptopropanoate, Red: 1 M 2-mercaptopropanoate, Green: 2 M 2-mercaptopropanoate. (f - Oscillation frequency).

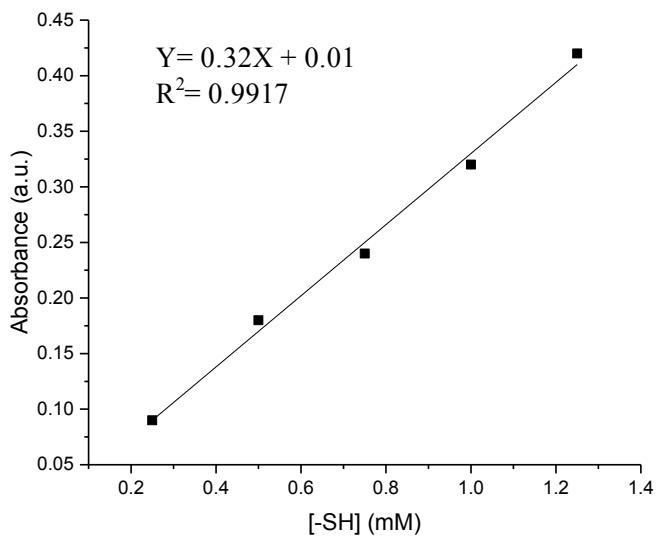


Figure S15. Standard calibration curve of Ellman's assay using L-cysteine.

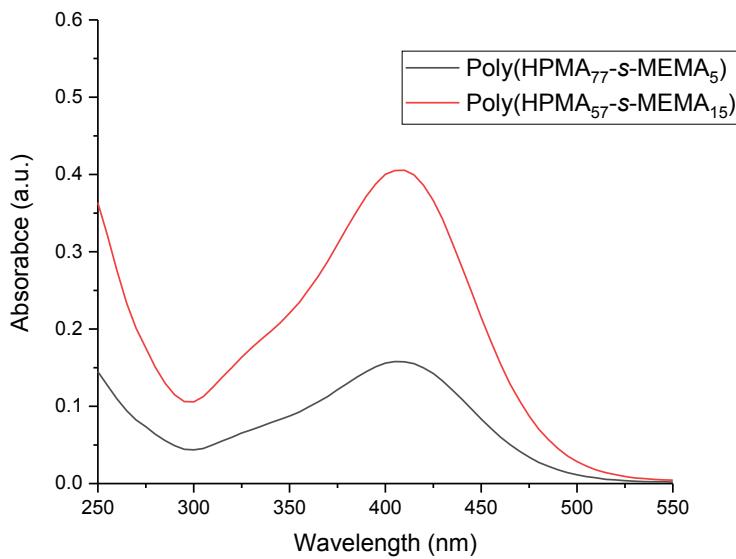


Figure S16. UV-VIS absorbance curves for poly(HPMA₇₇-s-MEMA₅) and poly(HPMA₅₇-s-MEMA₁₅) using Ellman's assay.

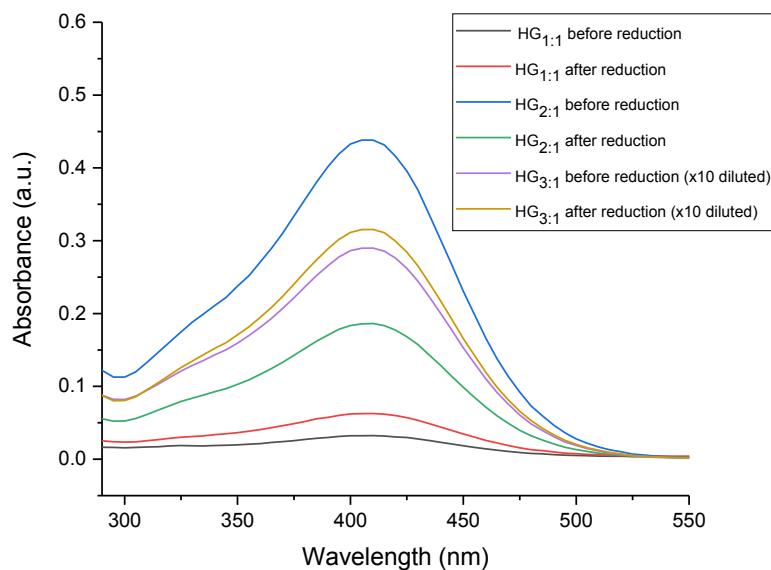


Figure S17. UV-VIS absorbance curves for hydrogel films made from poly(HPMA₇₇-s-MEMA₅) before and after reducing disulfides to thiols.

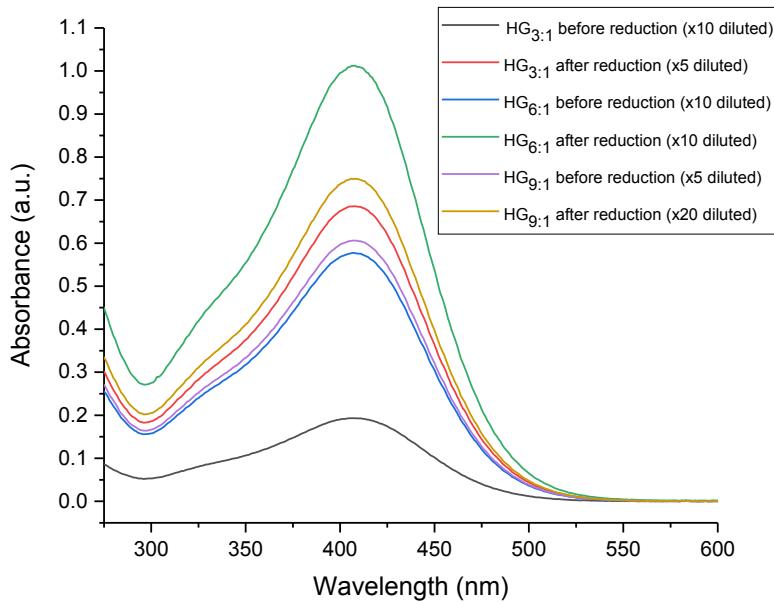


Figure S18. UV-VIS absorbance curves for hydrogel films made from poly(HPMA₅₇-s-MEMA₁₅) before and after reducing disulfides to thiols.

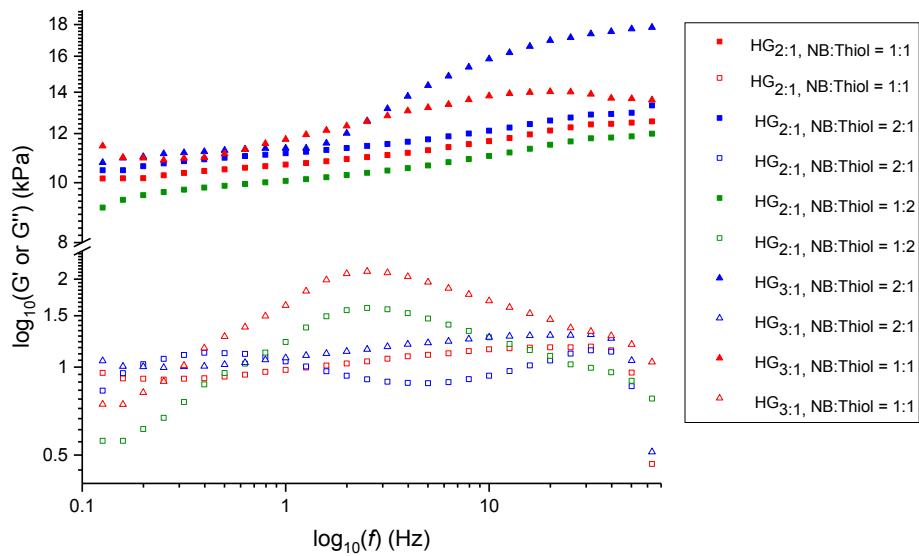


Figure S19. $\log_{10}G'$ (storage moduli, closed symbols) and $\log_{10}G''$ (loss moduli, open symbols) of hydrogels after secondary crosslinking using PEG-diNB as the secondary crosslinker. NB:Thiol- Norbornene (from PEG-diNB) to free thiol ratio. (f - Oscillation frequency).

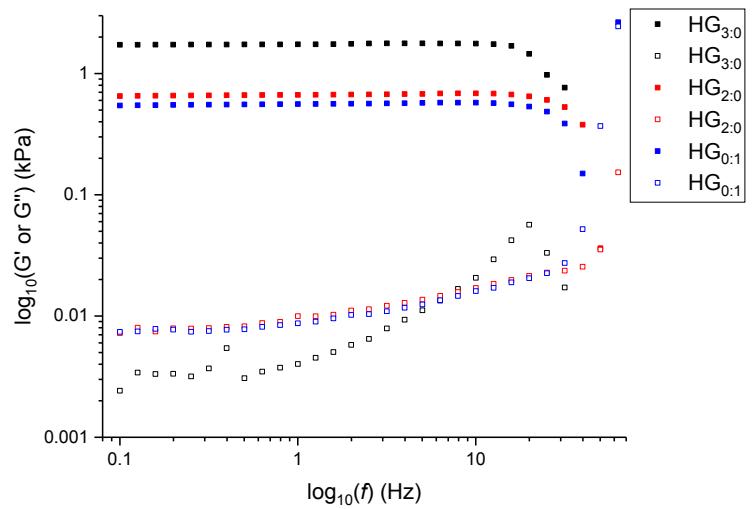


Figure S20. Frequency (f) sweeps of the control hydrogels. $\log_{10}G'$ (storage moduli, closed symbols) and $\log_{10}G''$ (loss moduli, open symbols) of hydrogels.

Table S1. Formulations of the hydrogels

HG_{X:Y}^a	Mass of copolymer (mg)	Mass of GelNB/ (mg)	Mass of PI^b/ (mg)	Mass of TCEP/ (mg)
HG _{1:1} ^c	100	500	6.0	18.0
HG _{2:1} ^c	200	500	7.0	36.0
HG _{3:1} ^c	300	500	8.0	54.0
HG _{3:1} ^d	100	500	6.0	54.0
HG _{6:1} ^d	200	500	7.0	100.0
HG _{9:1} ^d	300	500	8.0	150.0
HG _{0:1}	0.00	500	5.0	18.0
HG _{1:0} ^c	100	0.00	6.0	18.0
HG _{2:0} ^c	200	0.00	7.0	36.0
HG _{3:0} ^c	300	0.00	8.0	54.0

^aHG= Hydrogel, X:Y= Thiol:ene ratio in the reaction mixture, ^bPhotoinitiator (Irgacure 2959), ^cHydrogels were made using Poly(HPMA₇₇-*s*-MEMA₅), ^dHydrogels were made using Poly(HPMA₅₇-*s*-MEMA₁₅).