Electronic Supplementary Information (ESI)

Gelatin based dynamic hydrogels via thiol-norbornene reactions

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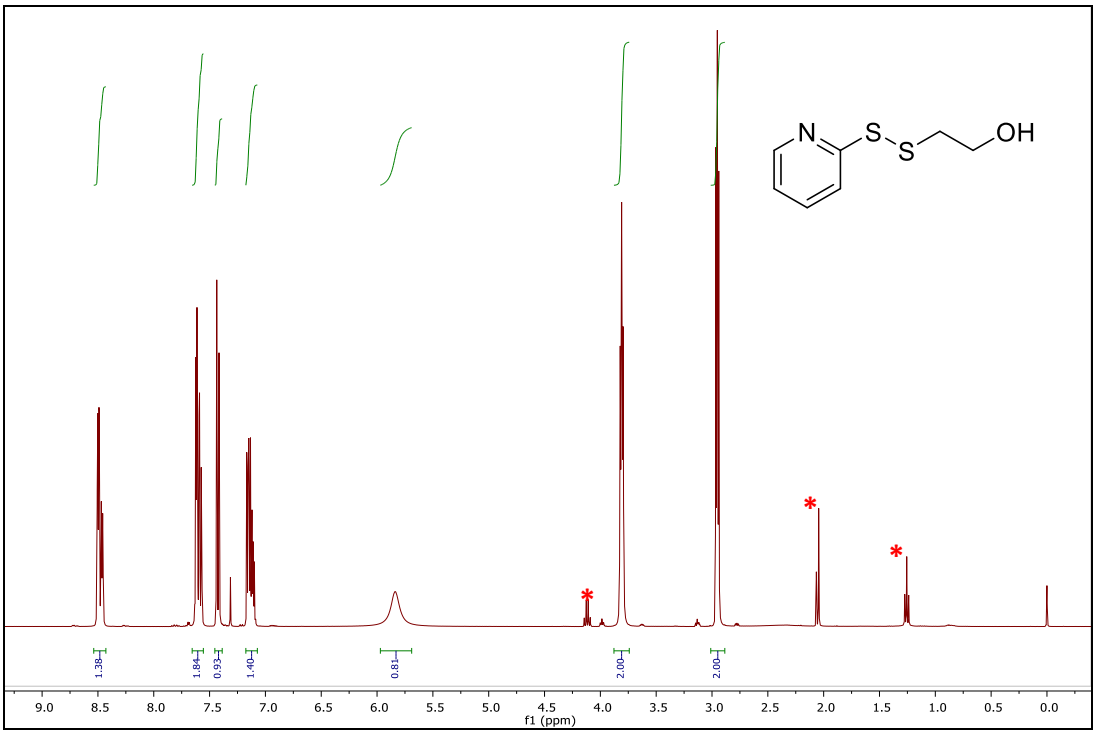

Figure S1. [1]H NMR spectrum of hydroxyethylpyridyl disulfide (HPDS). (* Solvent- Ethyl acetate).

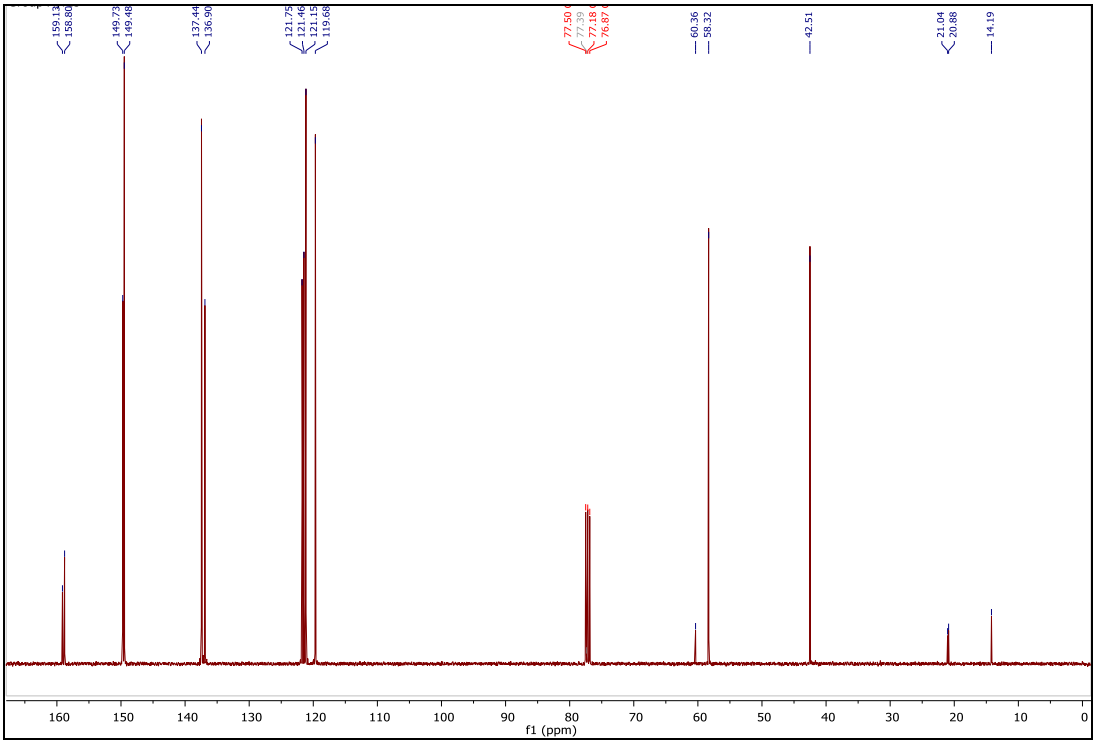

Figure S2. [13]C NMR spectrum of HPDS.

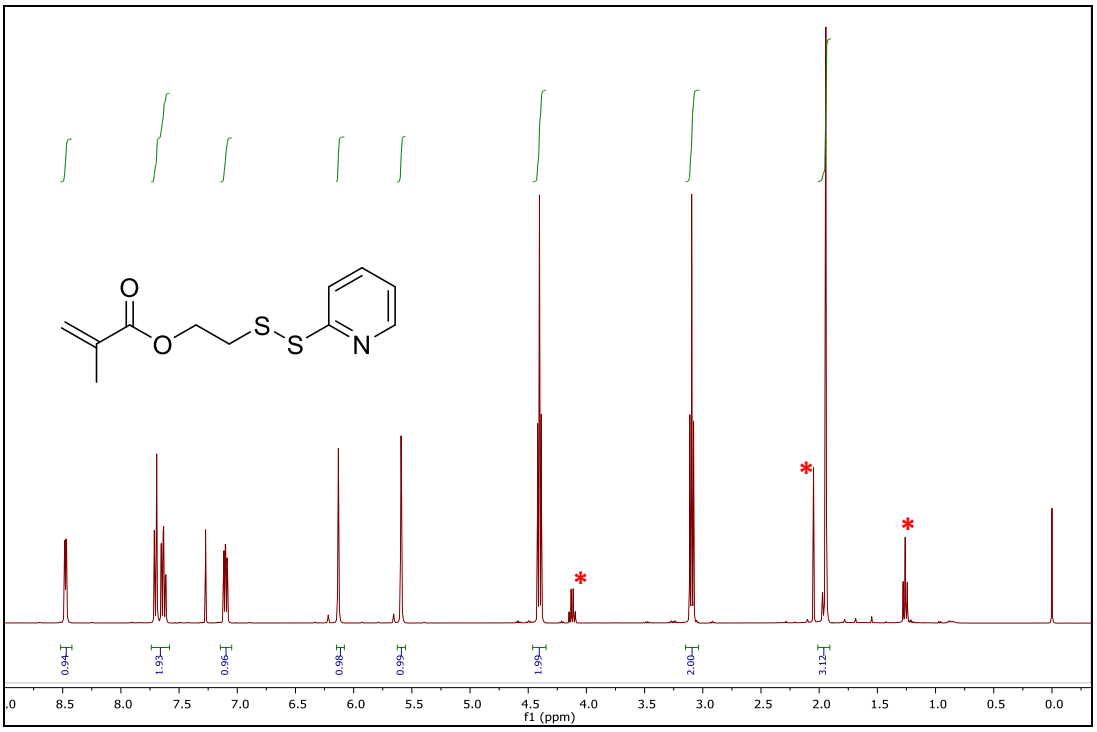

Figure S3. ^{1}H NMR spectrum of pyridyl disulfide ethylmethacrylate (PDSEMA). (* indicates the ethyl acetate solvent).

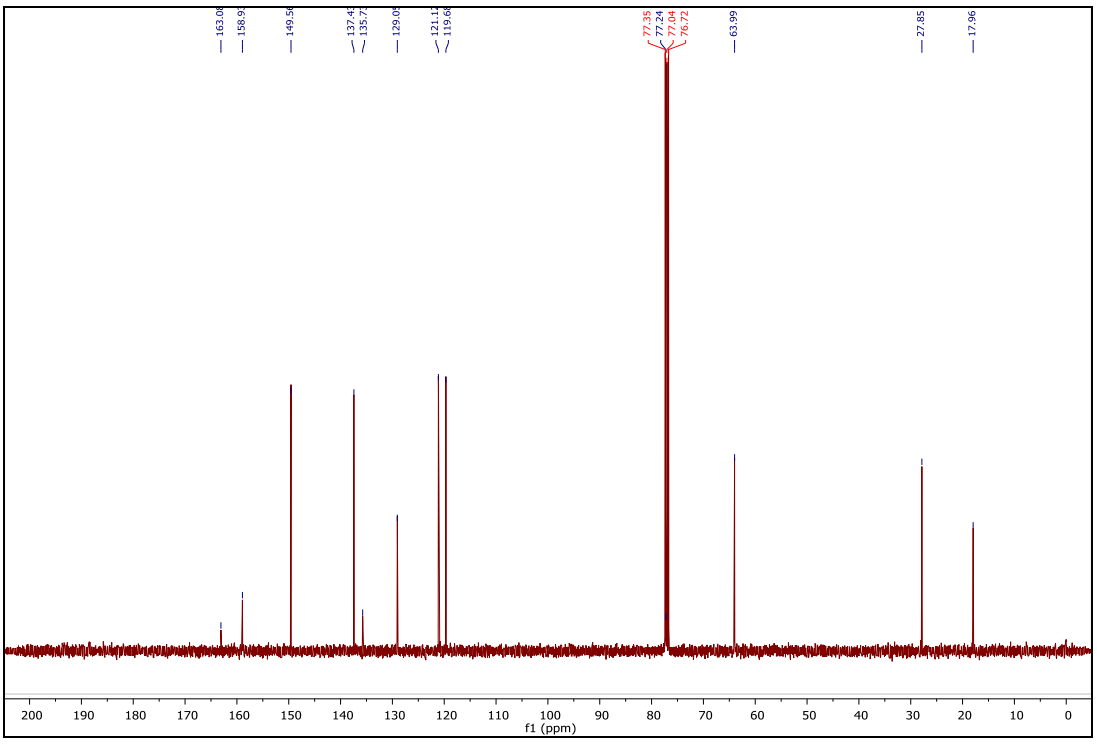

Figure S4. ^{13}C NMR spectrum of PDSEMA.

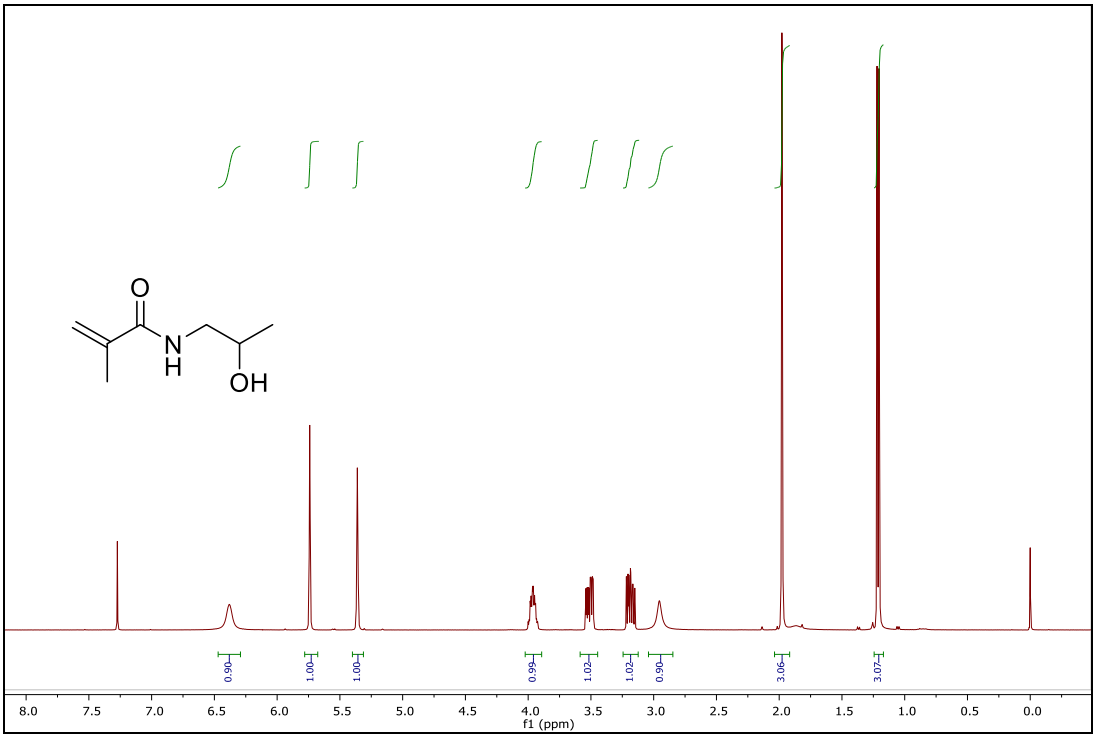

Figure S5. ^{1}H NMR spectrum of 2-hydroxypropyl methacrylate (HPMA).

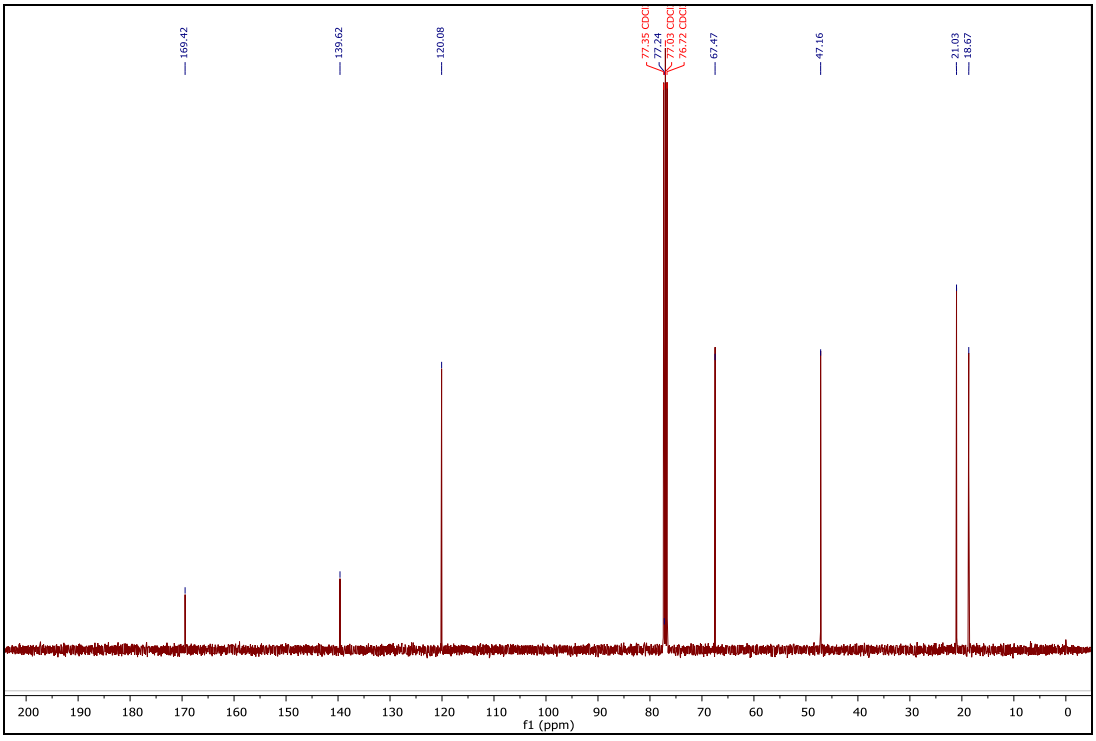

Figure S6. ^{13}C NMR spectrum of HPMA.

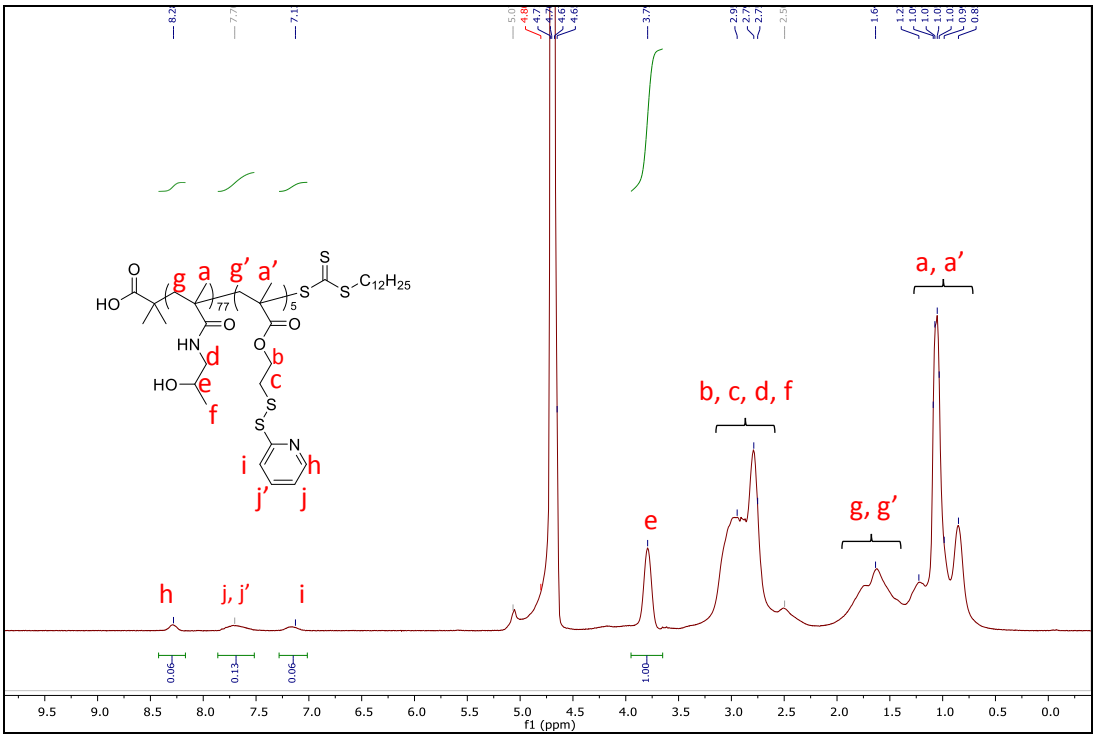

Figure S7. ^{1}H NMR spectrum of poly(HPMA$_{77}$-*s*-PDSEMA$_{5}$).

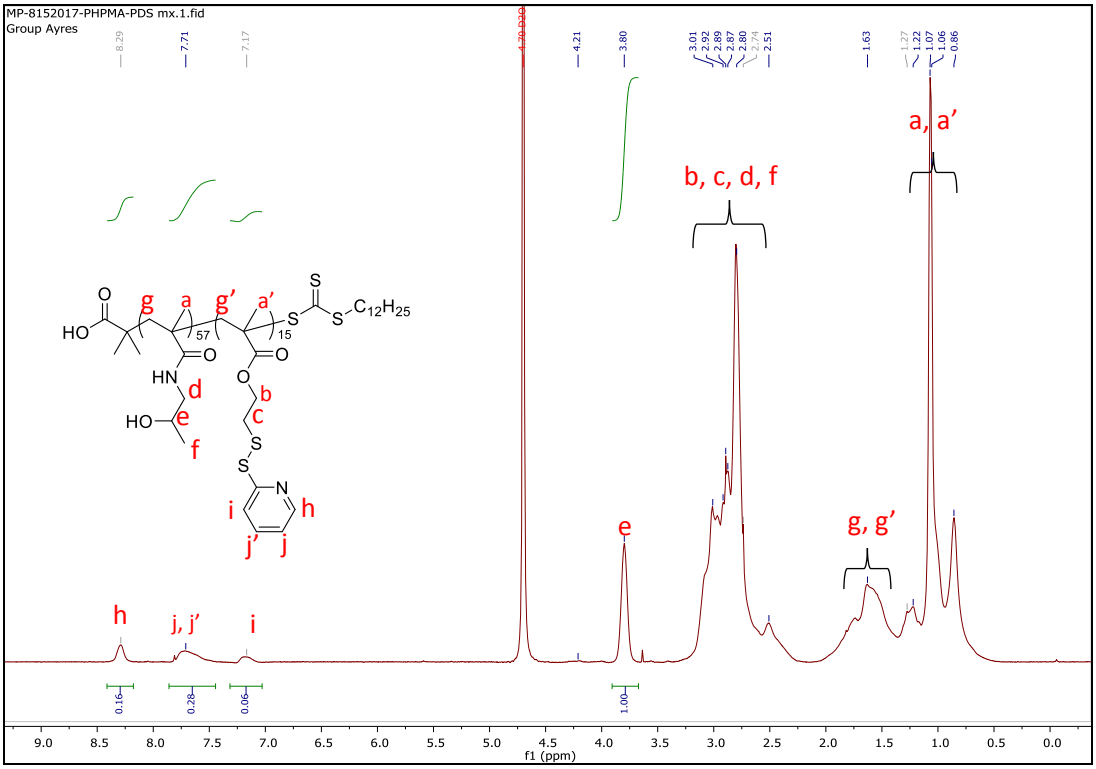

Figure S8. ^{1}H NMR spectrum of poly(HPMA$_{57}$-*s*-PDSEMA$_{15}$).

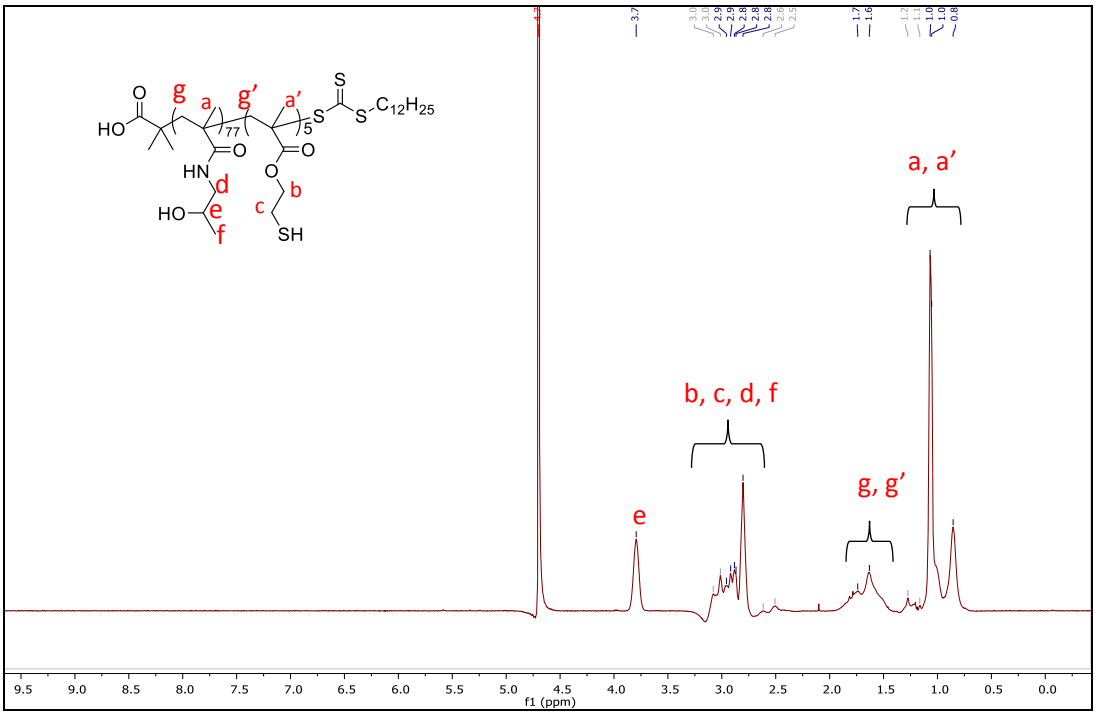

Figure S9. ^{1}H NMR spectrum of poly(HPMA$_{77}$-s-MEMA$_{5}$).

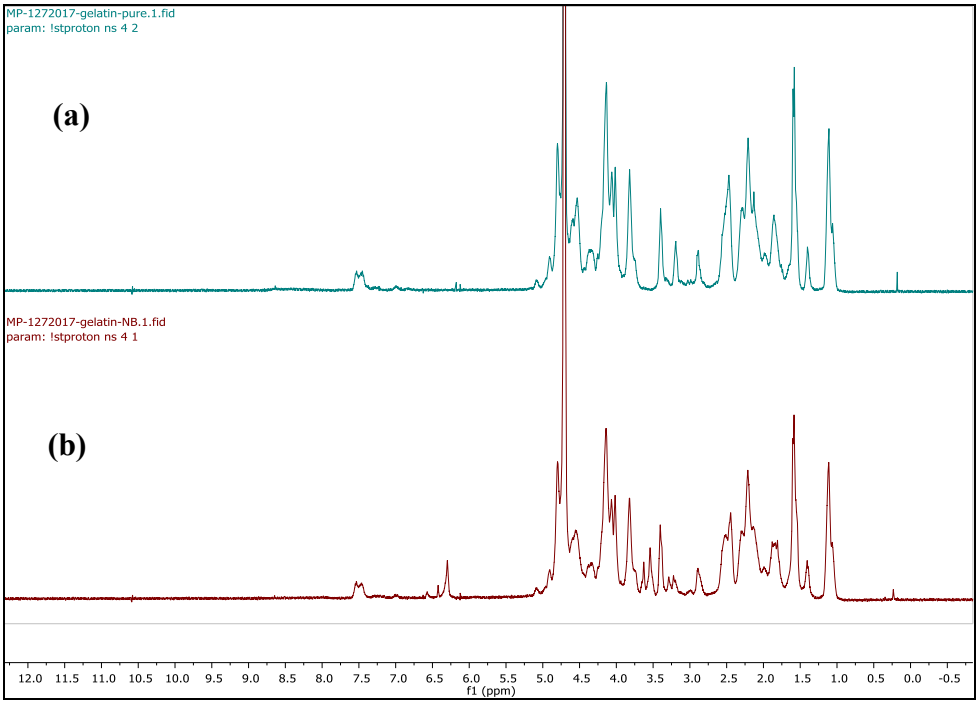

Figure S10. ^{1}H NMR spectrum of (a) pure gelatin, (b) Norbornene modified gelatin (GelNB).

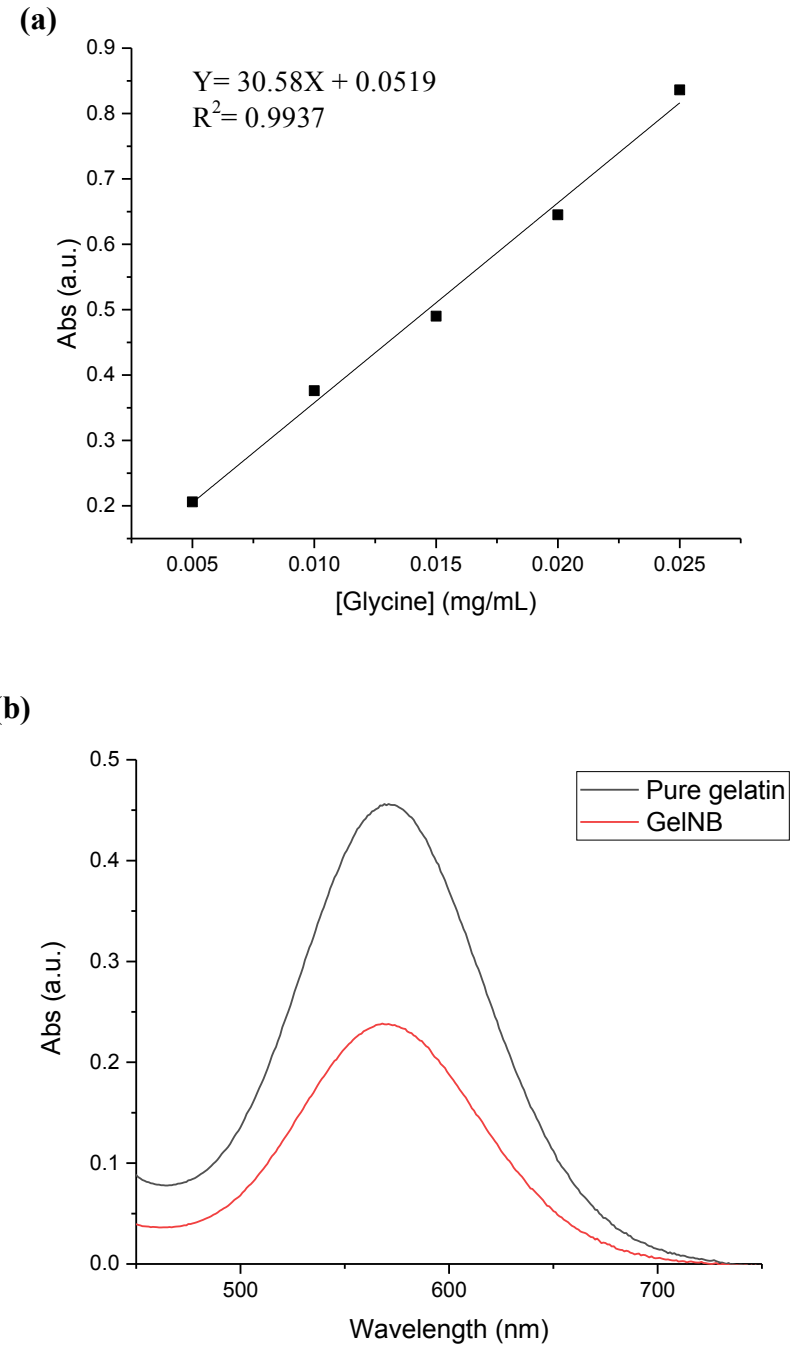

Figure S11. (a) Standard calibration curve of ninhydrin test using glycine. (b) UV-VIS absorbance curves for pure gelatin and GelNB.

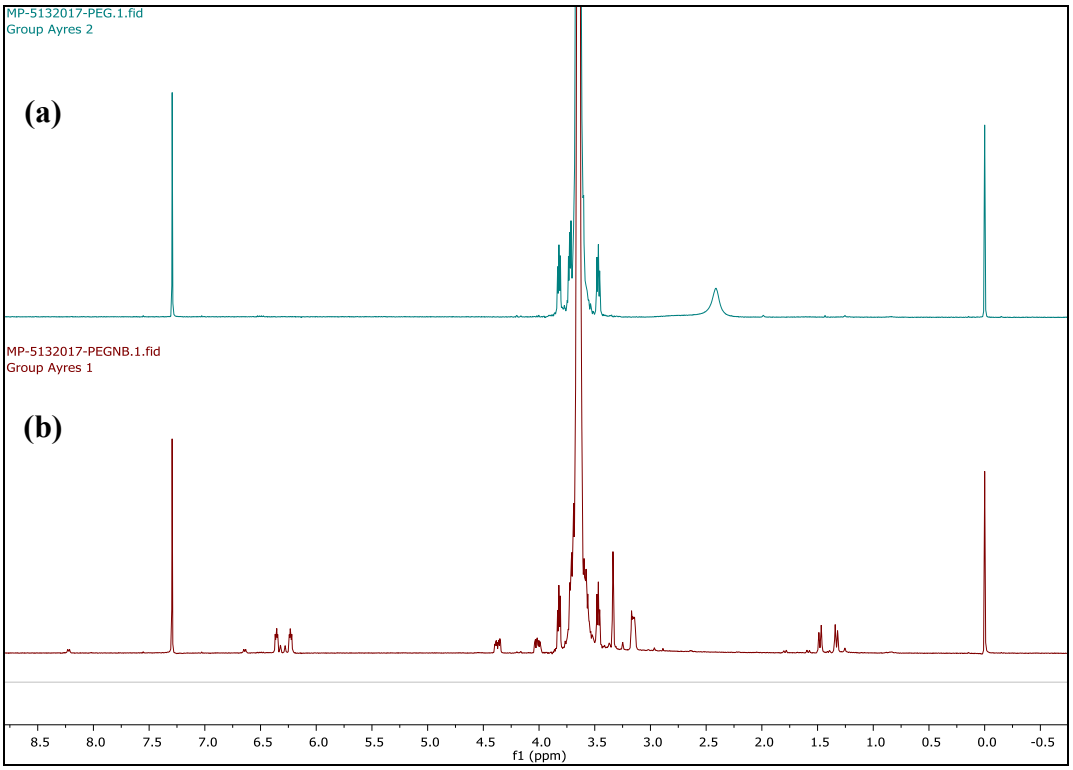

Figure S12. ^{1}H NMR spectrum of (a) poly(ethylene glycol) (PEG), (b) PEG-diNB.

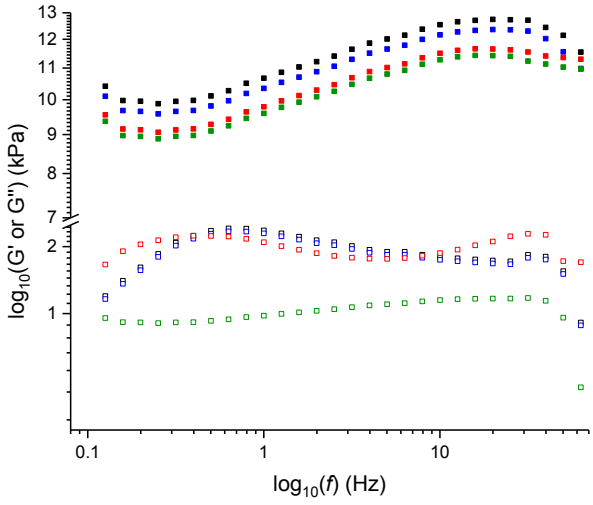

Figure S13. $Log_{10}G'$ (storage moduli, closed symbols) and $log_{10}G''$ (loss moduli, open symbols) of $HG_{3:1}$ swollen in different concentration solutions of 2-mercaptoethanol in pH 8 PBS. Black: 2-mercaptoethanol, Blue: 0.1 M 2-mercaptoethanol, Red: 1 M 2-mercaptoethanol, Green: 2 M 2-mercaptoethanol.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

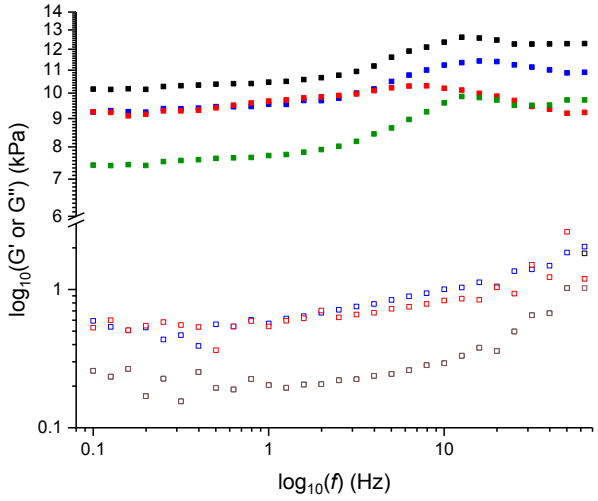

Figure S14. $Log_{10}G'$ (storage moduli, closed symbols) and $log_{10}G''$ (loss moduli, open symbols) of $HG_{2:1}$ swollen in different concentration solutions of 2-mercaptoethanol in pH 8 PBS. Black: 2-mercaptoethanol, Blue: 0.1 M 2-mercaptoethanol, Red: 1 M 2-mercaptoethanol, Green: 2 M 2-mercaptoethanol.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

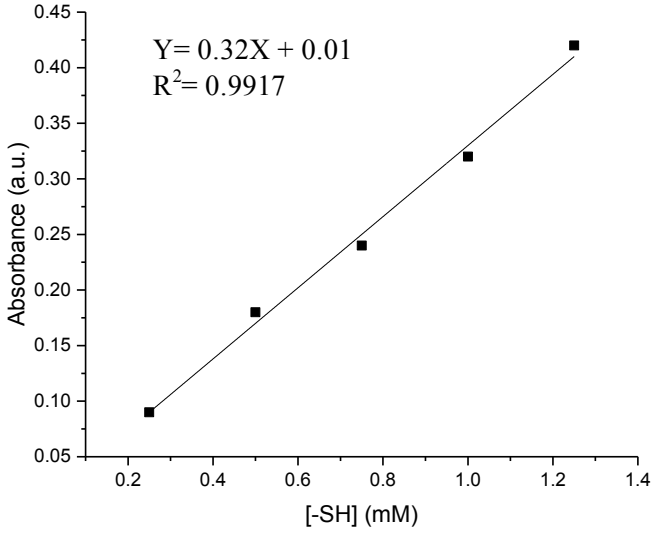

Figure S15. Standard calibration curve of Ellman's assay using L-cystine.

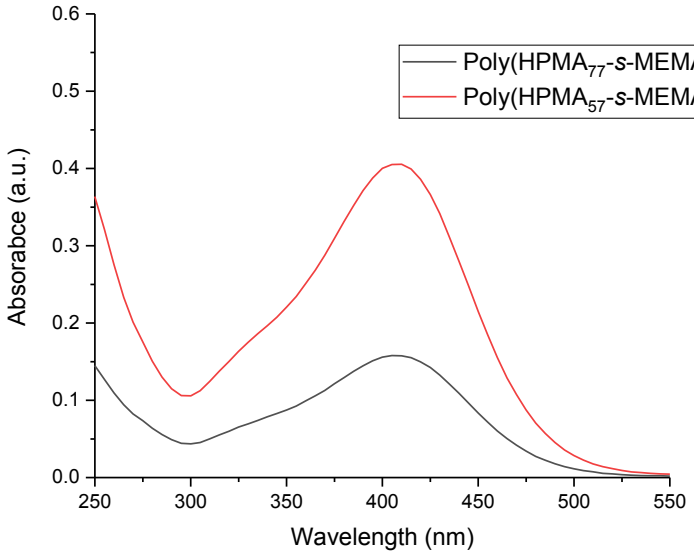

Figure S16. UV-VIS absorbance curves for poly(HPMA$_{77}$-*s*-MEMA$_5$) and poly(HPMA$_{57}$-*s*-MEMA$_{15}$) using Ellman's assay.

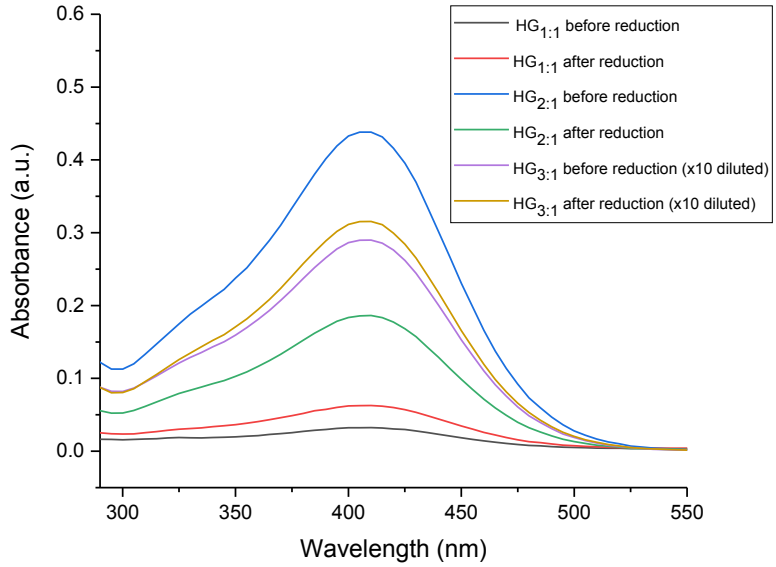

Figure S17. UV-VIS absorbance curves for hydrogel films made from poly(HPMA$_{77}$-*s*-MEMA$_5$) before and after reducing disulfides to thiols.

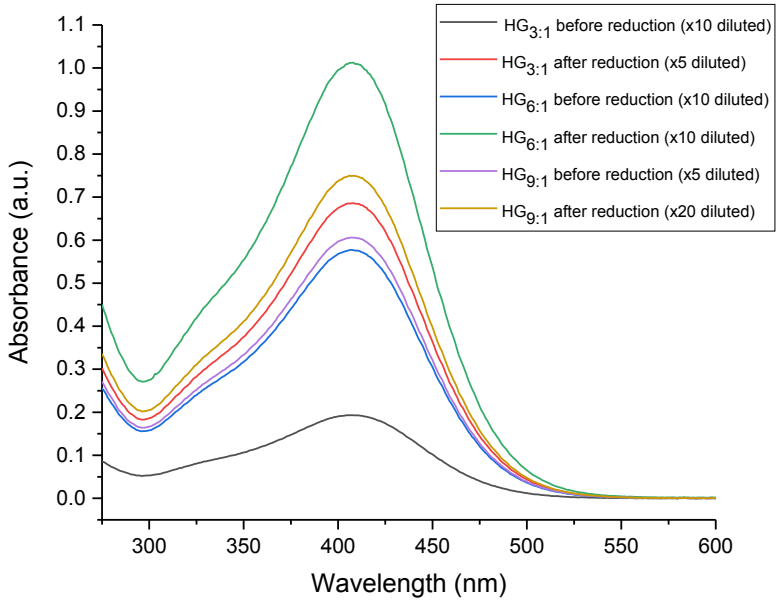

Figure S18. UV-VIS absorbance curves for hydrogel films made from poly($HPMA_{57}$-*s*-$MEMA_{15}$) before and after reducing disulfides to thiols.

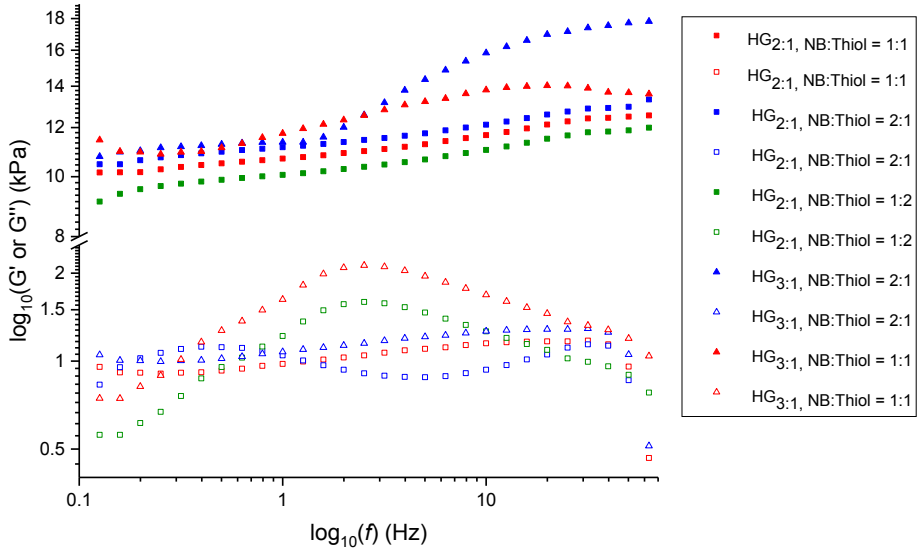

Figure S19. $Log_{10}G'$ (storage moduli, closed symbols) and $log_{10}G''$ (loss moduli, open symbols) of hydrogels after secondary crosslinking using PEG-diNB as the secondary crosslinker. NB:Thiol- Norbornene (from PEG-diNB) to free thiol ratio. (*f*- Oscillation frequency).

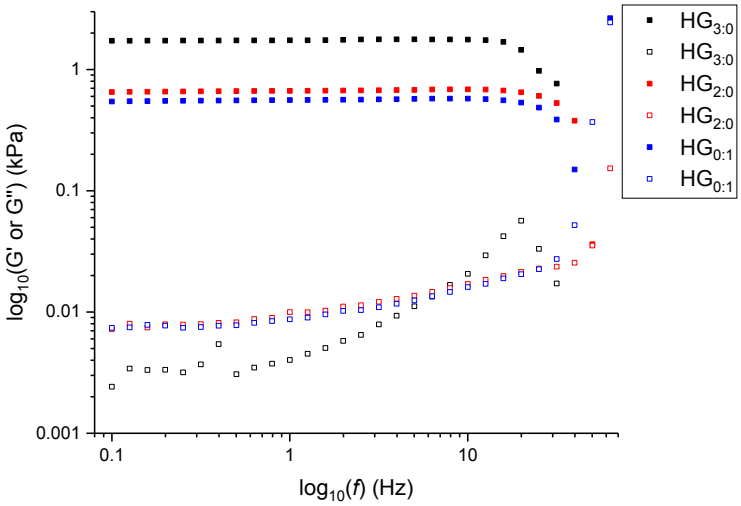

Figure S20. Frequency (*f*) sweeps of the control hydrogels. $Log_{10}G'$ (storage moduli, closed symbols) and $log_{10}G''$ (loss moduli, open symbols) of hydrogels.

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

[a]HG= Hydrogel, X:Y= Thiol:ene ratio in the reaction mixture, [b]Photoinitiator (Irgacure 2959), [c]Hydrogels were made using Poly($HPMA_{77}$-*s*-$MEMA_5$), [d]Hydrogels were made using Poly($HPMA_{57}$-*s*-$MEMA_{15}$).