Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.

Supporting Information

Mechanically robust and highly bactericidal macroporous polymeric gels based on quaternized *N*,*N*-(dimethylamino)ethyl methacrylate possessing varying alkyl chain lengths

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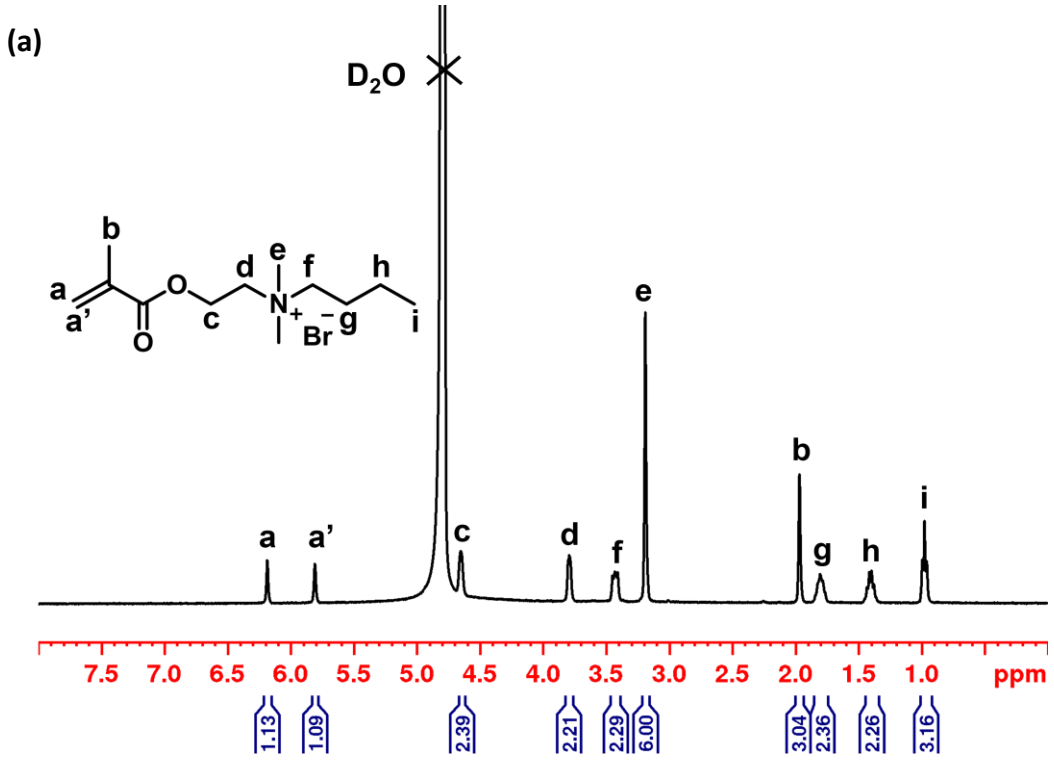


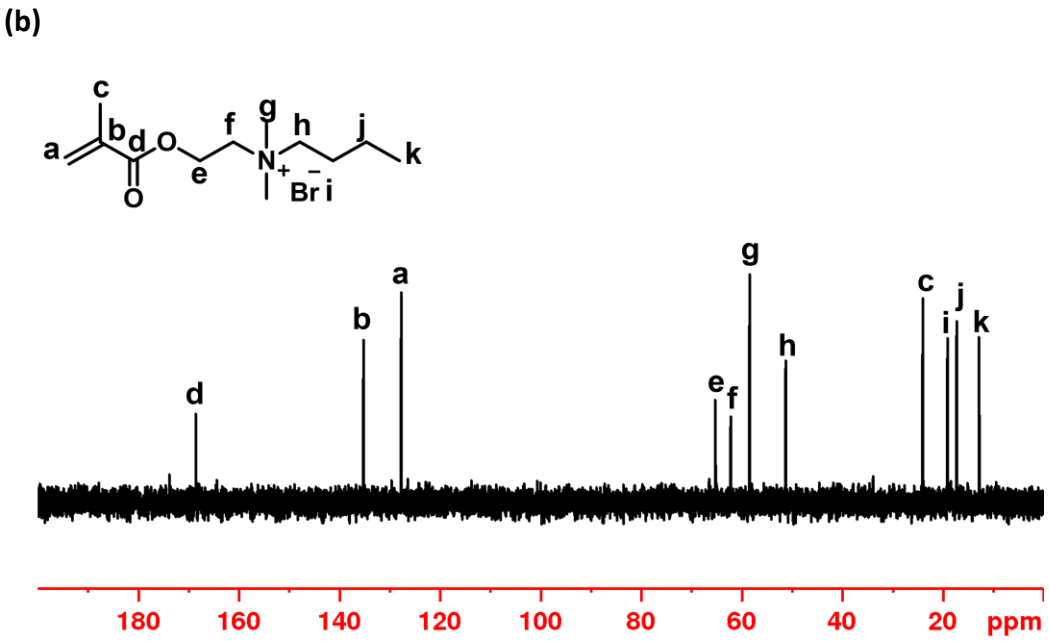
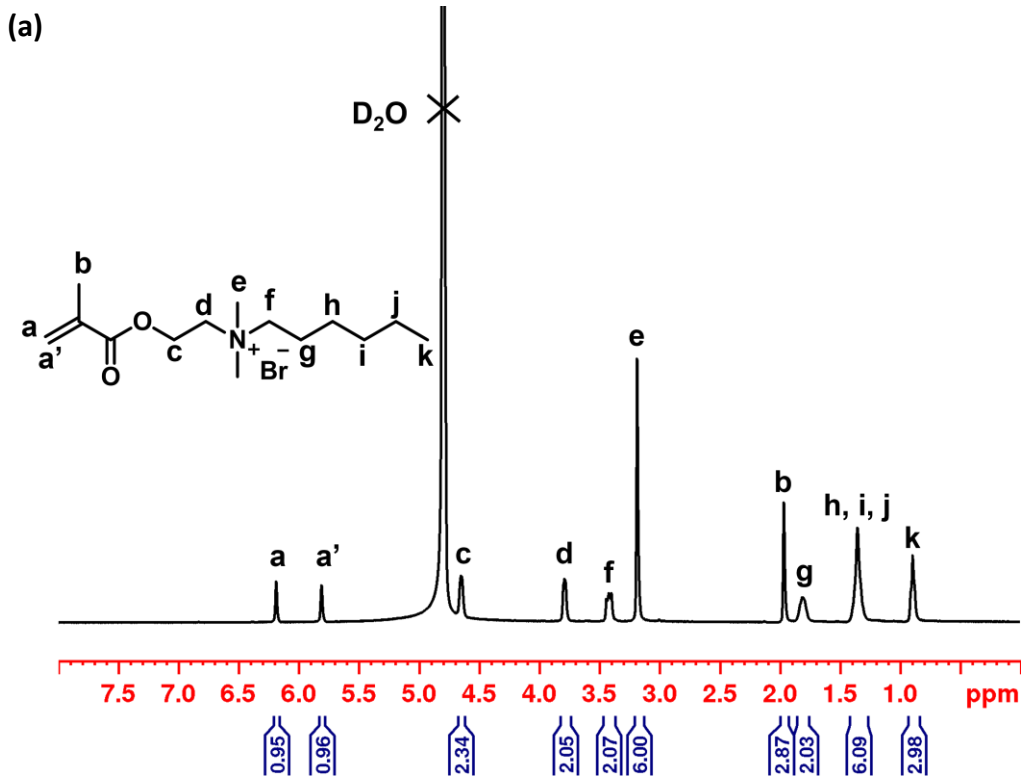


Figure S1. (a) ^{1}H NMR and (b) ^{13}C NMR were recorded for QA monomer bearing butyl chain in D_2O solvent.



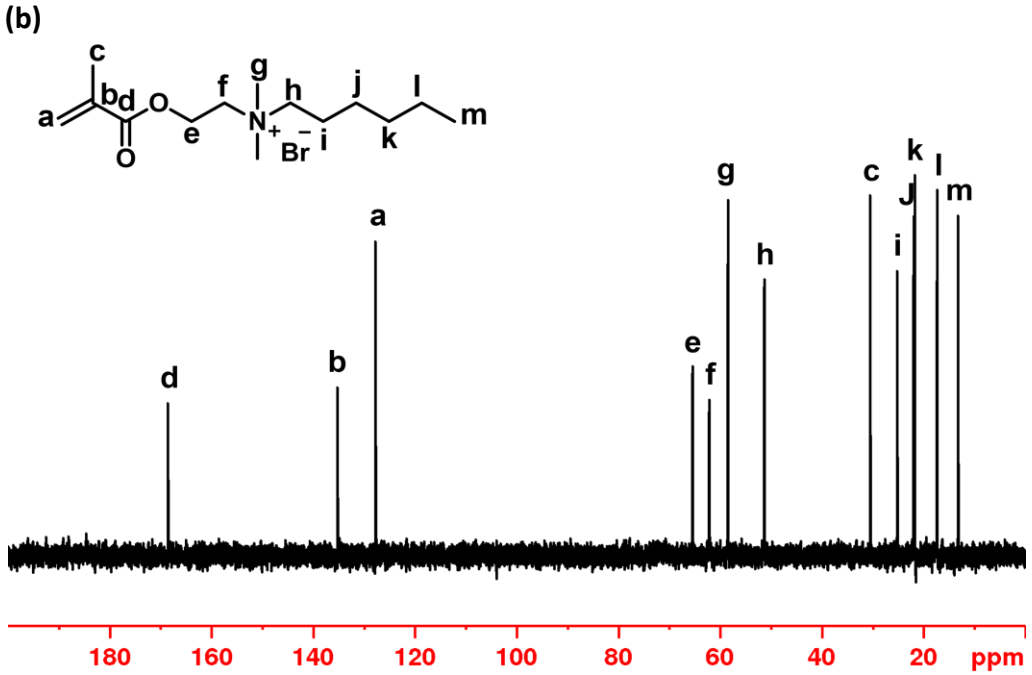
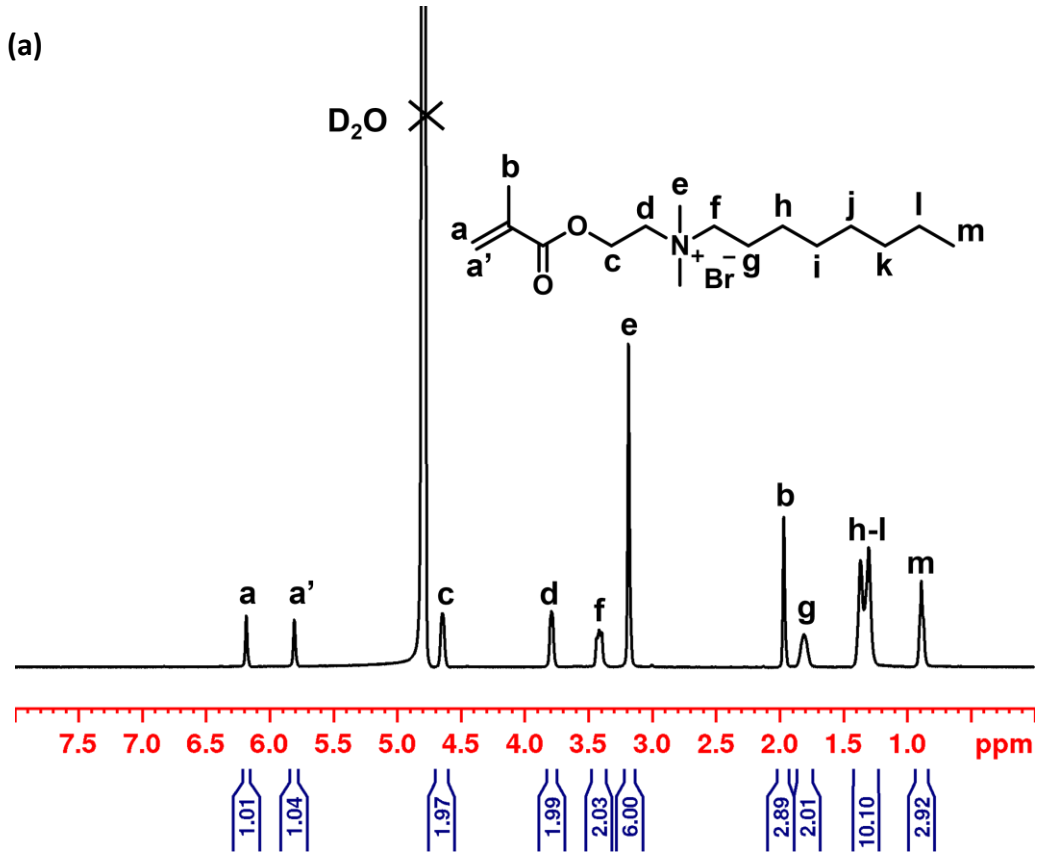


Figure S2. (a) ^{1}H NMR and (b) ^{13}C NMR were recorded for QA monomer bearing hexyl chain in D_2O solvent.



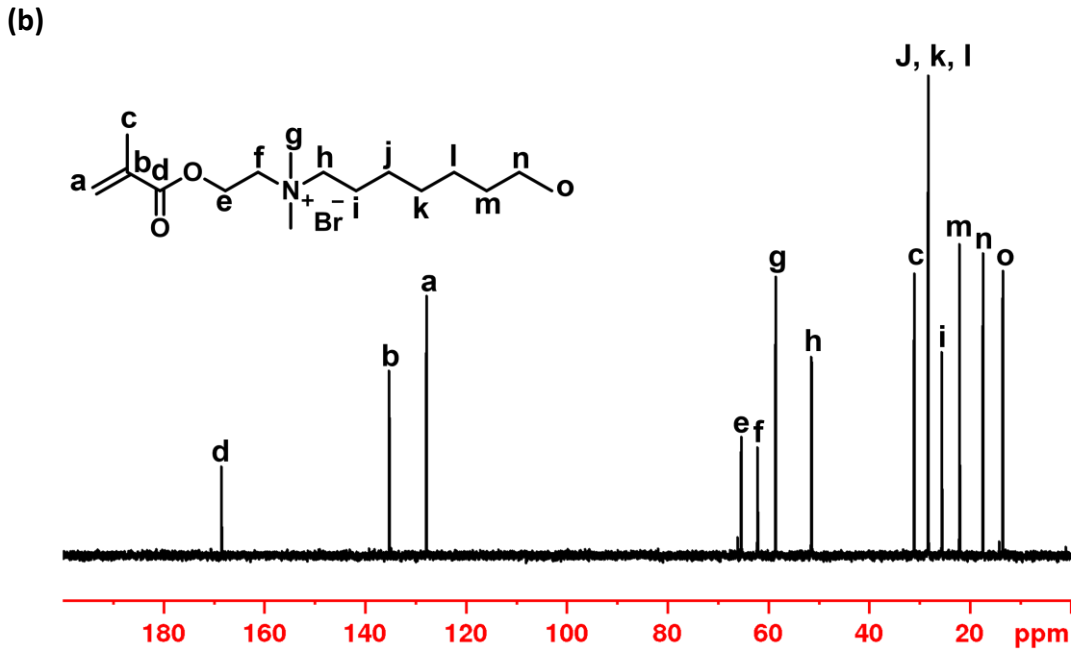


Figure S3. (a) ^{1}H NMR and (b) ^{13}C NMR were recorded for QA monomer bearing octyl chain in D_2O solvent.

Table S1. Composition of various MAPG containing different QA monomers as well as crosslinker amount.

Specimen designation	Monomer (mmol)	Crosslinker (eq.)	Initiator (µmol)	PMDETA (µmol)
C4-2.5	1.7	2.5	34	68
C4-5	1.7	5.0	34	68
C4-10	1.7	10	34	68
C4-15	1.7	15	34	68
C6-2.5	1.7	2.5	34	68
C6-5	1.7	5.0	34	68
C6-10	1.7	10	34	68
C6-15	1.7	15	34	68
C8-2.5	1.7	2.5	34	68
C8-5	1.7	5.0	34	68
C8-10	1.7	10	34	68
C8-15	1.7	15	34	68
Nme2-2.5	1.7	2.5	34	68
Nme2-5	1.7	5.0	34	68
Nme2-10	1.7	10	34	68
Nme2-15	1.7	15	34	68

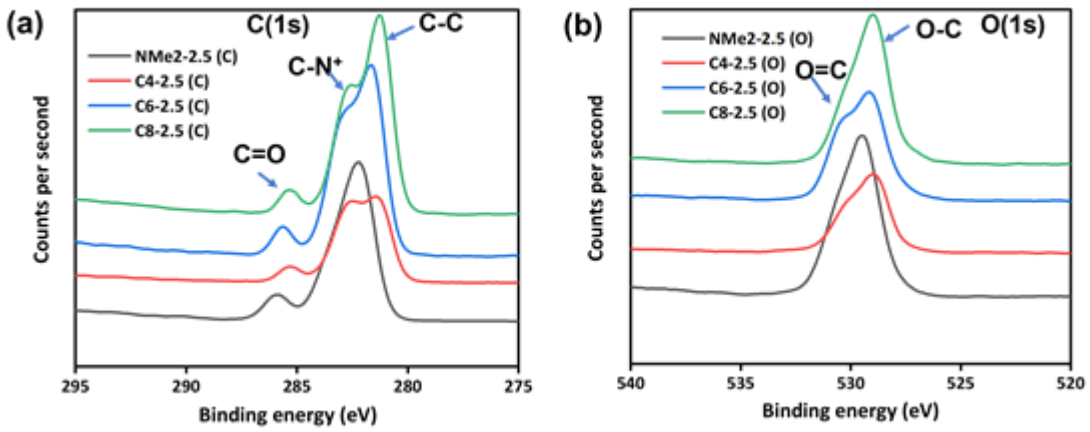


Figure S4. High resolution XPS of NMe2-2.5, C4-2.5, C6-2.5, and C8-2.5 gel samples (c) C(1s) (d) O(1s).

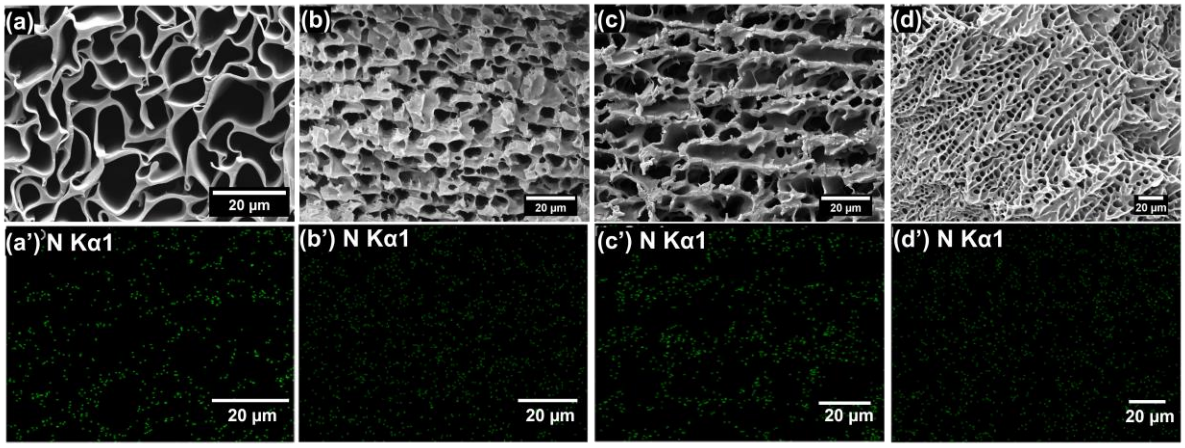


Figure S5. SEM micrographs and nitrogen mapping from EDX of MAPG (a,a') NMe2 having 2.5 eq. crosslinker (b,b') NMe2 having 5 eq. crosslinker (c,c') NMe2 having 10 eq. crosslinker (d,d') NMe2 having 15 eq. crosslinker**.**

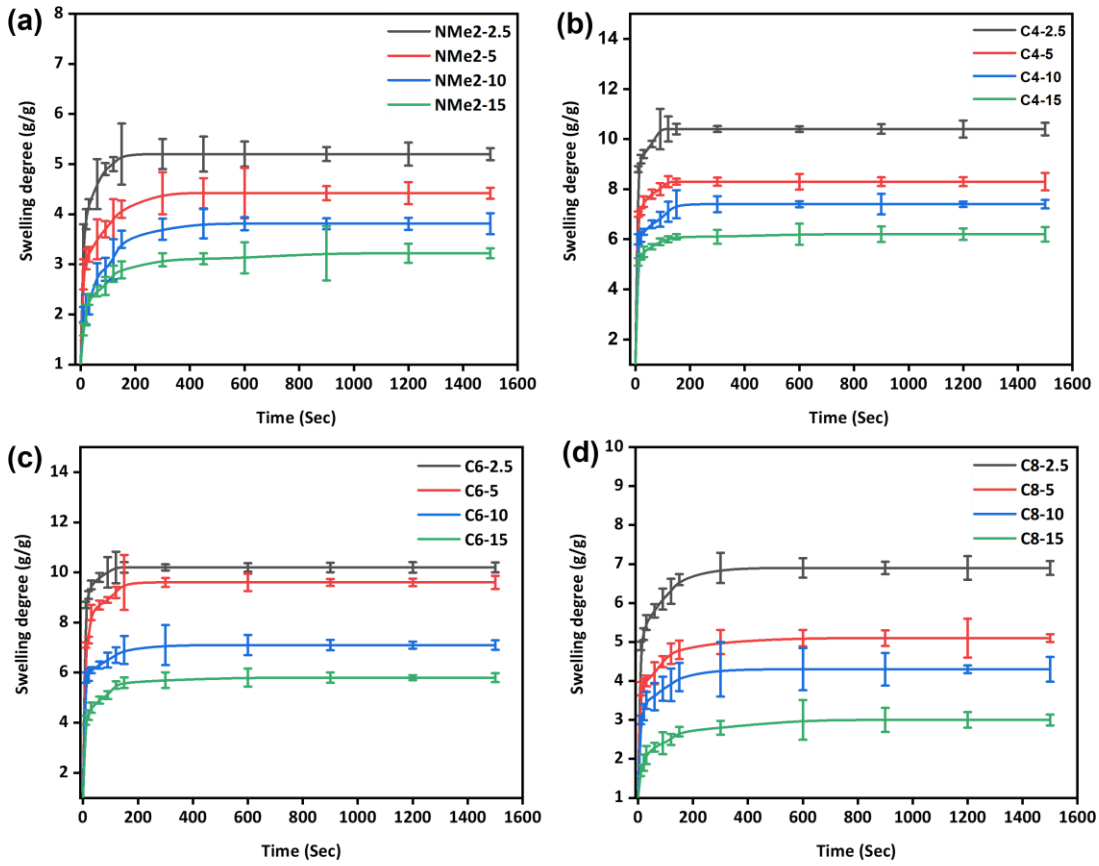


Figure S6. Swelling degree versus time for MAPG (a) NMe2 (2.5 eq., 5 eq., 10 eq., 15 eq.) (b) C4 (2.5 eq., 5eq., 10eq., 15 eq.) (c) C6 (2.5 eq., 5eq., 10eq., 15 eq.) (d) C8 (2.5 eq., 5eq., 10 eq., 15 eq.).

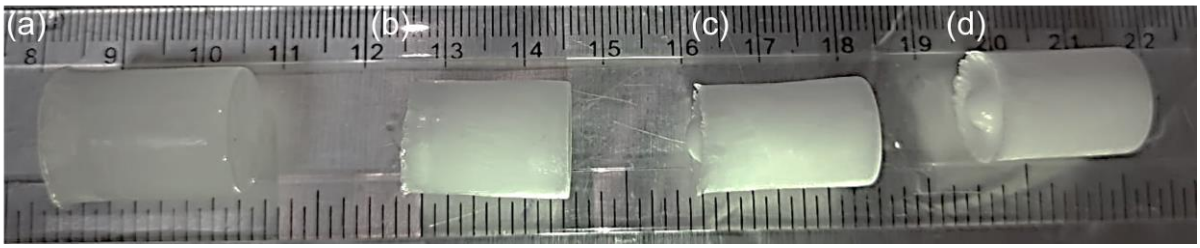


Figure S7. Swollen MAPG based on NMe2 (a) 2.5 eq. (b) 5 eq. (c) 10 eq. (g) 15 eq.

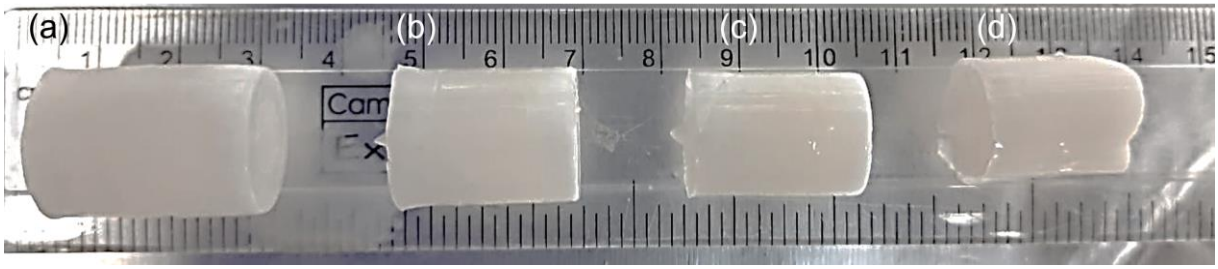


Figure S8. Swollen MAPG based on C4 (a) 2.5 eq. (b) 5 eq. (c) 10 eq. (g) 15 eq.

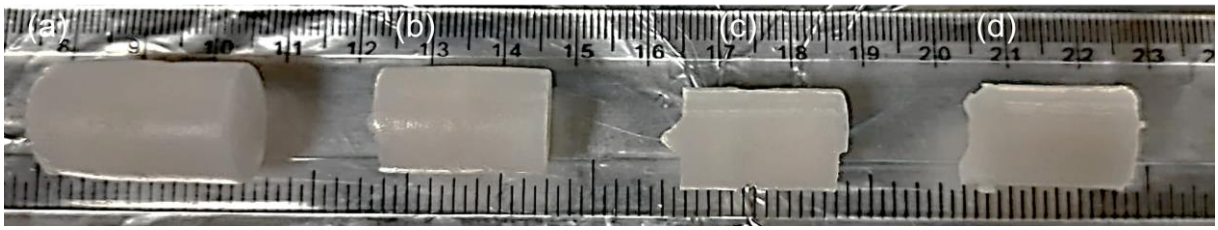


Figure S9. Swollen MAPG based on C6 (a) 2.5 eq. (b) 5 eq. (c) 10 eq. (g) 15 eq.

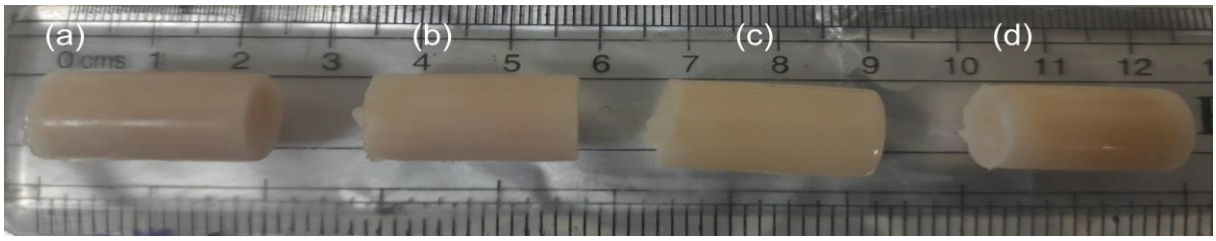


Figure S10. Swollen MAPG based on C8 (a) 2.5 eq. (b) 5 eq. (c) 10 eq. (g) 15 eq.

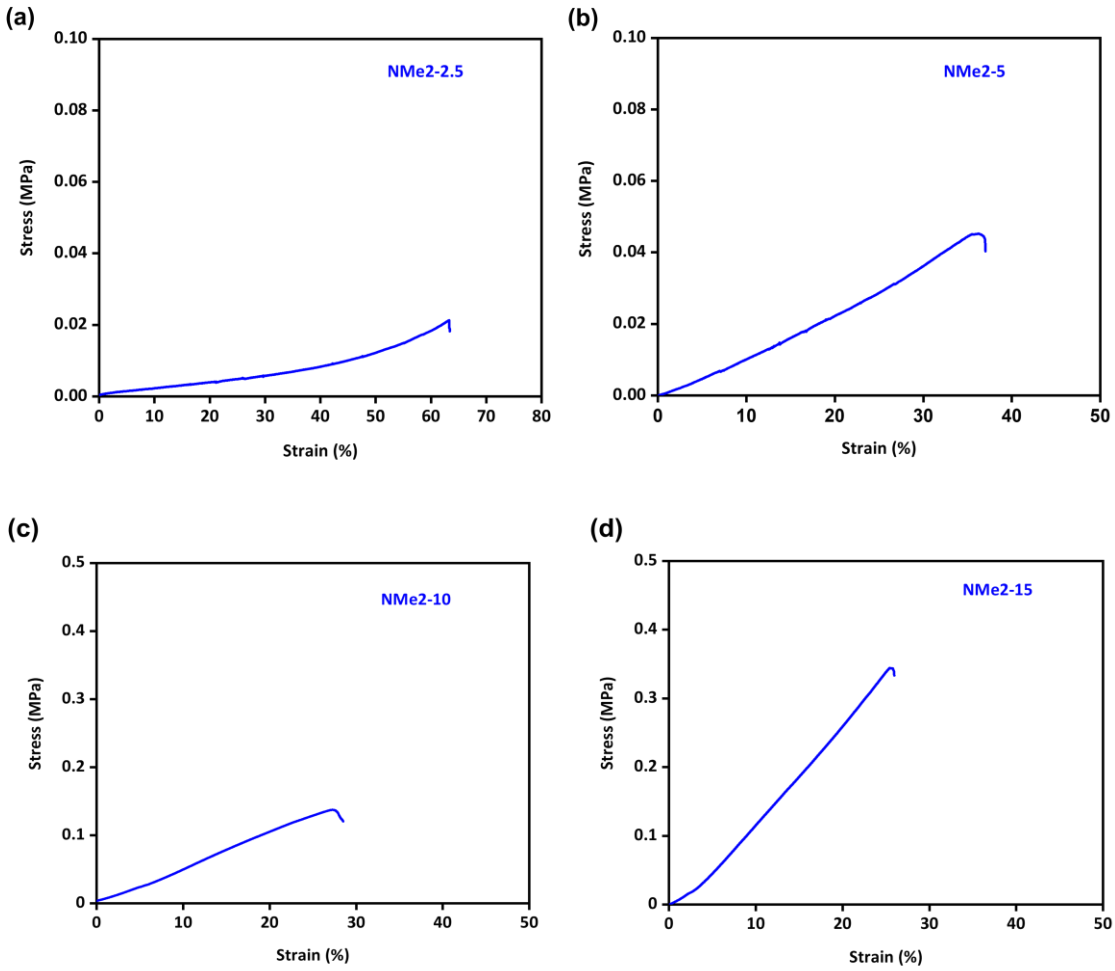


Figure S11. Stress vs strain curve of the NMe2 based MAPGs during the mechanical compression test. (a) NMe2-2.5 eq. (b) NMe2-5 eq. (c) NMe2-10 eq. (d) NMe2-15 eq.

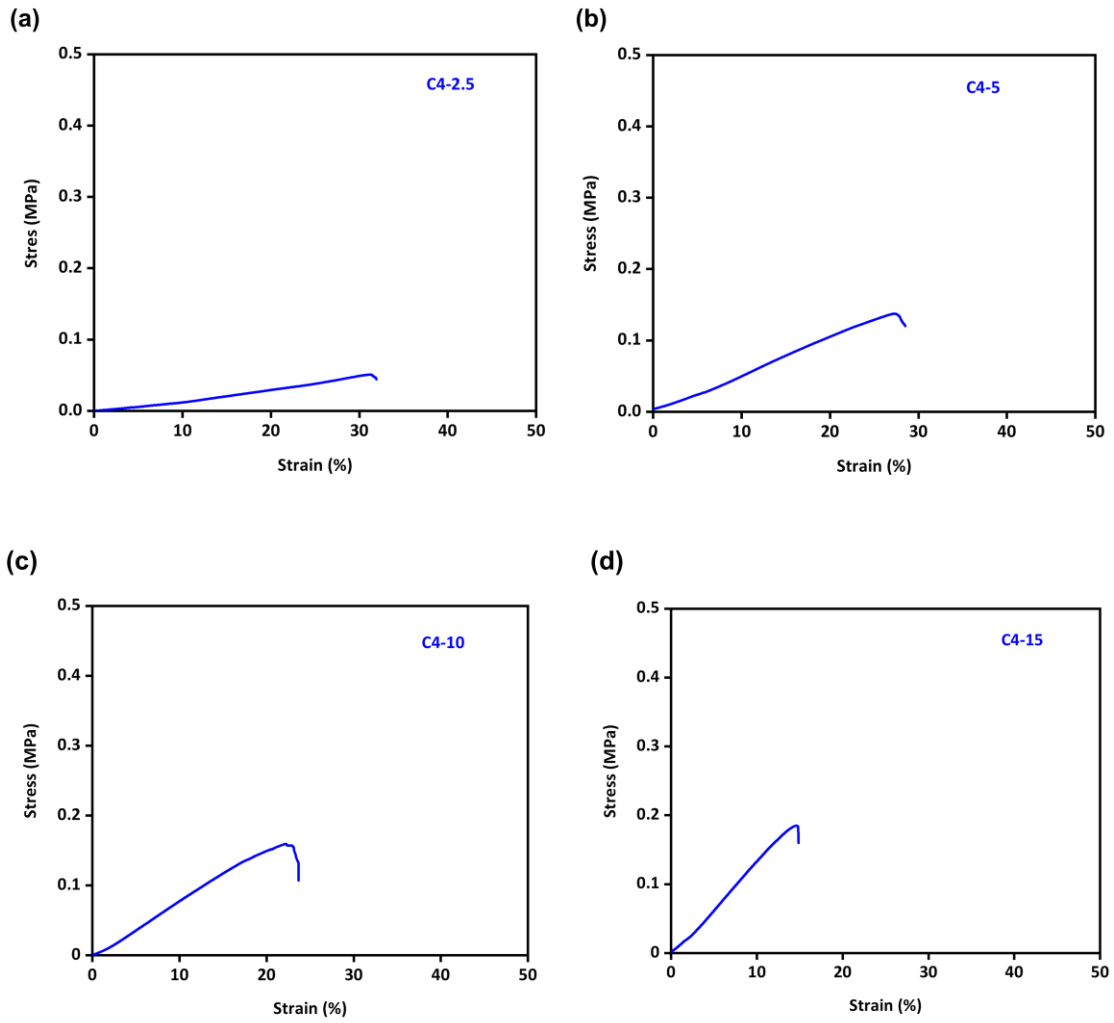
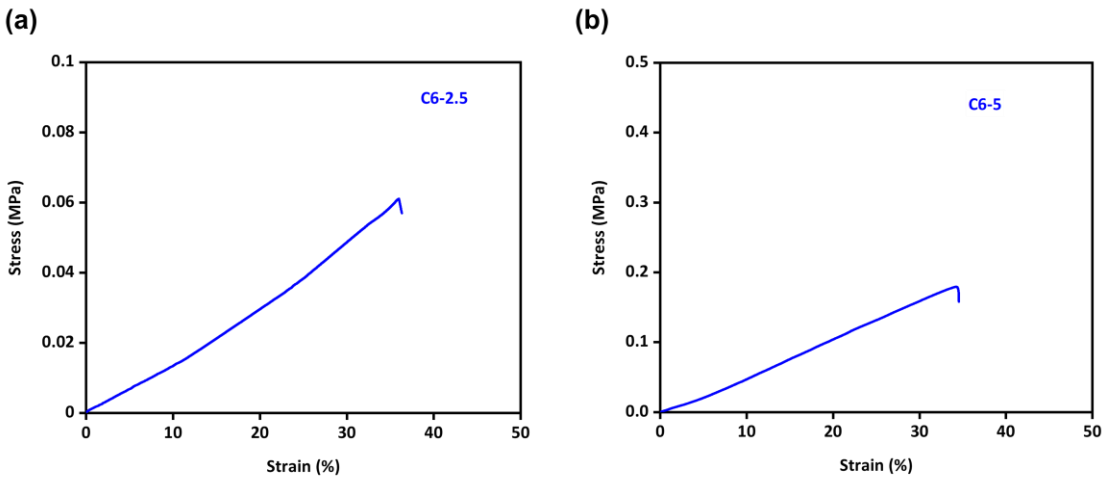


Figure S12. Stress vs strain curve of the C4-based MAPGs during the mechanical compression test. (a) C4-2.5 eq. (b) C4-5 eq. (c) C4-10 eq. (d) C4-15 eq.



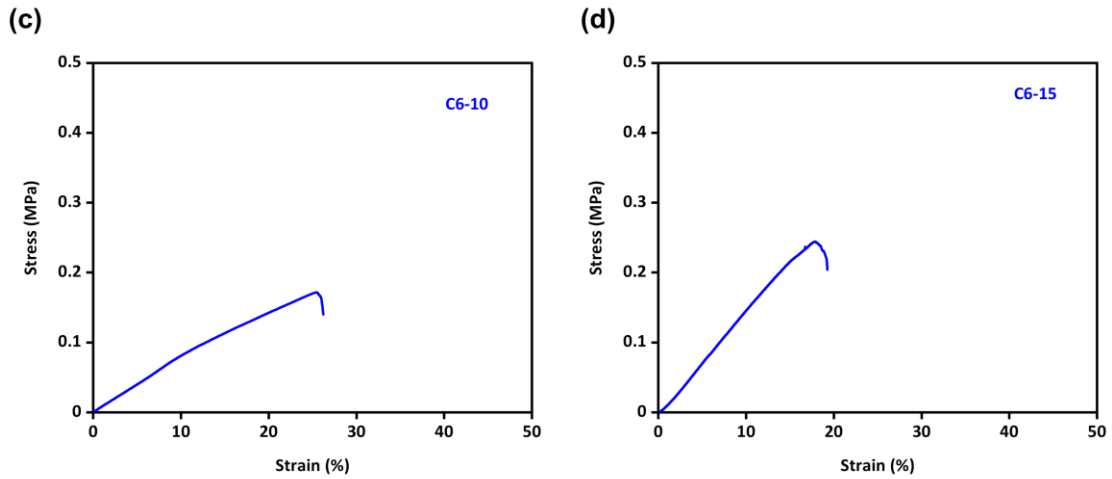


Figure S13. Stress vs strain curve of the C6-based MAPGs during the mechanical compression test, (a) C6-2.5 eq. (b) C6-5 eq. (c) C6-10 eq. (d) C6-15 eq.

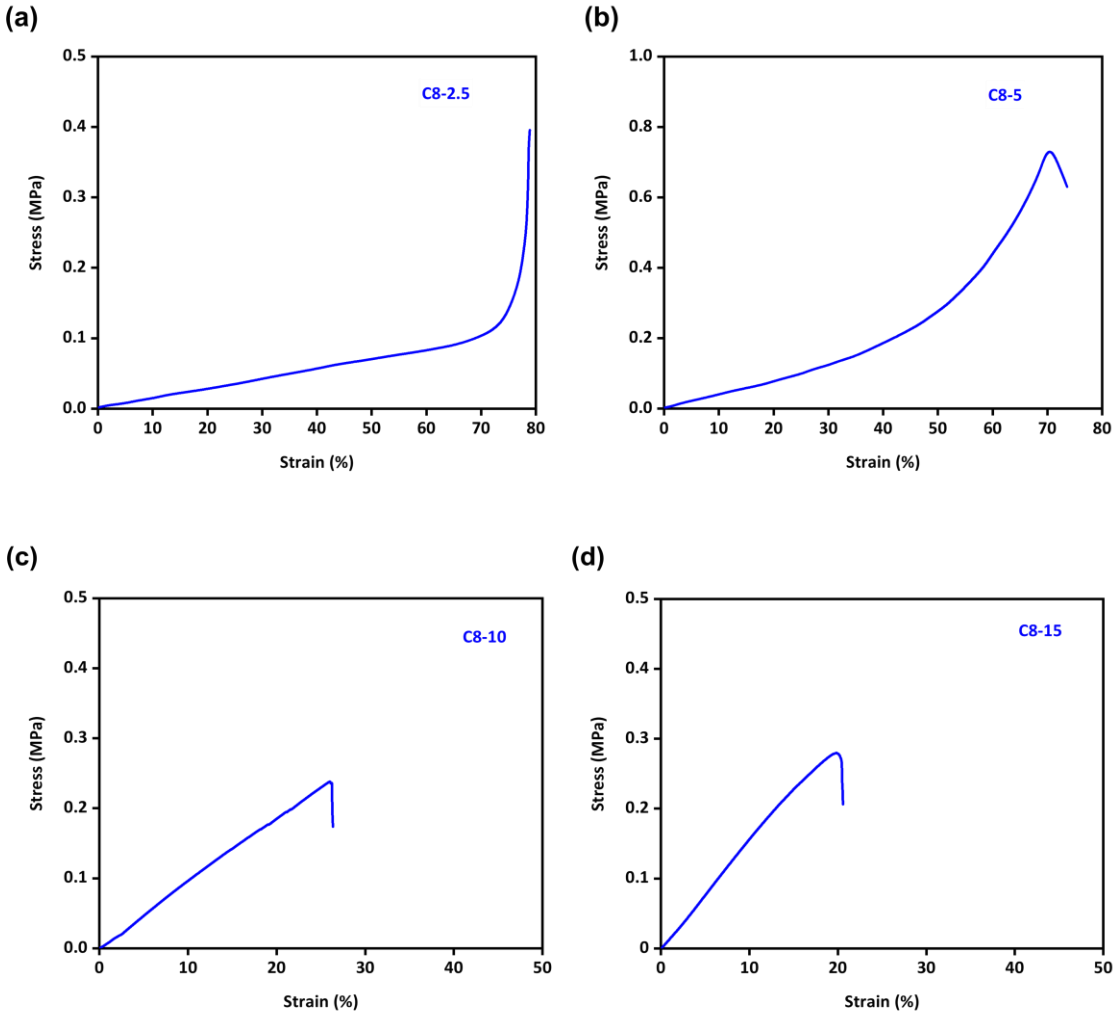


Figure S14. Stress vs strain curve of the C8-based MAPGs during the mechanical compression test. (a) C8-2.5 eq. (b) C8-5 eq. (c) C8-10 eq. (d) C8-15 eq.

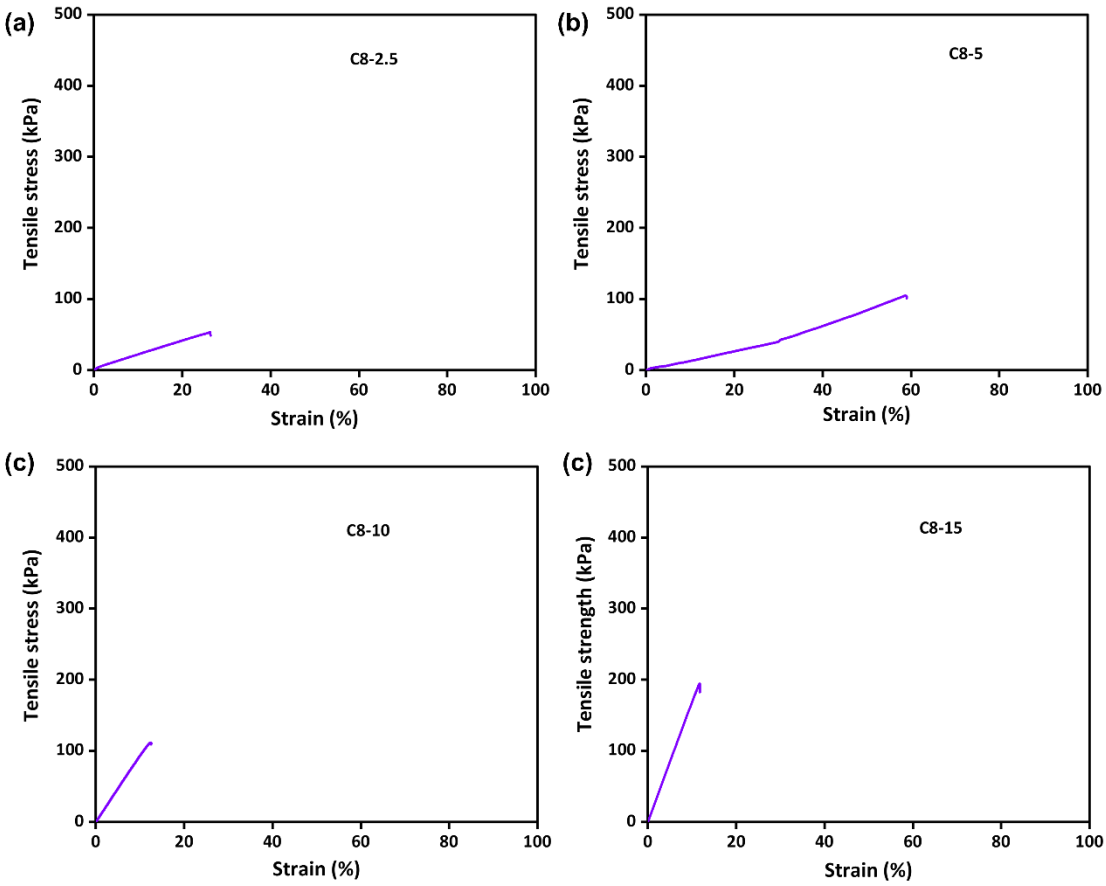


Figure S15. Tensile stress vs strain curve of the C8-based MAPGs during the tensile testing (a) C8-2.5 eq. (b) C8-5 eq. (c) C8-10 eq. (d) C8-15 eq.

Table S2. Experimental parameters for mechanical compression testing of gels.

Gel composition	Maximum force (kPa)	Strain at maximum force (%)	E (kPa)
NMe2-2.5	21	63	19.6 ± 11
NMe2-5	45	36	99.1 ± 42
NMe2-10	136	27	388 ± 40
NMe2-15	343	25	736 ± 84
C4-2.5	51	31	118 ± 24
C4-5	135	27	401 ± 44
C4-10	158	22	563 ± 74
C4-15	185	14	1016 ± 68
C6-2.5	60	35	131 ± 19
C6-5	178	34	434 ± 38
C6-10	174	25	795 ± 22
C6-15	243	17	1225 ± 81
C8-2.5	-	-	142 ± 14

C8-5	728	71	404 ± 58
C8-10	237	26	832 ± 67
C8-15	278	20	1446 ± 38

Table S3. Experimental parameters for tensile testing of the C8 gels.

GEL	**Maximum elongation (%)**	**Maximum tensile stress (kPa)**
C8-2.5	27 ± 4	53 ± 7.2
C8-5	58 ± 6	106 ± 4
C8-10	12 ± 3	118 ± 7
15	11 ± 2	197 ± 12