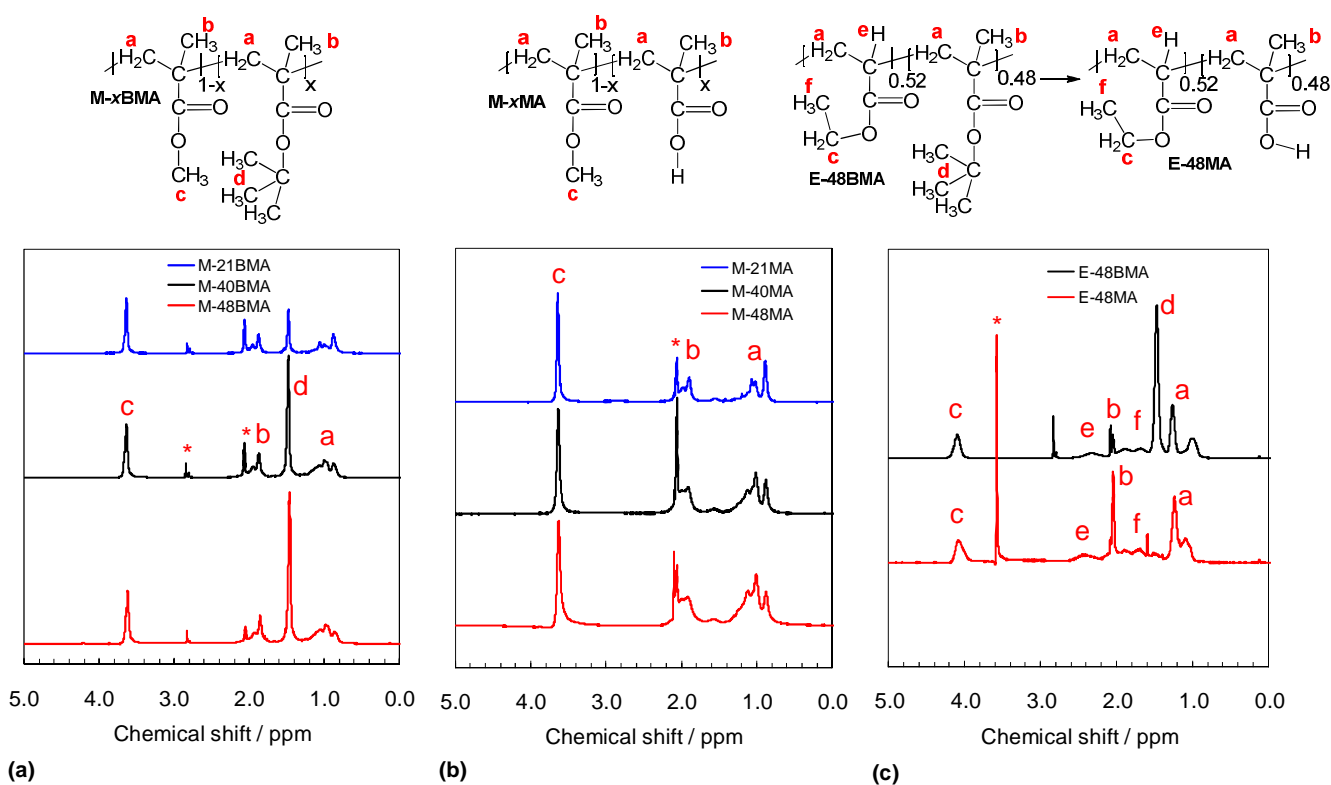


## SUPPLEMENTARY INFORMATION

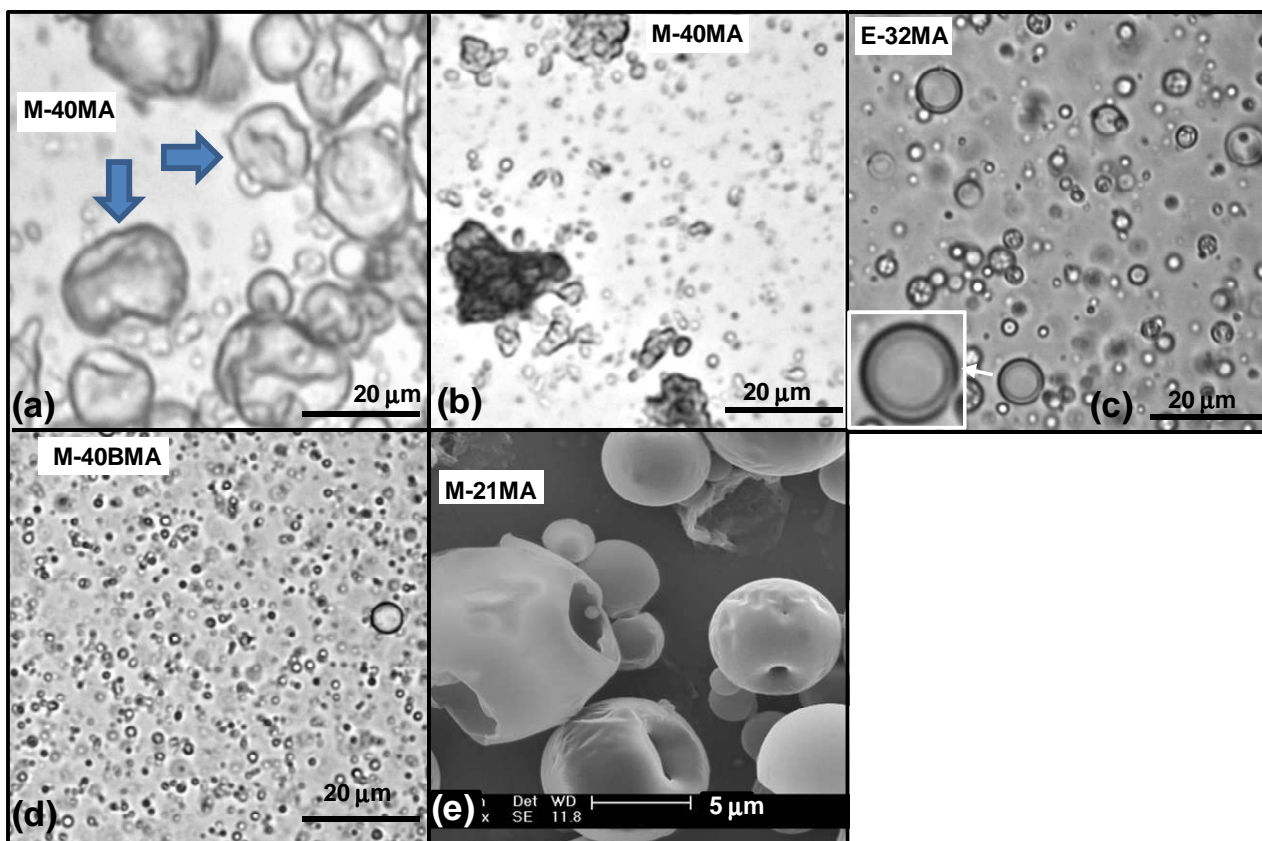
### Tuning the properties of pH-responsive and redox sensitive hollow particles and gels using copolymer composition

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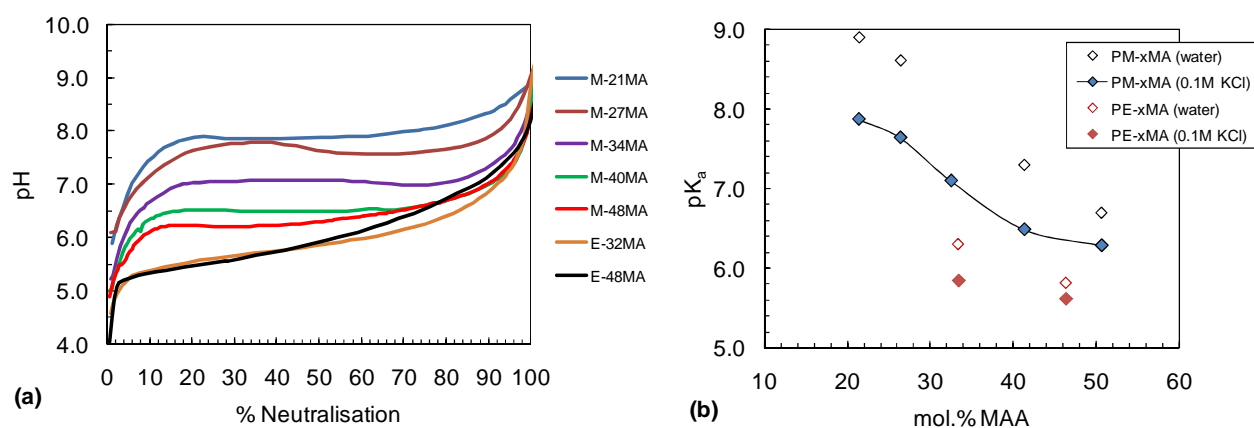
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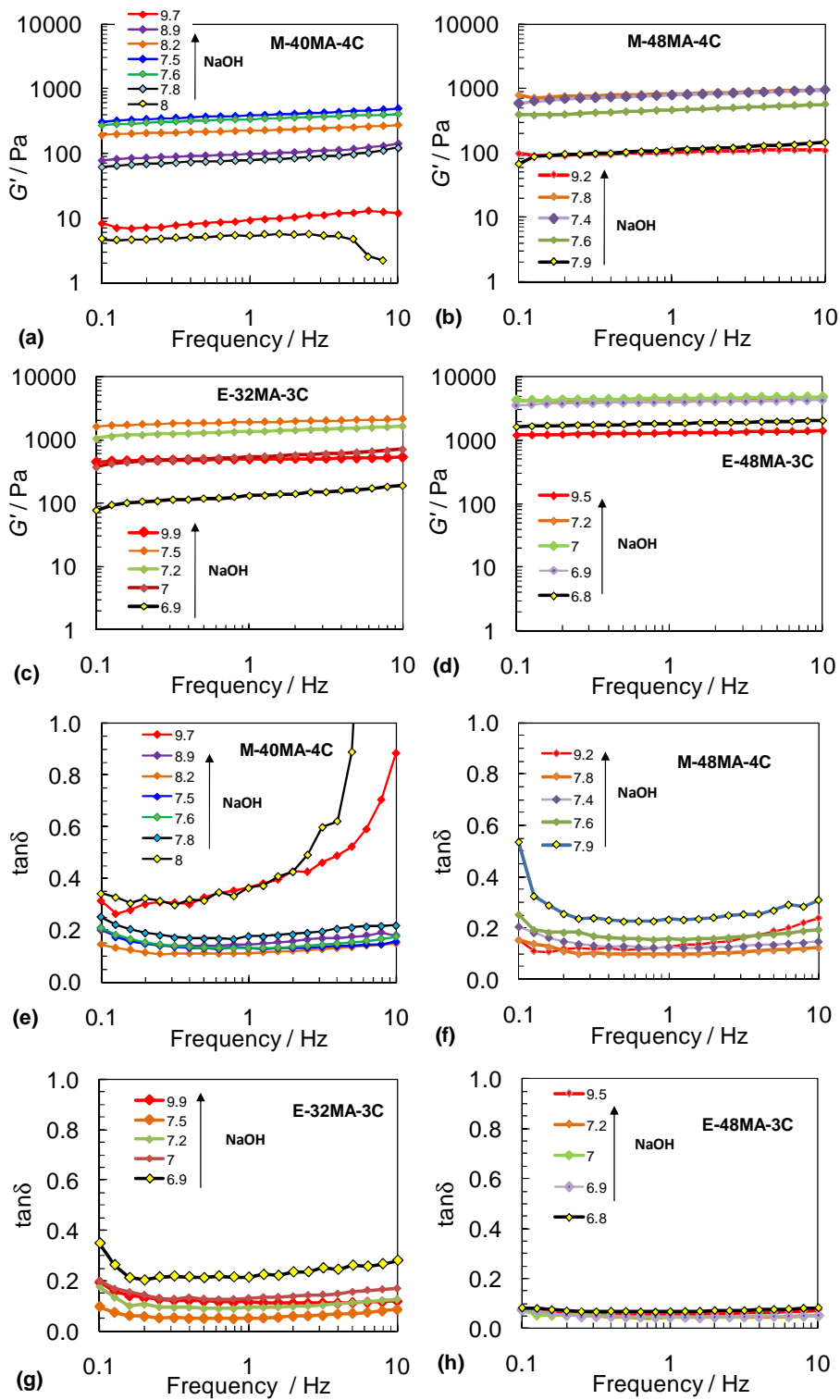
**Fig S1.** <sup>1</sup>H NMR spectra for (a) M-xBMA, (b) M-xMA and (c) E-48BMA and E-48MA copolymers. The values for x from <sup>1</sup>H NMR were determined for M-xBMA copolymer using the equation:  $x = 100/(3(A_c/A_d) + 1)$  where  $A_c$  and  $A_d$  are the areas for the c and d protons. The equation used for E-xBMA was  $x = 100/(4.5(A_c/A_d) + 1)$ . Solvent peaks are marked with asterisks.



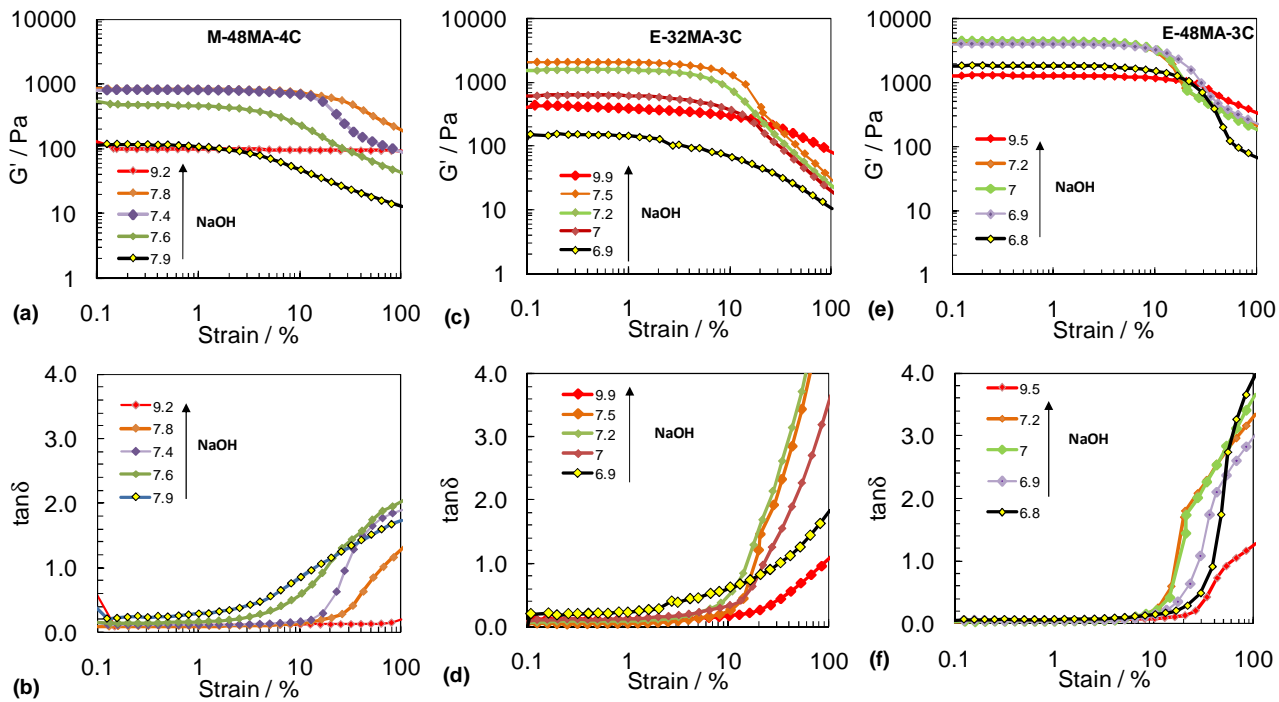
**Fig. S2. Micrographs of as made non-crosslinked hollow particles.** (a) M-40MA coated  $\text{CH}_2\text{Cl}_2$  droplets just after preparation. The arrows show collapsing particles. (b) M-40MA particles after  $\text{CH}_2\text{Cl}_2$  evaporation, (c) Shows E-32MA particles. (d) Shows M-40BMA particles prepared using the same method as for (a); however, methanol was not added. A scanning electron micrographs is shown for (e) M-21MA. All the particles were imaged from dispersions that had a pH of about 6.



**Fig. S3** (a) Variation pH with neutralisation for various M-xMA and E-xMA dispersions in 0.1 M KCl solution. (b) Variation of the apparent  $pK_a$  with mol.% MAA in copolymers. The lines are guides to the eye.



**Fig. S4.** Frequency sweep rheological data for M-40MA-4C ((a) and (e)), M-48MA-4C ((b) and (f)), E-32MA-3C ((c) and (g)) and E-48MA-3C ((d) and (h)) gels. The data were obtained using 5 wt% dispersions at a range of pH values (shown in figures). The arrows indicate the sequence of NaOH additions.



**Fig. S5.** Strain sweep rheological data for M-48MA-4C ((a) and (b)), E-32MA-3C ((c) and (d)) and E-48MA-3C ((e) and (f)) gels. The data were obtained using 5 wt% dispersions at a range of pH values (shown in figures). The arrows indicate the sequence of NaOH additions.