Electronic Supplementary Material (ESI) for RSC Advances.


# Electronic Supporting Information (ESI)

# Mild polyaddition and polyalkylation based on carbon-carbon bond formation reaction of active methylene

Caicai Jiao, Lilong Gao,* Bing Yu, Hailin Cong* and Youqing Shen

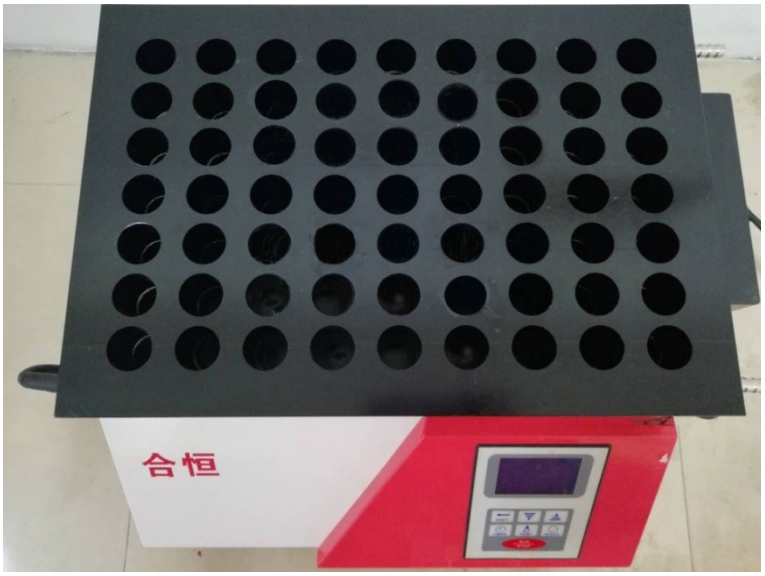



**Fig. S1** HTPSI for polymerization of AMCs.

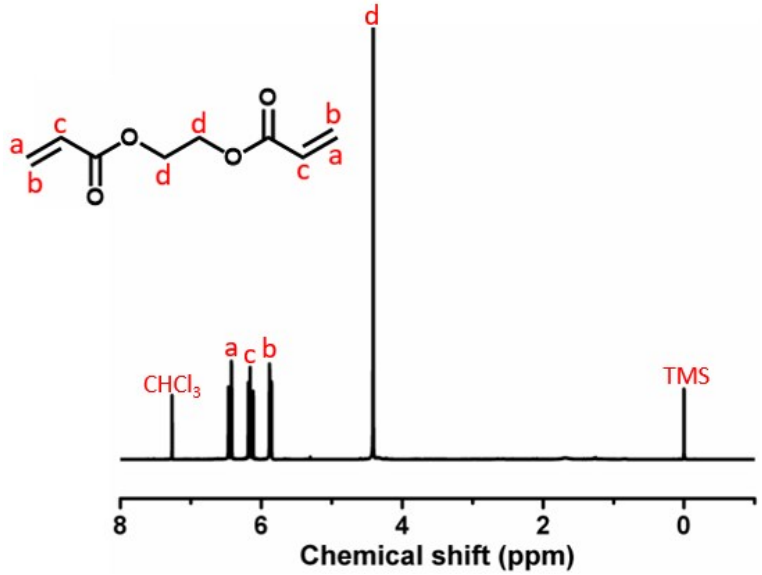



**Fig. S2** $^{1}$H NMR spectra of EGDA.

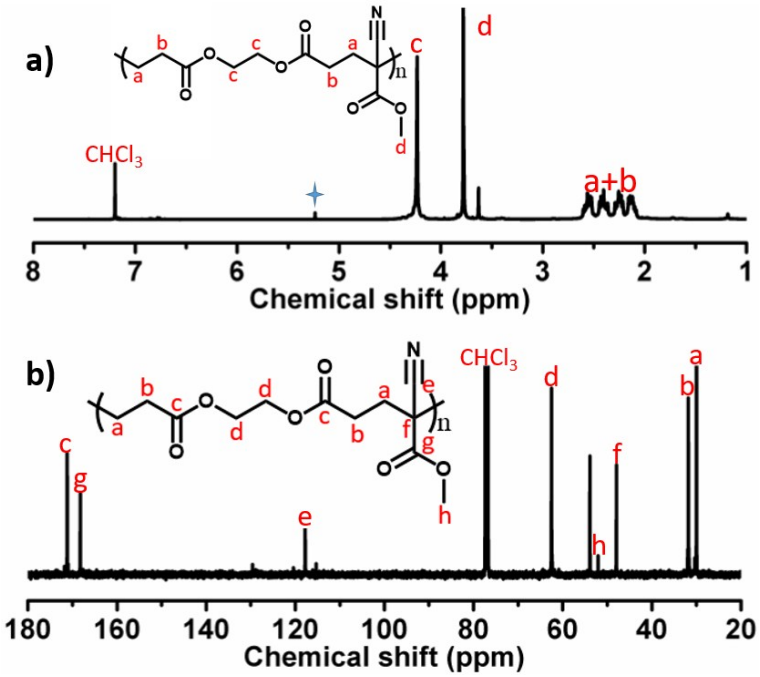



**Fig. S3** (a) $^{1}$H NMR spectra and (b) $^{13}$C NMR spectra of P(MCA-EGDA).

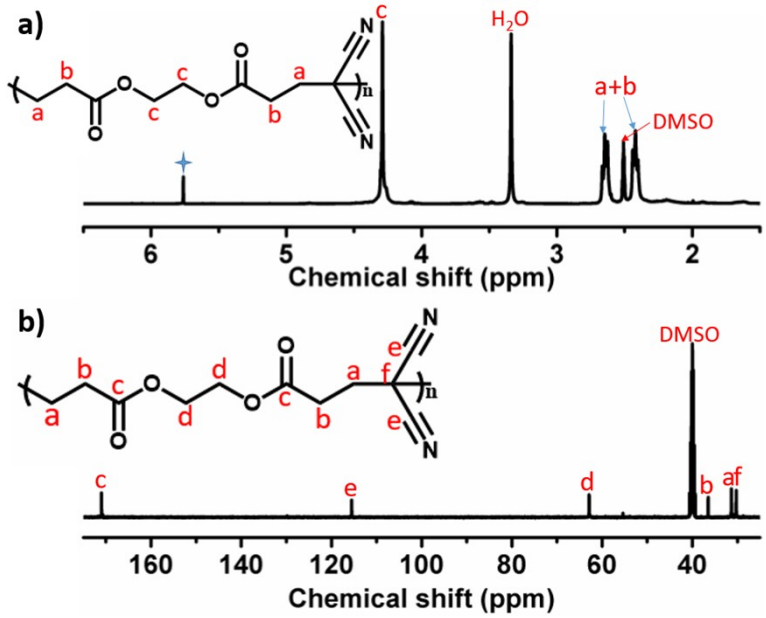



**Fig. S4** (a) $^{1}$H NMR spectra and (b) $^{13}$C NMR spectra of P(MN-EGDA).

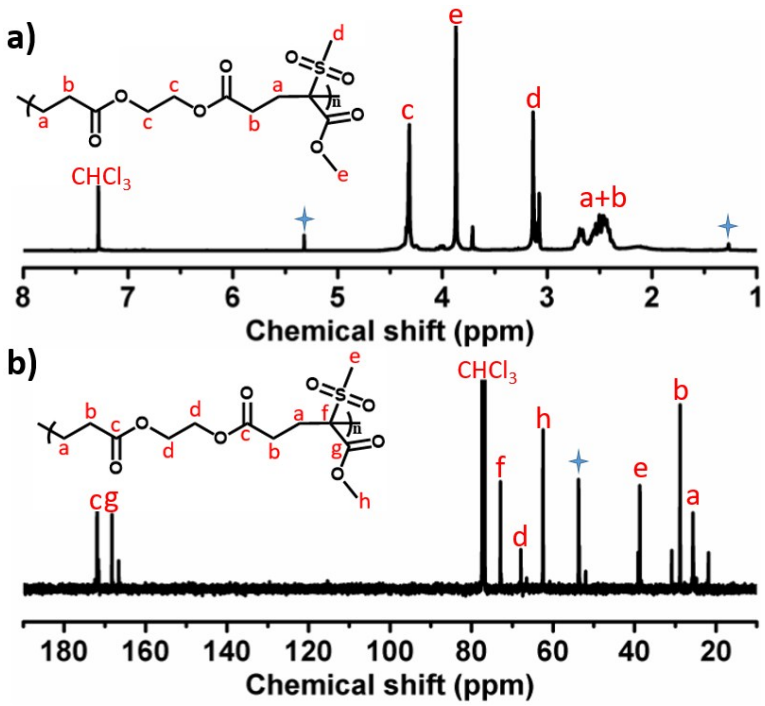



**Fig. S5** (a) $^{1}$H NMR spectra and (b) $^{13}$C NMR spectra of P(MMSA-EGDA).

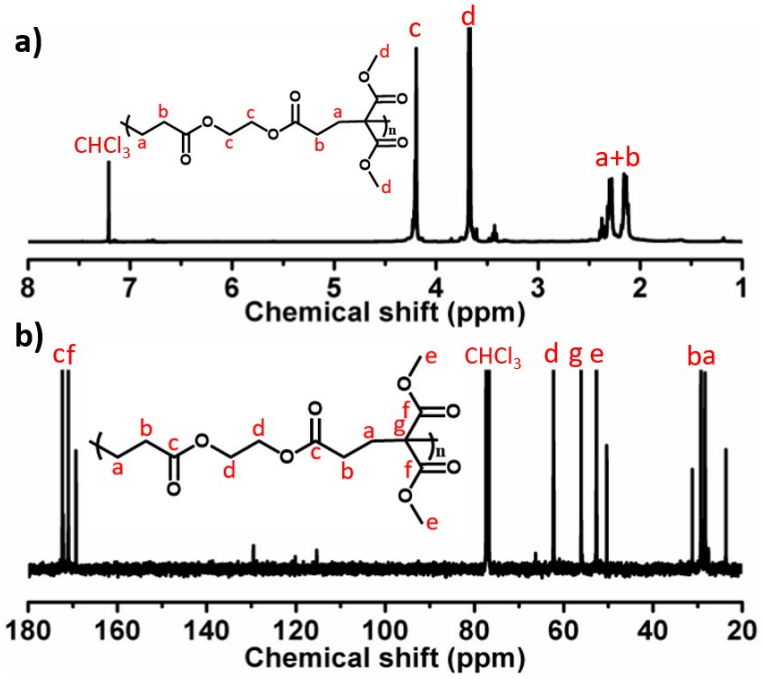



**Fig. S6** (a) $^{1}$H NMR spectra and (b) $^{13}$C NMR spectra of P(DMM-EGDA).

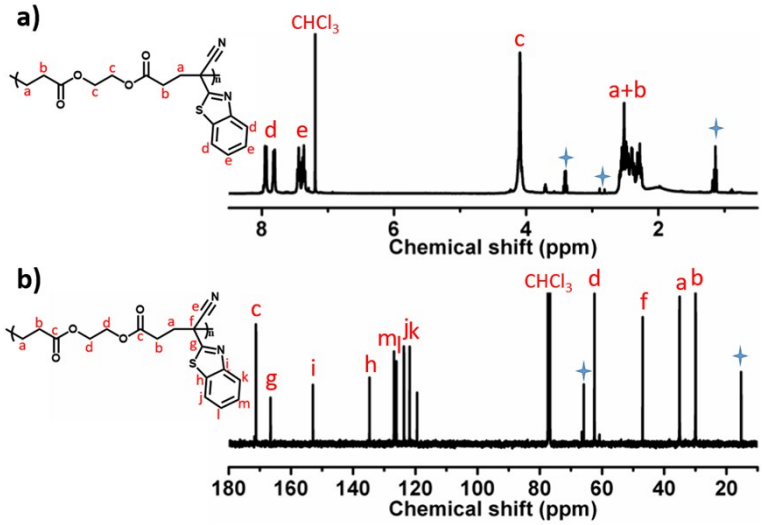



**Fig. S7** (a) $^{1}$H NMR spectra and (b) $^{13}$C NMR spectra of P(BTAN-EGDA).

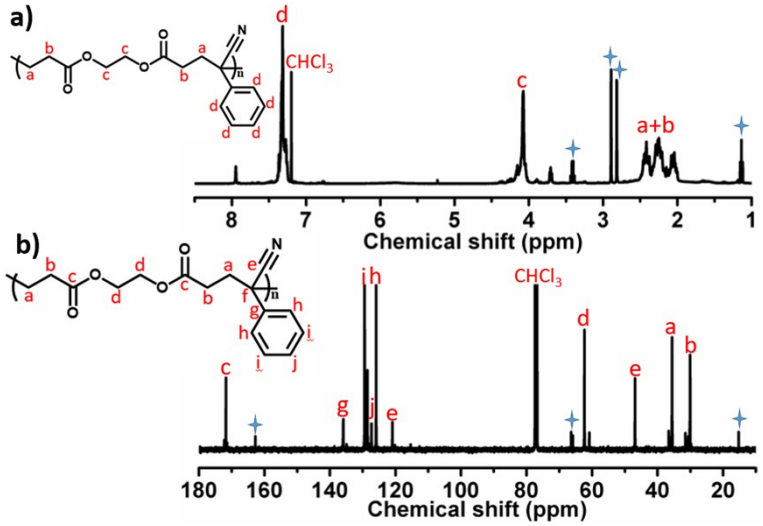



**Fig. S8** (a) $^{1}$H NMR spectra and (b) $^{13}$C NMR spectra of P(PAN-EGDA).

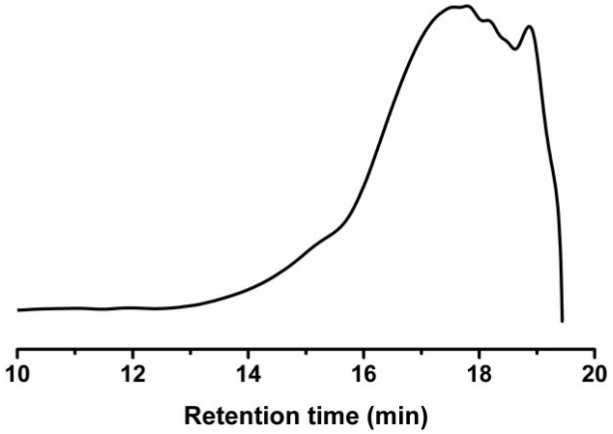



**Fig. S9** GPC curve of P(MN-EGDA).

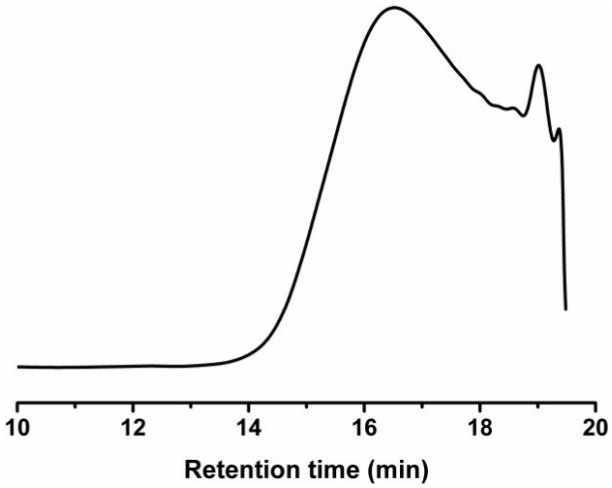



**Fig. S10** GPC curve of P(MMSA-EGDA).

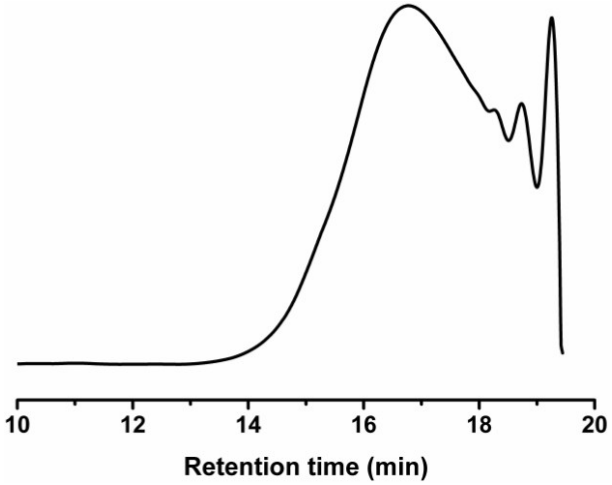



**Fig. S11** GPC curve of P(DMM-EGDA).

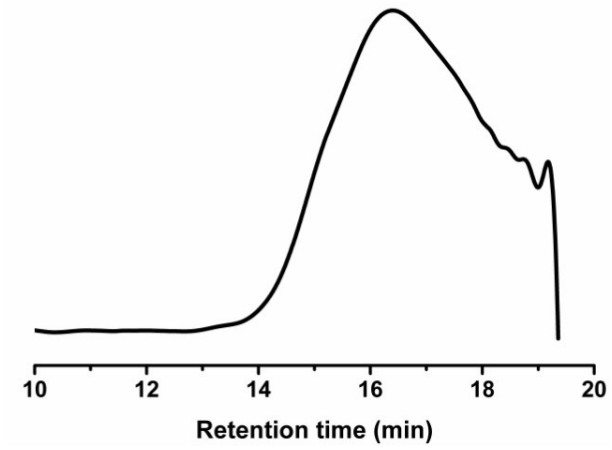



**Fig. S12** GPC curve of P(BTAN-EGDA).

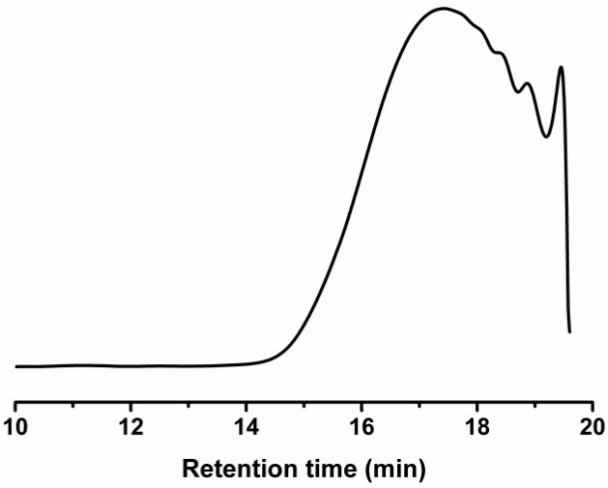



**Fig. S13** GPC curve of P(PAN-EGDA).

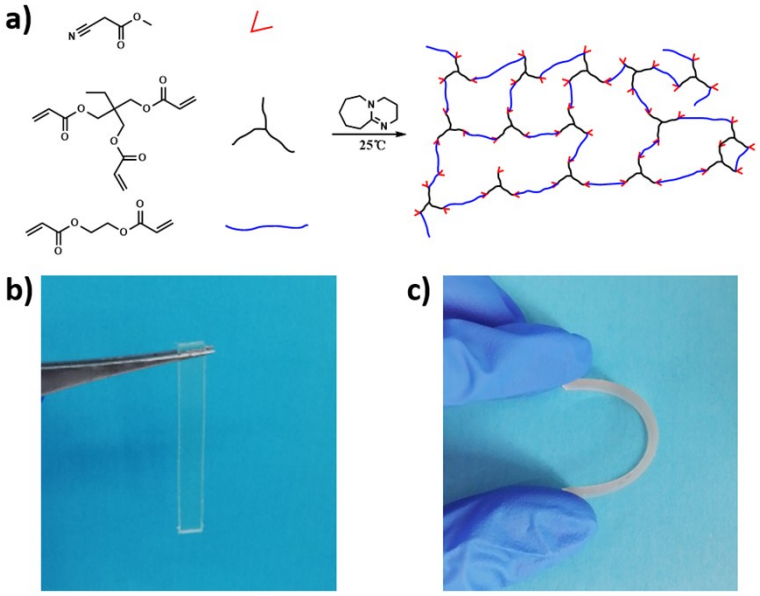



**Fig. S14** (a) Synthesis of elastomer with cyanogen groups, MCA: TMPTA: EGDA: DBU=1.15: 0.1: 1: 0.01. (b) Image of elastomer with high transparency and (c) Image of elastomer bending under internal force.

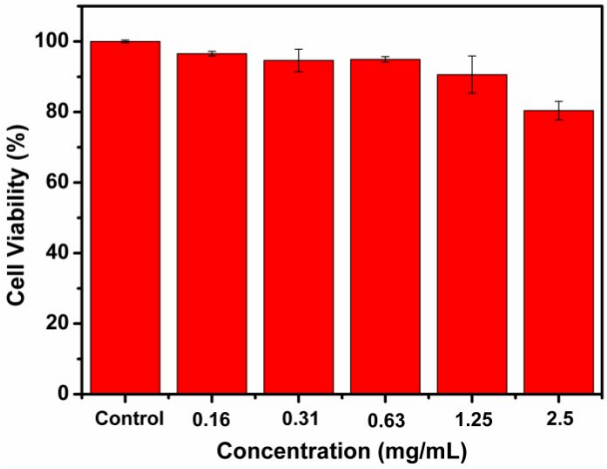



**Fig. S15** Cell viability of P(MN-EGDA) against Hela cells.

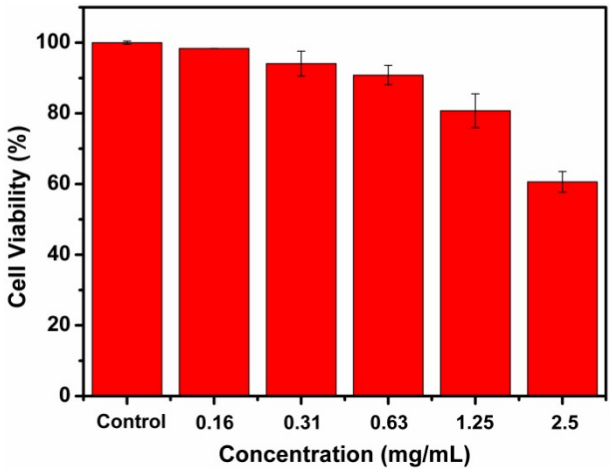



**Fig. S16** Cell viability of P(MMSA-EGDA) against Hela cells.

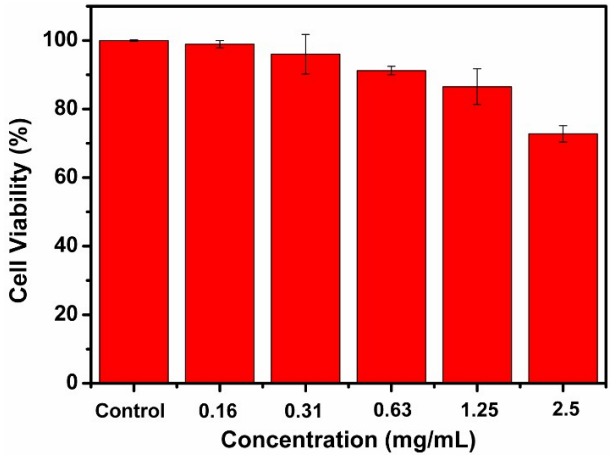



**Fig. S17** Cell viability of P(DMM-EGDA) against Hela cells.

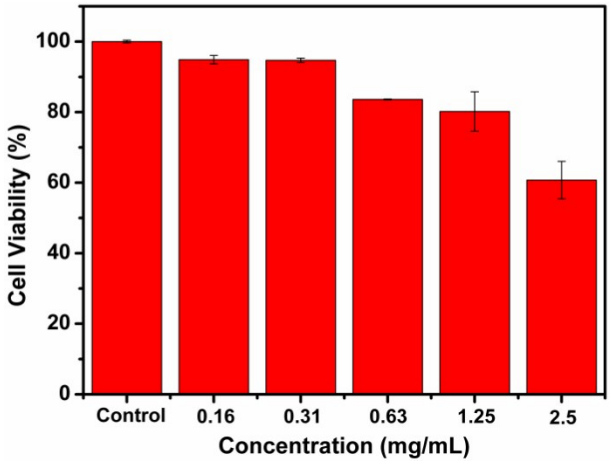



**Fig. S18** Cell viability of P(BTAN-EGDA) against Hela cells.

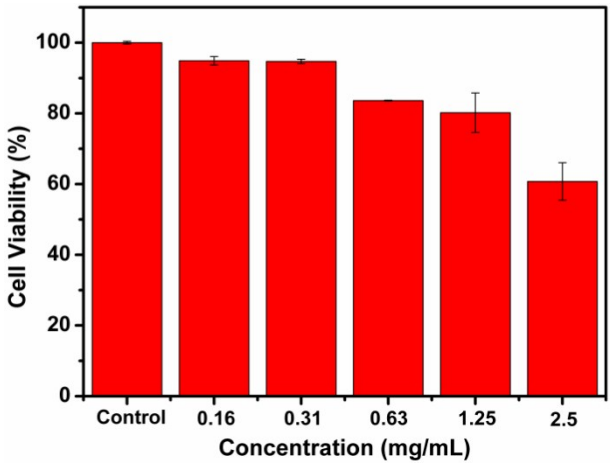



**Fig. S19** Cell viability of P(PAN-EGDA) against Hela cells.

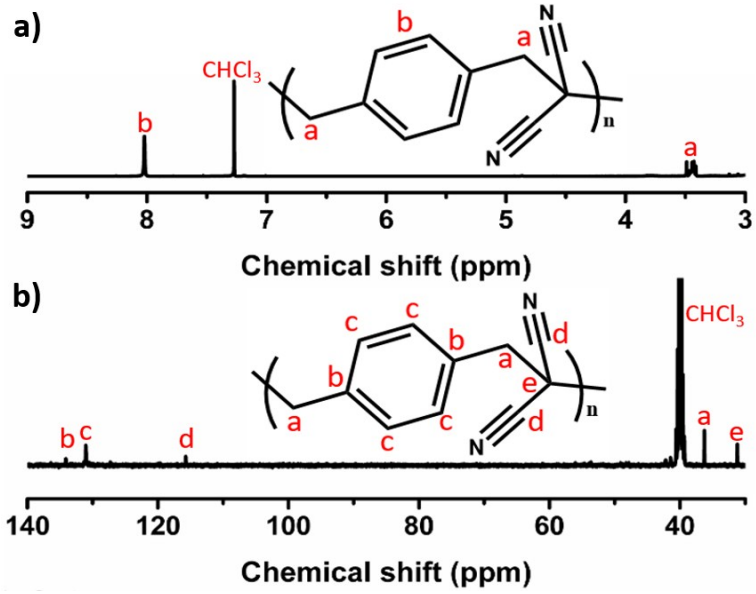



**Fig. S20** (a) $^{1}H$ NMR spectra and (b) $^{13}C$ NMR spectra of P(MN-BDC).

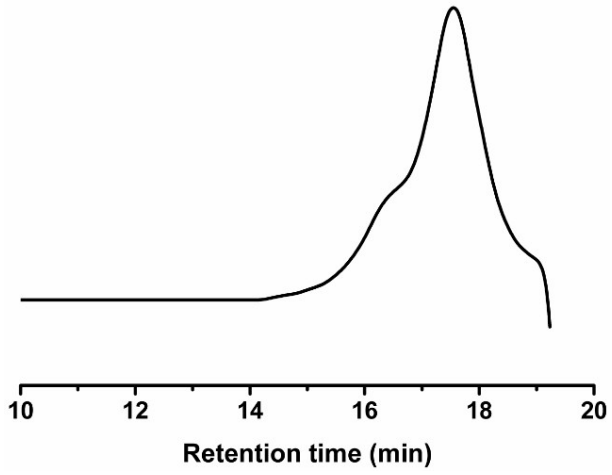



**Fig. S21** GPC curve of P(MN-BDC).

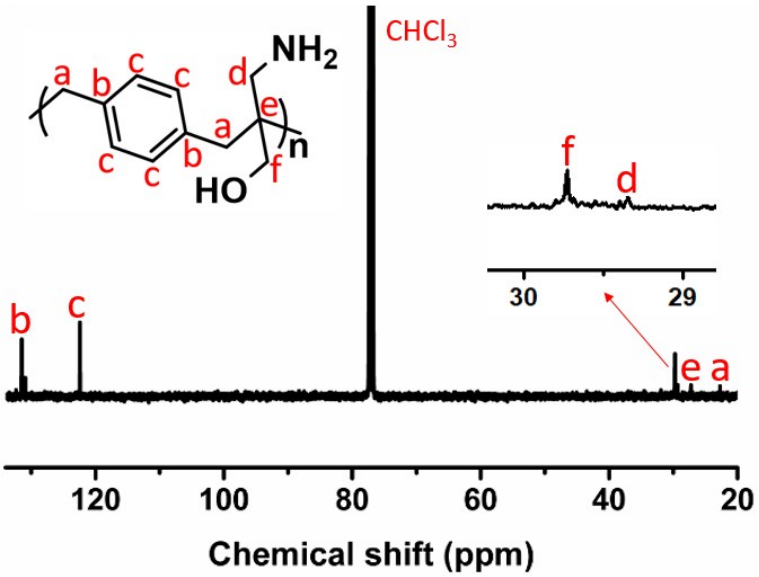
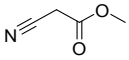
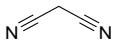
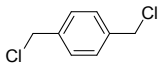
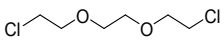
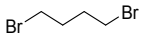



**Fig. S22** $^{13}C$ NMR spectra of R-P(MCA-BDC).

**Table S1**. The polyalkylation AMCs with dihalogen compounds.

| Monomer |  | |  | |
|---|---|---|---|---|
| | $M_w$ (×10³g/mol) | PDI | $M_w$ (×10³g/mol) | PDI |
|  | 25.4 | 1.28 | 12.1 | 1.22 |
|  | N | N | N | N |
|  | N | N | N | N |

Molecular weight and PDI were measured by GPC: linear polystyrene as the calibration standard, DMF as mobile phase, flow rate of 1.0 mL/min, temperature 50 °C.