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Supporting information for

Synthesis of Poly(2-hydroxyethyl methacrylate) End-Capped with Asymmetric Functional Groups via Atom Transfer Radical Polymerization

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The solubility of $CuCl_2$/bpy Complex

$CuCl_2$ (5 mg) and bpy (30 mg) catalyst complexes were mixed with 1 mL of methanol, methanol/2-butanone (m/m=3:2, 2:3, or 1:4) or 2-butanone, and 300 uL of these dissolved sample was diluted with 3 mL of corresponding solvent mixture. The solubility of these complexes was evaluated with UV-vis spectroscope by comparing ultraviolet absorption intensity of these diluted samples.

The solubility of PHEMA Polymer

PHEMA with DP of 80 and 800 (0.1 g) was dispersed in 1 mL of methanol, methanol/2-butanone (m/m=3:2 and 2:3) or 2-butanone under shaking once in a while over 24 h at room temperature. The solubility of PHEMA in these solvents was directly evaluated.

Evaluation of Polymerization Degree (DP) of PHEMA Samples

As shown in Fig. S2, monomer conversion was calculated by $conv. = 2*(\delta_{4.34}/2 - \delta_{5.58})/\delta_{4.34} \times 100\%$, the polymerization degree of was calculated by $DP = 2*(\delta_{4.34}/2 - \delta_{5.58})/\delta_{4.67}$ and molecular weight from ^{1}H NMR spectra was obtained by $M_{n,NMR} = 130.14 * DP + M_{initiator}$.

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Fig. S1 ^{1}H NMR spectra of a) propargyl 2-bromoisobutyrate (PBiB), b) 3-(trimethylsilyl)propargyl 2-bromoisobutyrate (TMSPBiB), and c) 3-(triisopropylsilyl)propargyl 2-bromoisobutyrate (TiPSPBiB).

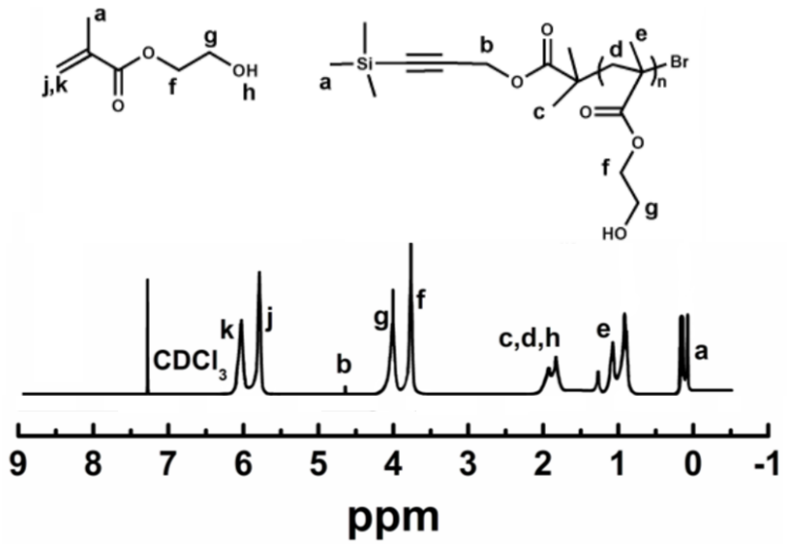

Fig. S2 ^{1}H NMR spectra of unpurified PHEMA with peaks assignment.

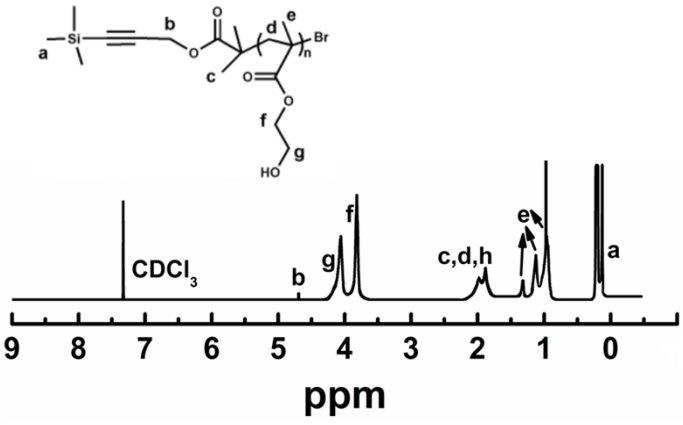

Fig. S3 ^{1}H NMR spectra of purified PHEMA.

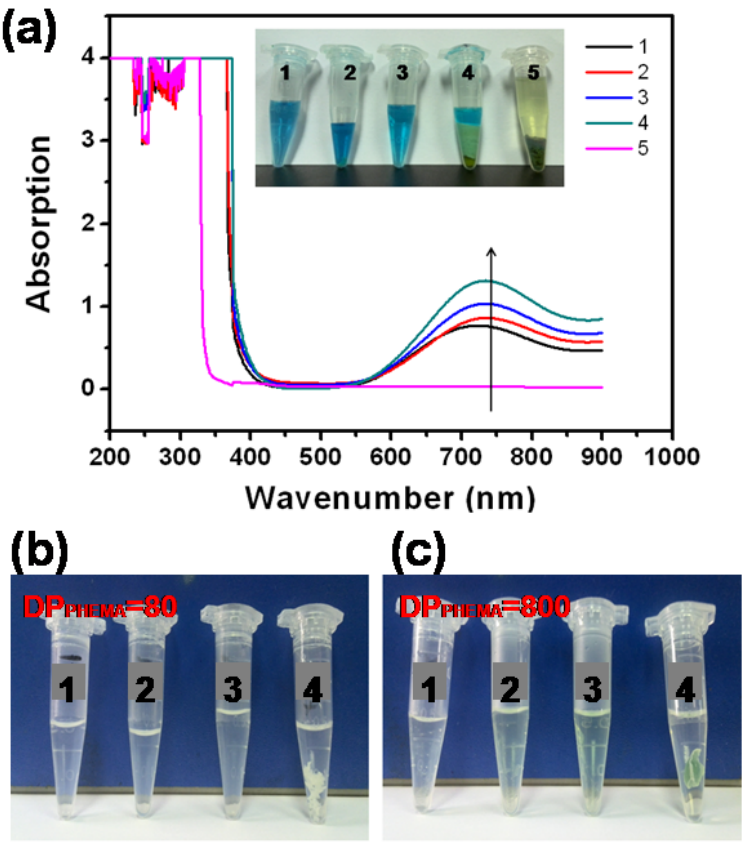

Fig. S4 the solubility of a) $CuCl_2$/bpy in methanol (sample 1), methanol/2-butanone at 3:2 (sample 2), methanol/2-butanone at 2:3 (sample 3), methanol/2-butanone at 1:4 (sample 4) and 2-butanone (sample 5); the solubility of PHEMA with molecular weight of b) 10400 g/mol and c) 104000 g/mol in methanol (sample 1), methanol/2-butanone at 3:2 (sample 2), methanol/2-butanone at 2:3 (sample 3), and 2-butanone (sample 4).

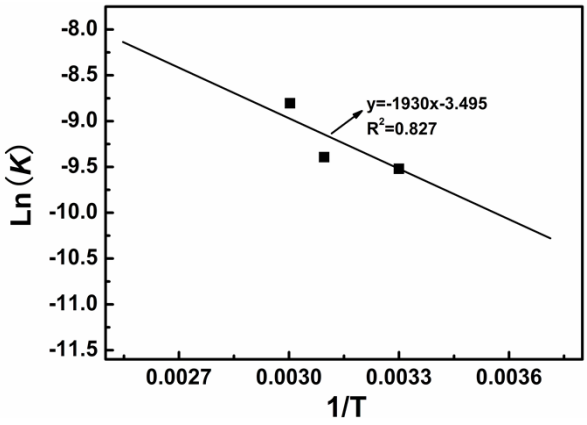

Fig. S5. The relationship of Ln(K_p^{app}) and 1/T based on Arrhenius equation.

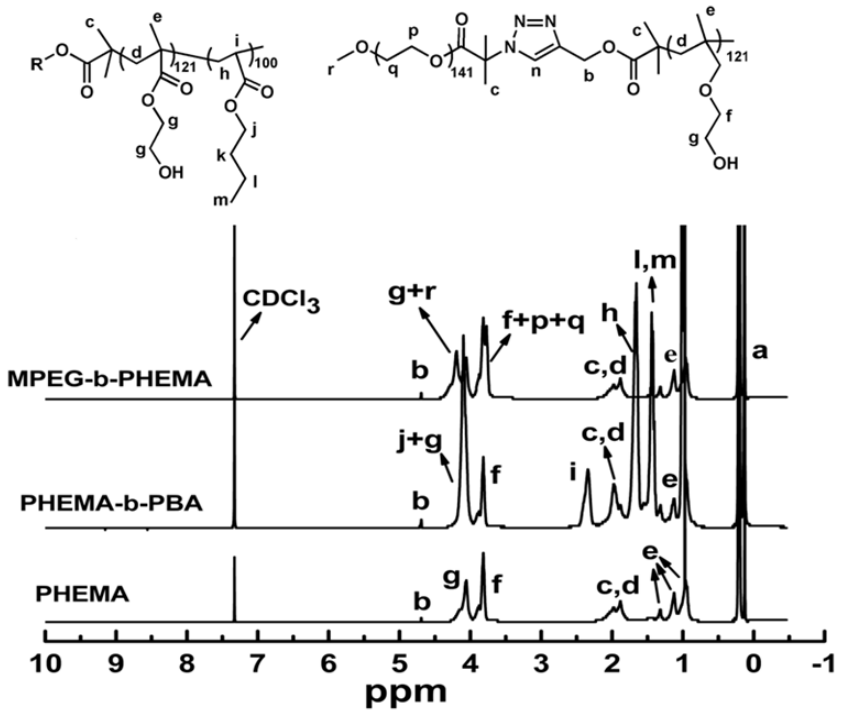

Fig. S6 The ^{1}H NMR spectra of purified TMS-C≡C-PHEMA-Br and block copolymers PHEMA-*b*-PBA and MPEG-*b*-PHEMA.

Table S1 The total solubility parameter (δ), dispersion solubility parameter (δ_D), hydrogen bonding solubility parameter (δ_H) and polar solubility parameter (δ_p) of methanol, methanol/2-butanone at 3:2, 2:3 and 1:4 (m/m) and 2-butanone with those of PHEMA polymer.

f_{MEK}/%	f_{MeOH}/%	δ/(cal/cm^3)$^{1/2}$	δ_d/(cal/cm^3)$^{1/2}$	δ_p/(cal/cm^3)$^{1/2}$	δ_h/(cal/cm^3)$^{1/2}$
0	100	14.49	7.42	6	10.9
40	60	12.402	7.56	5.36	7.54
60	40	11.358	7.63	5.04	5.86
80	20	10.314	7.7	4.72	4.18
100	0	9.27	7.77	4.4	2.5
PHEMA		11.38	7.75	5.76	7.22