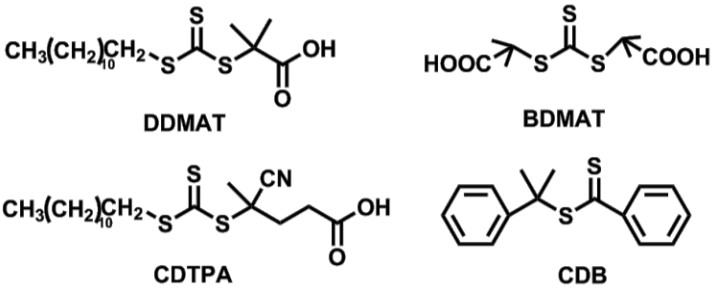
Electronic Supplementary Material (ESI) for Polymer Chemistry.

Supporting information for

N-Ester-substituted polyacrylamides with tunable lower critical solution temperature (LCST): the *N*-ester-substitutes dependent thermoresponse

Shengli Chen,[a] Yuan Zhang,[a] Ke Wang,[a] Heng Zhou,[a] and Wangqing Zhang*[a,b]

[a]Key Laboratory of Functional Polymer Materials of the Ministry of Education, Institute of Polymer Chemistry, Nankai University, Tianjin 300071, China.
[b]Collaborative Innovation Center of Chemical Science and Engineering (Tianjin), Nankai University, Tianjin 300071, China.



Scheme S1 The RAFT agents of DDMAT, BDMAT, CDTPA and CDB.

$$M_{n,th} = \frac{[\text{monomer}]_0 \times M_{\text{monomer}}}{[\text{RAFT}]_0} \times \text{Conversion} + M_{\text{RAFT}} \quad \text{(S1)}$$

Note: in eq S1 $[\text{monomer}]_0$ and $[\text{RAFT}]_0$ represent the concentration of the fed monomer and the RAFT agent, the Conversion is determined by ^{1}H NMR analysis by comparing the integral areas of the monomer protons of C=C-*H* at δ = 5.81 ppm with those of the 1,3,5-trioxane internal standard at δ = 5.10 ppm, and M_{monomer} and M_{RAFT} are the molar mass of the monomer and the RAFT agent.

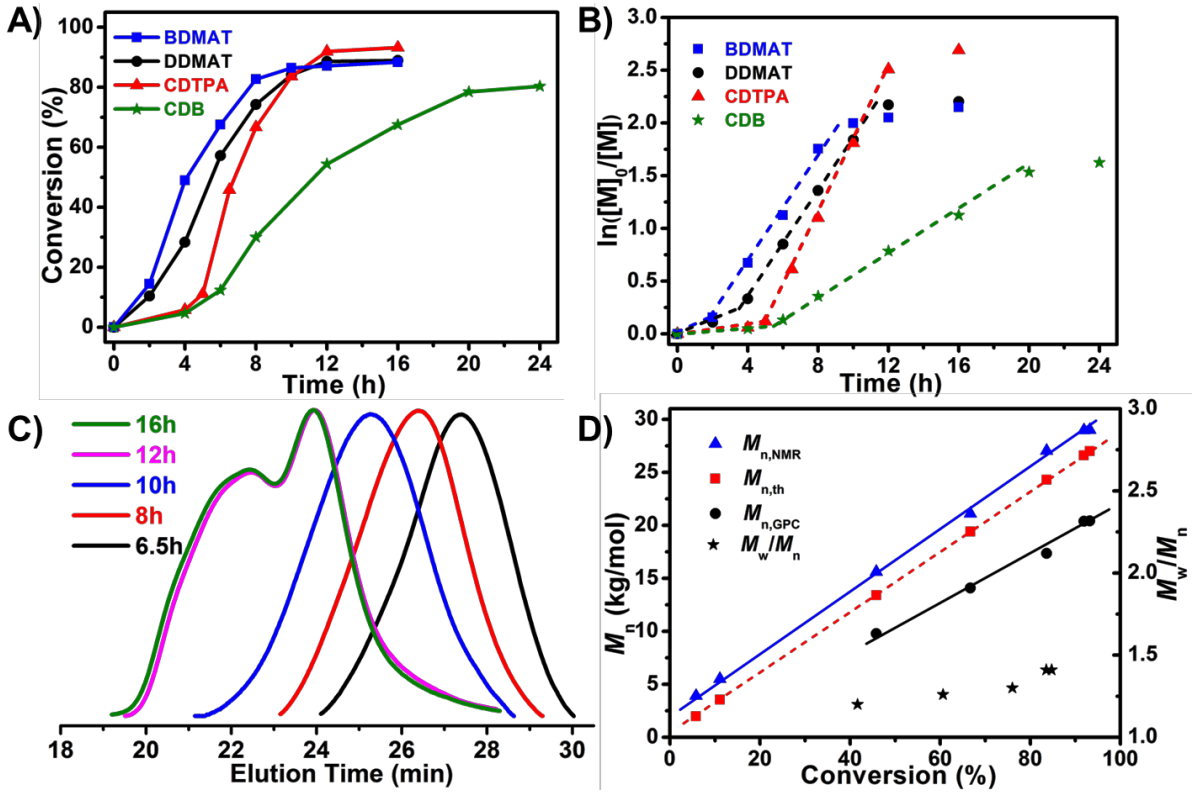


Fig. S1 Kinetics of solution RAFT polymerization of NAGME: the plots of time-dependent monomer conversion (A) and the ln($[M]_0$/[M])-time plots of the RAFT polymerization (B) using BDMAT, DDMAT, CDTPA and CDB as the RAFT agents, respectively; the GPC traces (C), the evolution of the molecular weight and the *Đ* (M_w/M_n) value of PNAGME with the monomer conversion (D) using CDTPA as the RAFT agent. Conditions: NAGME (1.43 g, 10.00 mmol, 33.3 wt% in 1,4-dioxane), $[NAGME]_0:[RAFT]_0:[AIBN]_0$ = 600:3:1, 70 ^{o}C.

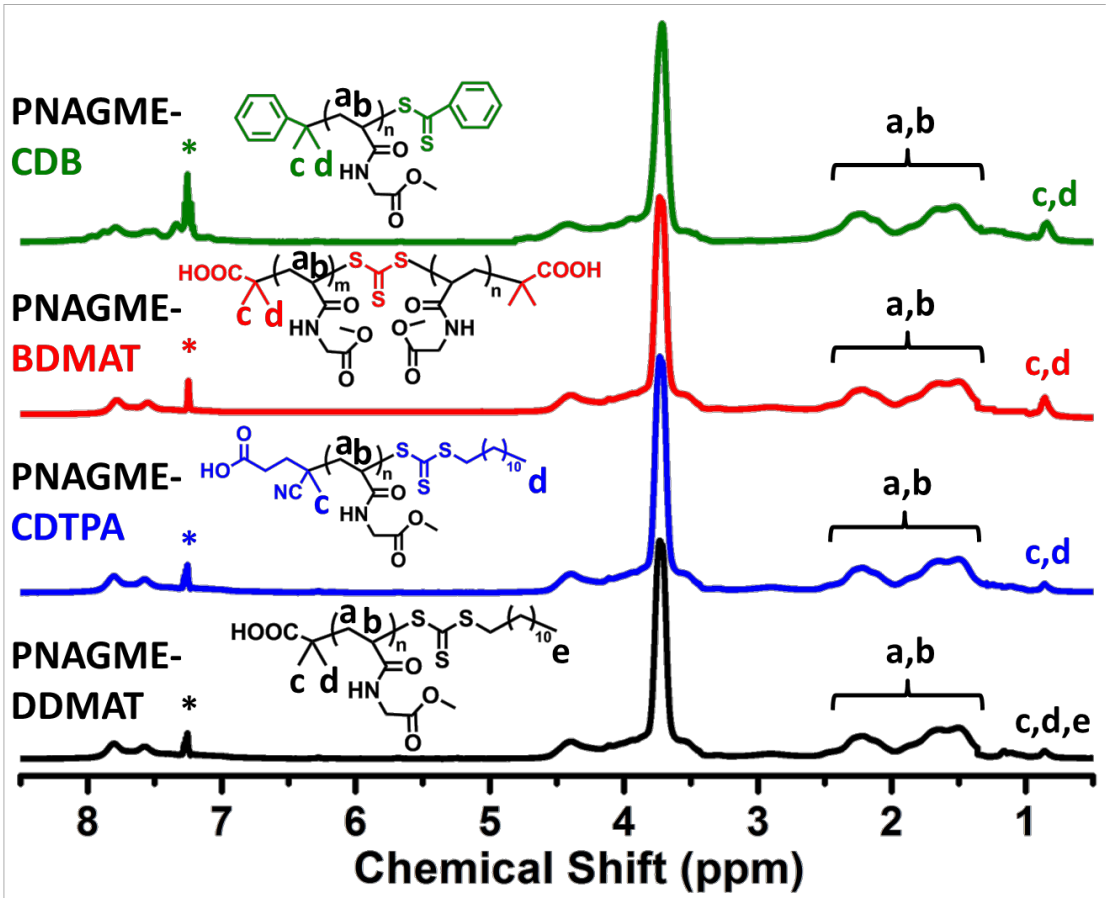


Fig. S2 The ^{1}H NMR spectra of the four samples of PNAGME synthesized using DDMAT, CDTPA, BDMAT and CDB as the RAFT agents.

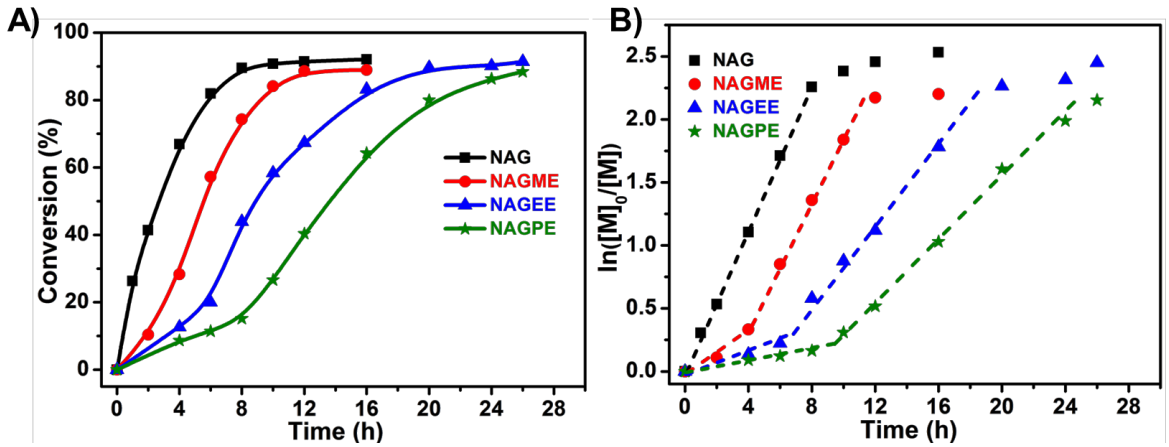


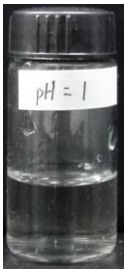
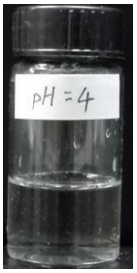
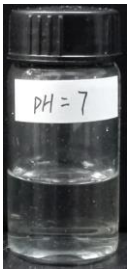
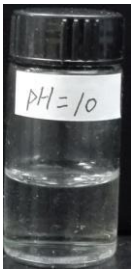
Fig. S3 Kinetics of solution RAFT polymerization of four *N*-ester substituted acrylamides NAG, NAGME NAGEE and NAGPE, respectively. The plots of time-dependent monomer conversion (A) and the ln($[M]_0$/[M])-time plots of the RAFT polymerization (B). Conditions: For all of the polymerization, the monomer concentration was fixed at 3.64 mol/L, $[Monomer]_0$:$[RAFT]_0$:$[AIBN]_0$ = 600:3:1, 70 ^{o}C.

Table S1 The table showing the solubility of four monomers in common solvents at 20 ^{o}C (approx. 293.15 K) and a pressure of one atm.

Monomer	Water	MeOH	EtOH	CH_2Cl_2	$CHCl_3$	Dioxane	DMF
NAG	S[a]	S	S	s[b]	s	S	S
NAGME	S	S	S	S	S	S	S
NAGEE	s	S	S	S	S	S	S
NAGPE	s	S	S	S	S	S	S

[a] S represents solubility > 10 mg/mL; [b] s represents solubility locates 1– 10 mg/mL.

Table S2 Summary of the photographs of the PNAG solution (c=1.0 wt%) with various pH from 1 to 10 at 25 ^{o}C and 90 ^{o}C, respectively, showing the polymer did not possess phase transition behavior.

pH	1	4	7	10
25 ^{o}C				
90 ^{o}C