Supporting Information

S1 Text. Synthesis process of micro-block P(AM-MAPTAC)

Predetermined amount of AM, MAPTAC, PAAS, distilled water, EDTA and urea were added into a 10ml pyrex glass vessel and fully stired until completely dissolved. The pH of the reaction solution was adjusted by HCl (1+1) and NaOH (0.1mol L^{-1}). Then predetermined amount of VA-044 was added after the reaction solution was completely deoxygenated by bubbling with pure N_2 (99.99%) for 30 min. Finally, the reaction vessel was sealed up immediately and exposed to radiation with a 500 W high pressure mercury lamp (Tianyuanhuiteng, China) at room temperature until the set time. After UV irradiation, the gels were aged for 2h. The TPAMA was purified by first dissolved in distilled water and pH adjusted to 2.0, then washed by acetone and ethanol for several times. Finally, the white product was dried in a vacuum oven at 60 °C until constant weight.

S2 Text. Characterization methods of polymers

In this section, AM, PMA, PAM and Template PAMA were chosen to comparative analysis. After copolymers were milled into fine powder, FTIR, ^{1}H NMR spectra of copolymer were recorded by a 550Series II infrared spectrometer (BRUKER Company, Switzerland) using KBr pellets and Avance-500 NMR spectrometer (Bruker, Switzerland) in deuterium oxide (D_2O) with tetramethylsilane as internal standard. The thermal decomposition property of Template PAMA was determined by a STA449C instrument (Netzsch, Germany) under argon atmosphere at a heating rate of 10°C min^{-1}. SEM analysis was performed on MIRA 3 LMU SEM system (TES-

CAN Company, Czech Republic). The intrinsic viscosity was determined by one-point method.

S3 Text. Analytical methods for RT, COD, FCMC, Zeta potential and SRF

After the flocculation, supernatant was collected 1 cm below the water surface with a syringe for RT, COD and Zeta potential measurement using a turbidity meter (2100Q, HACH), COD analyzer (DR1010, HACH) and Zeta potential analyzer (Zetasizer Nano 3000, Malvern, U.K.). The sludge after the flocculation was filtered by a vacuum pump at 0.05 MPa, and filtrate volume was recorded at 5 s, 10 s, 20 s, 30 s, 40 s, 50 s, and 60 s during the filtration. The filter cake was placed into a crucible and dried for 24 h at 105 °C in a thermostatic drying oven. FCMC can be calculated by Equation 1:

$$FCMC = \frac{M_1 - M_2}{M_1 - M_0} \qquad \text{Equation 1}$$

where M_1 is the total weight of the filter cake without drying and crucible, M_2 is the total weight of the filter cake after drying and crucible, and M_0 is the weight of the crucible.

SRF of sludge can be calculated using Equation 2.

$$SRF = \frac{2bpA^2}{\mu c} \qquad \text{Equation 2}$$

where p is the filtering pressure (N/m^2), A is the filtering area (m^2), μ is the kinetic viscosity (N s/m^2), b is the slope of the filtration equation curve (Equation 3), and c is the filter cake weight per unit volume filter (kg/m^3), which can be obtained by

Equation 4.

$$\frac{t}{\upsilon} = b\nu + a \qquad \text{Equation 3}$$

where t is the filtering time (s), and v is the filtrate volume (m^3),

$$c = \frac{\frac{1}{C_i}}{100 - C_i} - \frac{C_f}{100 - C_f} \qquad \text{Equation 4}$$

where C_i is the moisture content of the initial sludge, and C_f is the moisture content of the filter cake.

S1 Table. 5-factors Box-behnken design and the value of response function

Runs	A	B	C	D	E	Response values	
						Actal	Predicted
1	4.75	0.07	1	0.33	60	13.190	13.246
2	3	0.07	1	0.33	30	8.990	8.624
3	4.75	0.02	1	0.33	30	8.011	7.816
4	4.75	0.12	1	0.15	60	9.748	9.950
5	6.5	0.12	1	0.33	60	11.380	11.736
6	3	0.07	1	0.33	90	9.050	8.918
7	6.5	0.07	1	0.33	90	11.180	11.506
8	4.75	0.07	1	0.33	60	13.086	13.246
9	6.5	0.07	1	0.15	60	10.366	10.440
10	4.75	0.12	0.5	0.33	60	11.280	11.482
11	4.75	0.07	1.5	0.15	60	10.748	10.607
12	4.75	0.07	1.5	0.33	30	8.570	9.078
13	3	0.07	1.5	0.33	60	9.610	10.049
14	4.75	0.02	1	0.5	60	9.660	10.032
15	4.75	0.02	1	0.15	60	9.070	9.531
16	4.75	0.07	1	0.15	90	10.380	10.181
17	6.5	0.02	1	0.33	60	9.110	9.185
18	4.75	0.12	1.5	0.33	60	11.660	11.295
19	4.75	0.07	0.5	0.33	30	9.670	10.093
20	3	0.07	1	0.15	60	9.460	9.788
21	3	0.12	1	0.33	60	9.100	9.056
22	4.75	0.12	1	0.5	60	11.770	11.883
23	4.75	0.07	0.5	0.5	60	12.570	12.202

24	4.75	0.07	1	0.15	30	8.849	8.447
25	4.75	0.07	1	0.33	60	12.980	12.863
26	4.75	0.07	1	0.5	90	10.980	11.282
27	3	0.07	0.5	0.33	60	10.937	11.077
28	6.5	0.07	1.5	0.33	60	12.127	11.962
29	4.75	0.07	0.5	0.15	60	11.930	11.606
30	4.75	0.12	1	0.33	90	10.873	10.569
31	6.5	0.07	1	0.5	60	12.563	12.268
32	6.5	0.07	1	0.33	30	8.470	8.562
33	4.75	0.07	1.5	0.33	90	11.117	11.333
34	4.75	0.02	1	0.33	90	9.447	9.107
35	4.75	0.07	1	0.33	60	12.990	13.246
36	4.75	0.02	0.5	0.33	60	10.280	10.539
37	3	0.07	1	0.5	60	10.4343	10.394
38	4.75	0.07	1	0.33	60	13.580	13.246
39	4.75	0.07	1.5	0.5	60	12.628	12.444
40	4.75	0.07	1	0.5	30	9.680	9.779
41	6.5	0.07	0.5	0.33	60	12.154	11.690
42	4.75	0.07	1	0.33	60	13.160	13.246
43	4.75	0.07	0.5	0.33	90	10.943	10.922
44	4.75	0.02	1.5	0.33	60	10.276	9.969
45	3	0.02	1	0.33	60	9.664	9.339
46	4.75	0.12	1	0.33	30	8.783	8.623

Fig S1

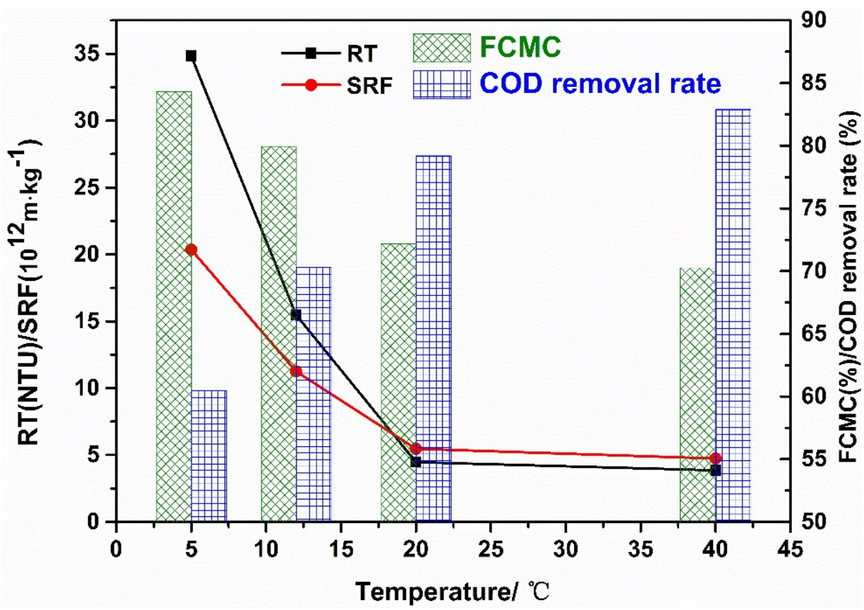

Fig S1. Effect of temperature on dewatering performance of TP3

In addition, the effect of temperature on the dewatering performance of TP3 had also been evaluated in the dewatering tests (Fig S1). In a certain range, with temperature increased, the thermal motion of particles was increased, and thus the probability of collision between particles was also increased. These enhancement was beneficial to flocculation and sedimentation. Therefore, it was better to treat sludge by flocculation in summer.