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Text S1. The measuring method for the polymer molecular weight.

The molecular weight of the polymer was calculated by the equation displayed as follows (Equation (1)).

$$M_r = 802 [\eta]^{1.25}, \quad (1)$$

where M_r and $[\eta]$ are the molecular weight and the intrinsic viscosity of the polymer, respectively. The intrinsic viscosities of polymers (η) related to the molecular weight was used to assess the absorption and bridging ability. This was conducted on an Ubbelohde viscosity meter (Shanghai Shenyi Glass Instrumental Co. Ltd., Shanghai, China) in a 2 mol L⁻¹ NaCl aqueous solution at 30 °C.

Text S2. Analytical methods for the fractal dimension D_f of the flocs

Fractal dimension (D_f) could be determined by the light scattering method from the negative slope of log-log plot by a well-known power-law relation [1,2]:

$$I \propto Q^{D_f}, \quad (2)$$

where I is the light intensity, and Q is the scatter vector which can be given according to the following equation:

$$\frac{4\pi n \sin(\theta/2)}{\lambda}, \quad (3)$$

where λ is the wavelength of radiation in vacuum (631 nm in this work), n is the refractive index of the dispersion medium (1.33 for water), and θ is the scattering angle, respectively.

Text S3. Analytical methods for FCMC and SRF.

After a 30 min settling period, the conditioned sludge was poured into a Buchner funnel for filtering under a vacuum pressure of 0.09 MPa for 30 min or until the vacuum could not be maintained (in < 30 min). FCMC was obtained by the Equation (4) [3]:

$$\text{FCMC}\% = \frac{M_1 - M_2}{M_1}, \quad (4)$$

where $FCMC$ is the filter cake moisture content, M_1 is the weight of the wet filter cake after filtration, and M_2 is the weight of filter cake after drying at 105 °C for 4 h. SRF was calculated from the Equation (5) [4]:

$$\text{SRF} = \frac{2bPA^2}{\mu c}, \quad (5)$$

where SRF is the specific resistance to filtration, P is the filtration pressure (N/m²), A is the filtration area (m²), μ is the viscosity of filtrate (N·s/m²), b is the slope obtained from the plot of $t/V_f(y) - V_f(x)$, where V_f is the volume of filtrate (m³) and t is the filtration time (s), and filtrate volume was recorded

at 5 s, 10 s, 20 s, 30 s, 40 s, 50 s, 60 s, 70 s and 80 s during the filtration, and c is the weight of solids per unit filtrate volume (kg/m^3), $c = [(1/C_i)/[(100C_i - C_f)/100C_f]]$, where C_i is the initial moisture content (%) and C_f is the final moisture content (%).

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