Supplementary data for:

Enhanced coagulation of titanium tetrachloride aided by the modified compound bioflocculant

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S1 Test water and jar test

S1.1 Test water

HA and FA simulated water samples were used in this study. The HA stock solution (1.0 g/L) was prepared as follows: 1.0 g of HA (supplied from Ju-Feng Chemical Technology Co., Ltd, Shanghai, China), together with 0.04 g sodium hydroxide (NaOH), was dissolved in deionized water under continuous stir for 30 min, and then diluted the solution to 1.0 L. NaOH was used to promote the dissolve of HA. The stock solution of FA (1.0 g/L) was prepared by dissolving 1.0 g of FA (biochemical reagent, purchased from Yinong Biochemical Technology Co. Ltd., Shanghai, China) directly in deionized water.

Coagulation experiments were performed with two simulated water: i) containing 10 mg/L of HA prepared in deionized water and tap water (Yang et al., 2010), with the turbidity, UV_{254} absorbance, DOC, zeta potential and pH of the suspension was 3.59±0.02 NTU, 0.432±0.005 cm^{-1}, 4.096±0.144 mg/L, -14.5±0.5 mV and 8.2-8.4, respectively; ii) containing 10 mg/L of FA prepared in tap water (Wang et al., 2012), with the turbidity, UV_{278} absorbance, DOC, zeta potential and pH of the suspension was 0.45±0.02 NTU, 0.089±0.002 cm^{-1}, 4.905±0.145 mg/L, -15.0±1.0 mV and 8.3-8.4, respectively.

S1.2 Jar-test

A program-controlled jar test apparatus (ZR4-6, Zhongrun Water Industry Technology Development Co. Ltd., China) was used to perform the standard jar test. When organic polymer was used as coagulant aids, the best results were obtained when the

polymer was added after the addition of the primary coagulant (Bratby, 1980). The effect of dosing sequence of $TiCl_4$ and MCBF on coagulation performance and floc properties was also investigated in this study.

In the first comparative experiment, $TiCl_4$ was added first at the start of rapid mixing phase (200 rpm) and then followed by MCBF after 30 s. This dual-coagulant was denoted as $TiCl_4$-MCBF. The second comparative experiment reversed the addition sequence of $TiCl_4$ and MCBF and the dual-coagulant was denoted as MCBF-$TiCl_4$. Coagulation performance of $TiCl_4$ was also conducted for comparison. After the coagulants addition, rapid mixing (200 rpm) continued for 1 min. Then, the stirring speed was reduced to 40 rpm with duration of 10 min, followed by 10 min of quiescent settling. After sedimentation, the supernatant samples were collected using a syringe from about 2 cm below the water surface for subsequent measurements. The collected samples were prefiltered through a 0.45 μm fiber membrane before testing DOC (a Shimadzu TOC-VCPH analyzer), UV_{254} and UV_{278} (a ultravioletuisible spectrophotometer, provided by Puxi General Instrument Co. Ltd., Beijing, China), while the turbidity was measured without filtration using a 2100P turbidimeter (Hach, USA) and zeta potential was analyzed with a Zetasizer 3000HSa (Malvern Instruments, UK).

S2 Coagulation performance of MCBF

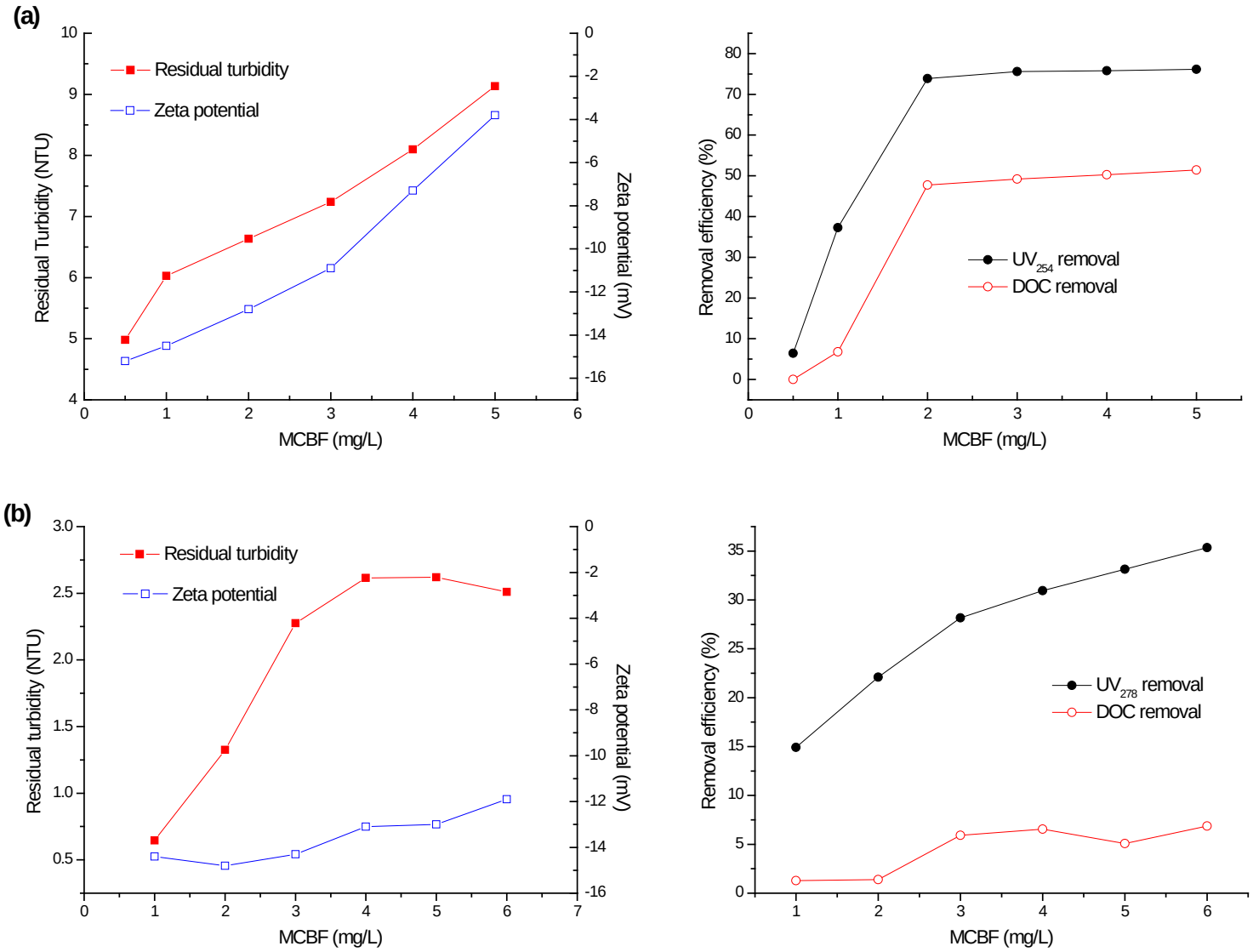

Fig. S1 Coagulation performance of MCBF for simulated water treatment: HA (a) and FA (b)