Supporting Information

α-Fe_2O_3 Nanodisk/Bacterial Cellulose Hybrid Membranes as High-Performance Sulfate-Radical-Based Visible Light Photocatalysts under Stirring/Flowing States

Zhong-Shuai Zhu[a,b], Jin Qu[a*], Shu-Meng Hao[a], Shuang Han[b], Kun-Le Jia[b], and Zhong-Zhen Yu[a,b*]

[a] State Key Laboratory of Organic-Inorganic Composites, College of Materials Science and Engineering, Beijing University of Chemical Technology, Beijing 100029, China.

[b] Beijing Key Laboratory of Advanced Functional Polymer Composites, Beijing University of Chemical Technology, Beijing 100029, China.

E-mail: qujin@mail.buct.edu.cn (J. Qu), yuzz@mail.buct.edu.cn (Z.-Z. Yu)

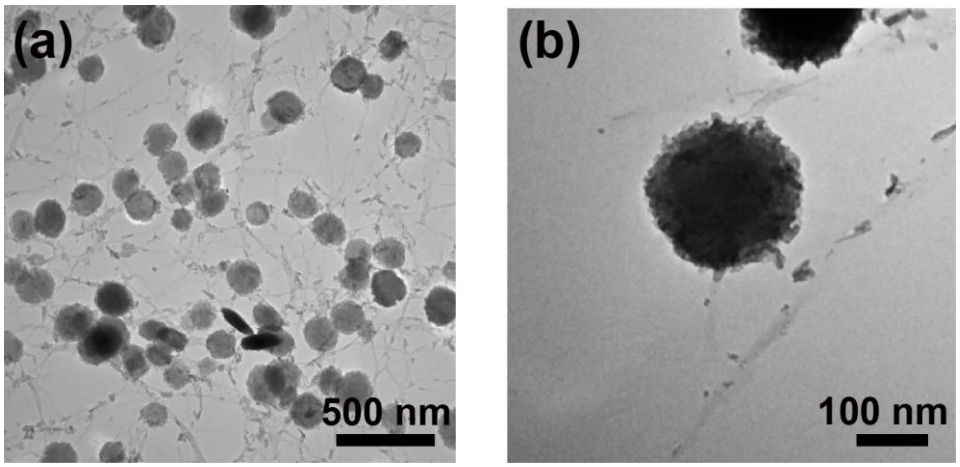

Figure S1. (a, b) TEM images of BFO-30.

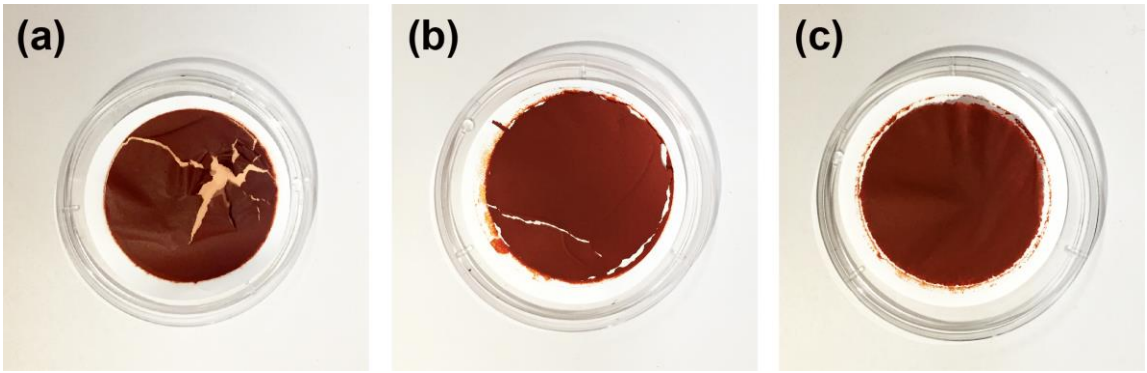

Figure S2. Digital photographs of (a) BFO-10, (b) BFO-20, and (c) BFO-40 membranes with the substrates.

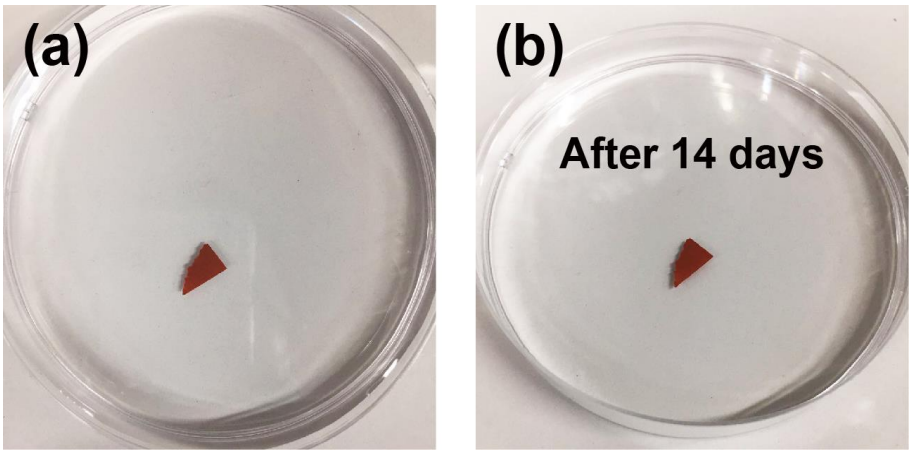

Figure S3. Digital photographs of a piece of BFO-30 membrane in water (a) before and (b) after 14 days.

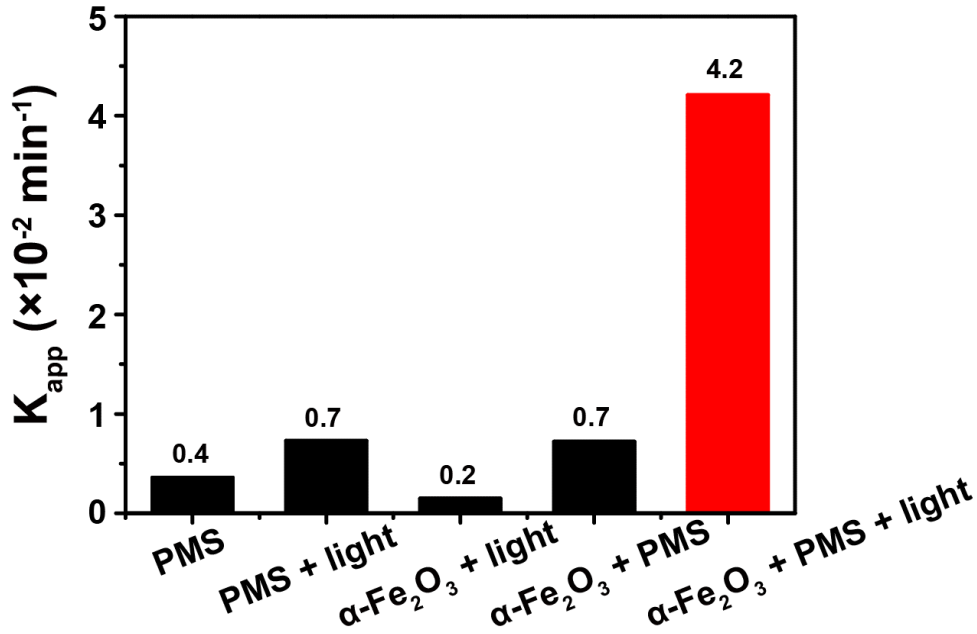

Figure S4. The degradation rate constants (Kapp) of RhB under different conditions with or without 0.2 g L^{-1} of PMS.

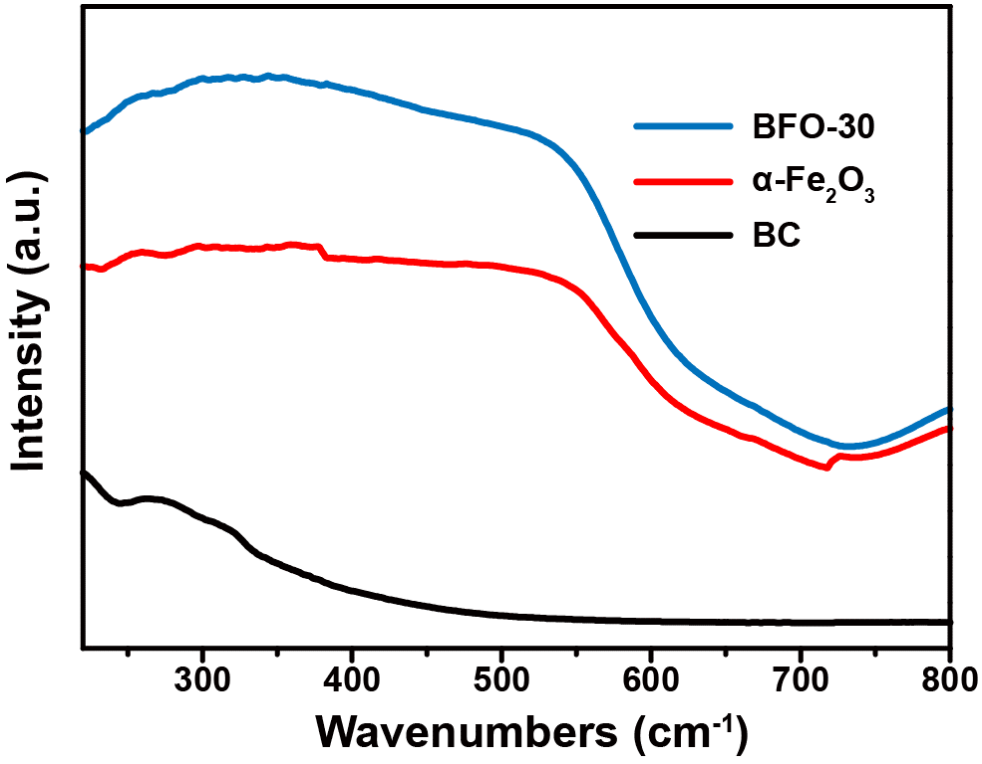

Figure S5. UV-vis diffuse reflectance spectra of BC, α-Fe_2O_3 and BFO-30.

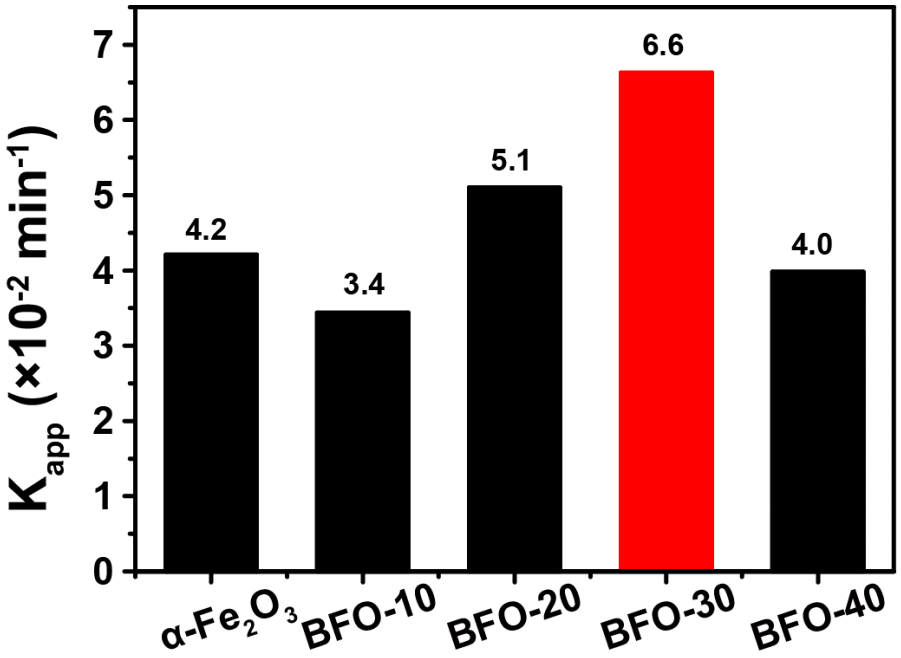

Figure S6. Degradation rate constants (Kapp) of RhB using BFOs as catalysts with 0.2 g L^{-1} of PMS.

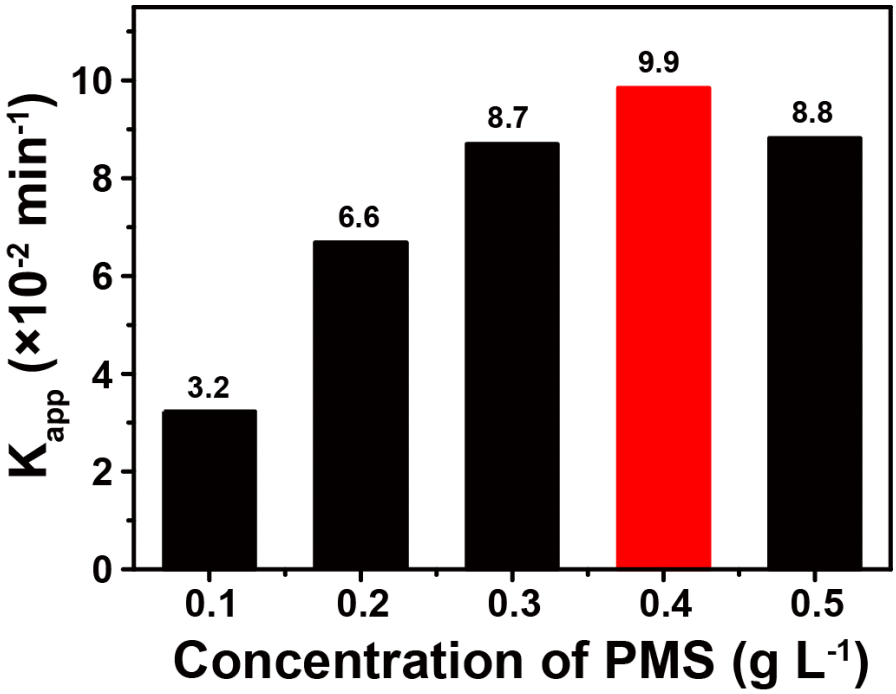

Figure S7. Degradation rate constants (Kapp) of RhB using BFO-30 as the catalyst with different amounts of PMS.

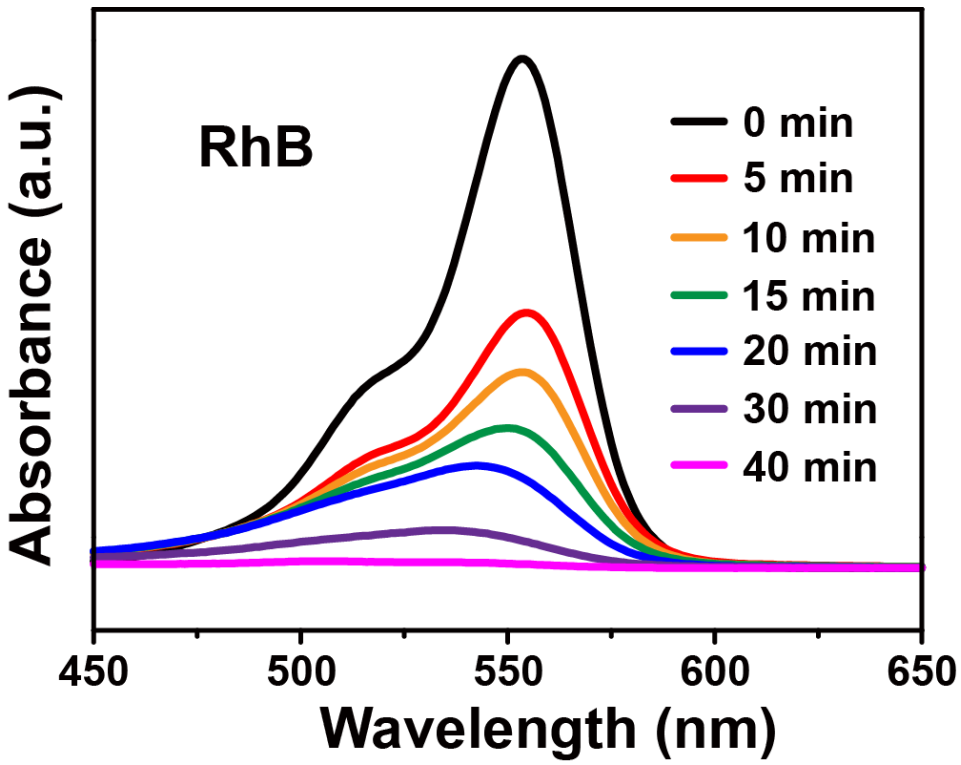

Figure S8. UV-vis spectra of RhB using BFO-30 with 0.4 g L^{-1} of PMS.

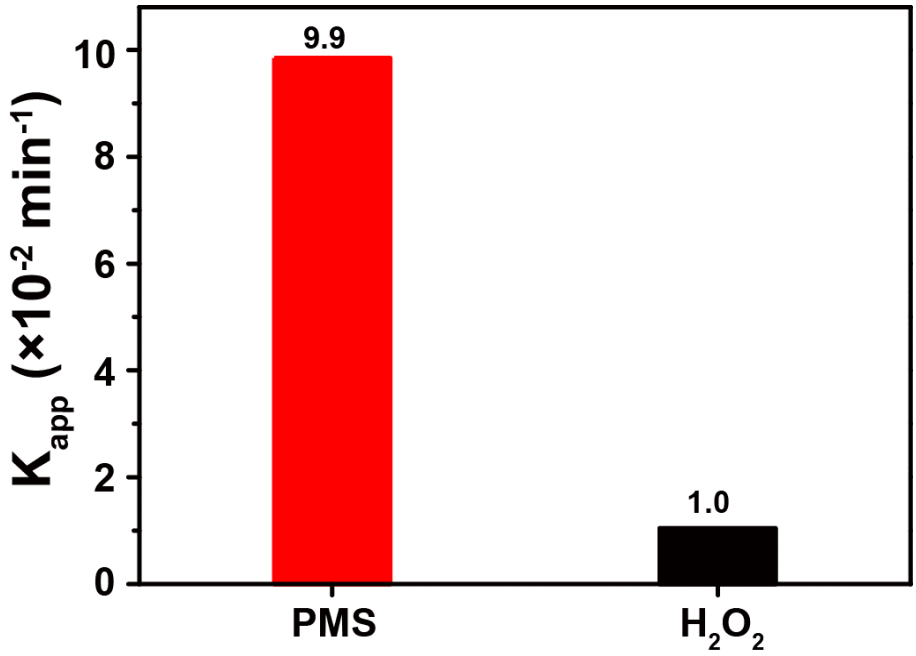

Figure S9. Degradation rate constants (Kapp) of RhB using BFO-30 as the catalyst with the same molar amounts of PMS and H_2O_2.

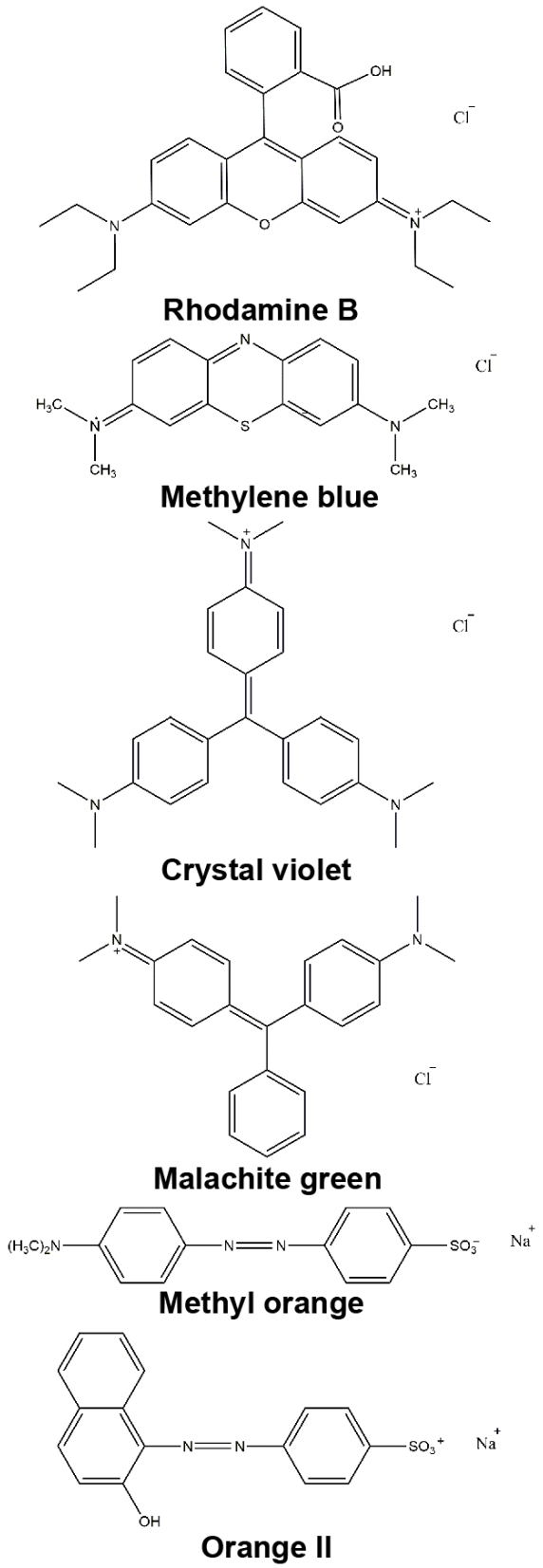

Figure S10. Molecular structures of organic dyes.

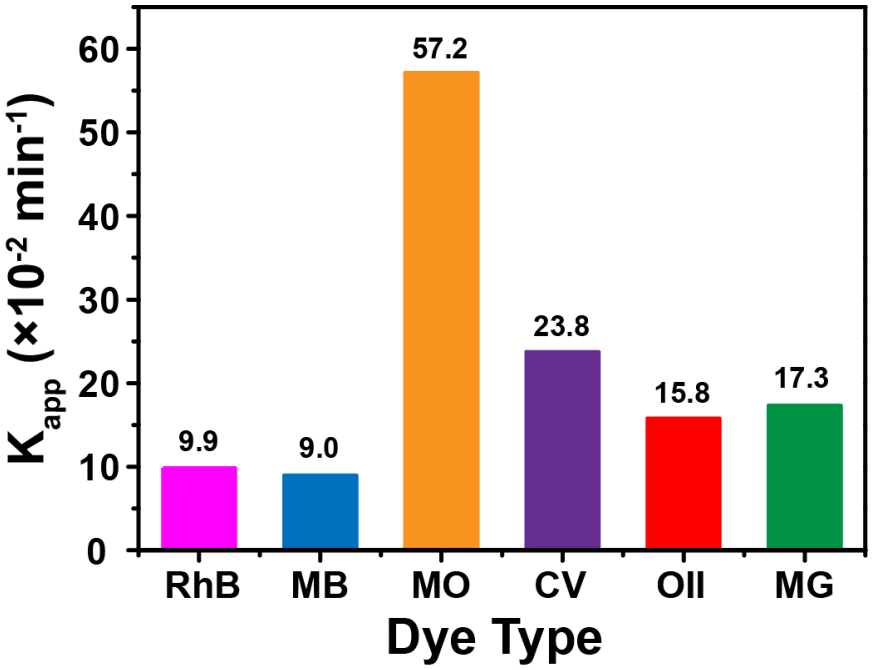

Figure S11. Degradation rate constants (Kapp) of different dyes using BFO-30 as the catalyst with 0.2 g L^{-1} of PMS.

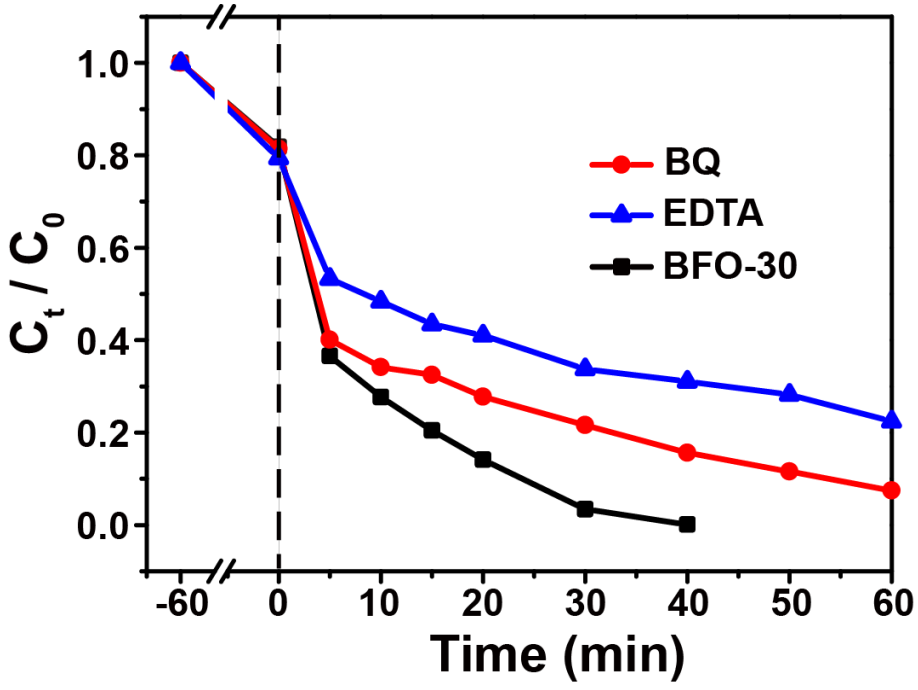

Figure S12. Relative concentration (C_t/C_0) changes of RhB using BFO-30 with BQ and EDTA (BQ or EDTA: 10 mM; RhB: 50 mL 10 ppm; PMS: 0.4 g L^{-1}).

Table S1. Photodegradation performances of BFO-30 membrane with different flow rates

Q (mL h^{-1})	m_m (mg)	t (h)	m (mg)	D_f (%)	Q_t (10^{-3} h^{-1})
3	7.5	84	2.52	100	4.0
6	7.5	62	3.52	93	7.6
9	7.5	42	3.30	87	10.5

Q: the flow rate of RhB per hour; m_m: the mass of BFO-30 membrane; t: total reaction time; m: the consumption of RhB caused by 7.5 mg of BFO-30 membrane in the total reaction time; D_f: the final degradation efficiency until the final reaction time; Q_t: the consumption of MB caused by 1 mg of BFO-30 membrane per hour.