Electronic Supplementary Material (ESI) for RSC Advances.

The efficiency and mechanism of dibutyl phthalate removal by copper-based metal organic frameworks coupled with persulfate

Huanxuan Li [a*], Yayun Zhang [b], Shaodan Xu [a], Jia Du [a], Junhong Tang [a*]

[a] Hangzhou Dianzi University, College Materials & Environmental Engineering, Hangzhou 310018, PR China.

[b] Bioproducts, Sciences and Engineering Laboratory, Department of Biological Systems Engineering, Washington State University, Richland, WA 99354-1671, USA.

[c] The Key Lab of Pollution Control and Ecosystem Restoration in Industry Clusters, Ministry of Education, South China University of Technology, Guangzhou Higher Education Mega Center, Guangzhou 510006, PR China

Corresponding author at: Hangzhou Dianzi University, College Materials & Environmental Engineering, Hangzhou 310018, Zhejiang, PR China. E-mail address: hxlee@hdu.edu.cn (H. Li)

Text S1. Characterization

The morphology of the as-synthesized Cu-BTC was observed by thermal field emission scanning electron microscope (FESEM, Quanta 200， Holland), which was linked to the EDS/INCA 350 (energy dispersive X-ray analyser) manufactured by Oxford Instruments Ltd. Before test, the samples were coated with an electrically conductive surface layer of Au. The X-ray diffraction (XRD) patterns of Cu-BTC and Cu-BTC-A samples were detected with a scan speed of 2°/min and a step size of 0.02° in 2θ by an X-ray diffractometer D8 Advance X-ray Diffraction system. Fourier transform infra red (FTIR) spectra were recorded with KBr disk containing the powder sample with the FTIR spectrometer (Nicolet Magna 550) in the range of 4000-200 cm^{-1}. Photoelectron spectroscopy (XPS) was performed using an X-ray Photoelectron Spectroscopy (ESCA) spectrometer, with a monochromatized Al-K X-ray source. The binding energy was calibrated using the C 1s peak at 284.8 eV. The Brunauer-Emmett-Teller specific surface area were determined through nitrogen adsorption/desorption experiments conducted using a NOVA 2000e gas sorption analyzer (Quantachrome Corp.). Prior to the analysis, the samples were degassed at 150 °C for 1h in vacuum.

Text S2. Electrochemical performance of Cu-BTC-A/GCE

Electrochemical experiments were recorded using a VMP3 (Bio-Logic, French) electrochemical workstation. All experiments were carried out in a three compartment cell with a working electrode, a platinum plate counter electrode and a Ag/AgCl reference electrode. The electrolyte was 1.0 M KOH aqueous solution.

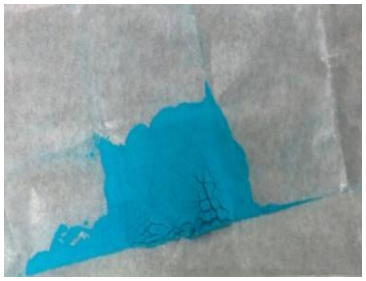

Fig. S1. The photographs of as-synthesized Cu-BTC.

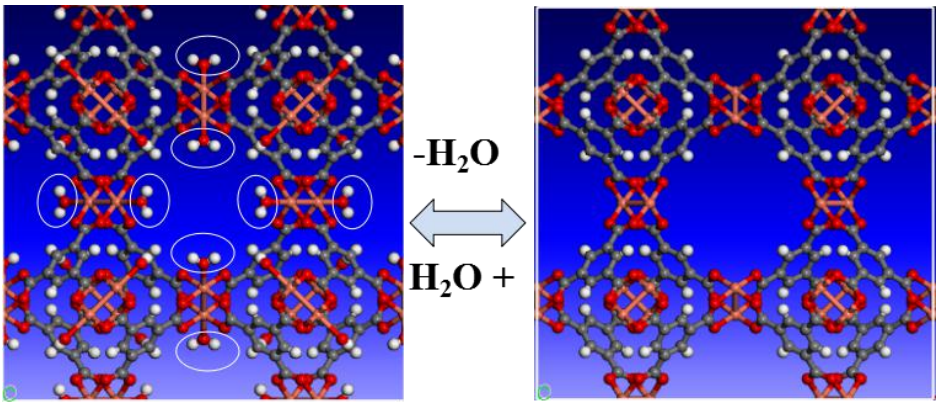

Fig. S2. Structure of the Cu-BTC before and after the water removal.

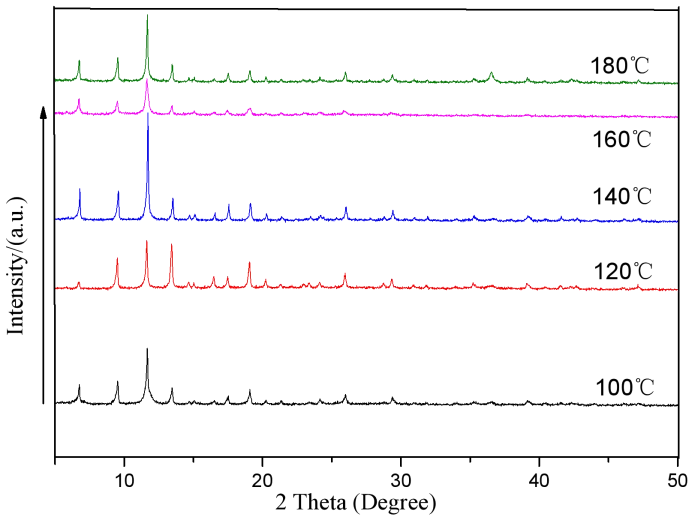

Fig. S3. The XRD of Cu-BTC-A synthesized at different temperatures for 24h.

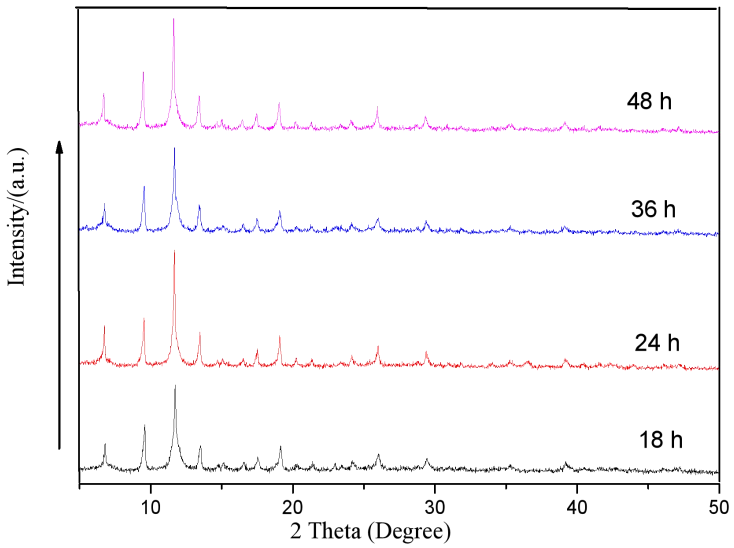

Fig. S4. The XRD of Cu-BTC-A synthesized at 100℃ for different time.

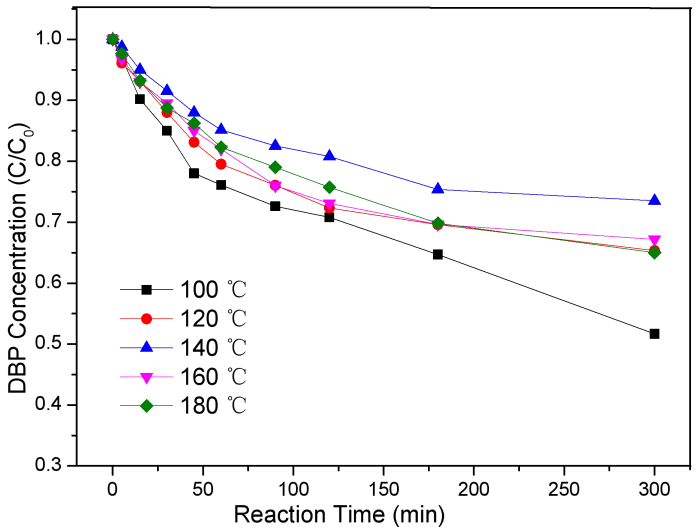

Fig. S5. Effect of synthesized temperature on DBP removal. Experiment condition: DBP = 0.018 mM; PS = 1.08 mM; Cu-BTC-A (synthesized for 24h) = 1.0 g/L; T = 25 °C; no pH adjustment.

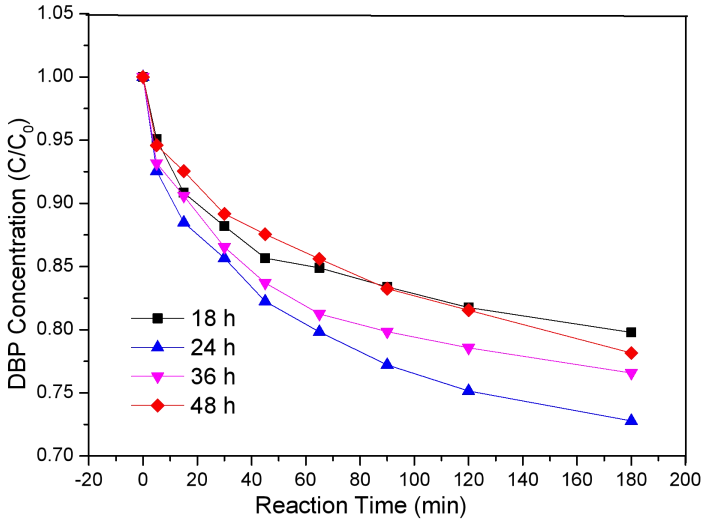

Fig. S6. Effect of synthesized reaction time on DBP removal. Experiment condition: DBP = 0.018 mM; PS = 1.08 mM; Cu-BTC-A (synthesized at 100 ºC) = 1.0 g/L; T = 25 ºC; no pH adjustment.