

## ***Supporting Information***

### **Synergistic Combination of the Capillary Effect of Collagen Fibers and Size-Sieving Merits of Metal–Organic Frameworks for Emulsion Separation with High Flux**

Hanzhong Xiao,<sup>†,‡,§</sup> Yiwen Cui,<sup>†,‡</sup> Yujia Wang,<sup>‡,§</sup> Huifang Li,<sup>‡,§</sup> Guangyan Chen,<sup>†</sup> Xin Huang<sup>\*†,‡,§</sup> and Bi Shi <sup>†,‡,§</sup>

<sup>†</sup>National Engineering Laboratory for Clean Technology of Leather Manufacture, Sichuan University, Chengdu 610065, P.R. China

<sup>‡</sup>College of Biomass Science and Engineering, Sichuan University, Chengdu 610065, P.R. China

<sup>§</sup>Key Laboratory of Leather Chemistry and Engineering of Ministry of Education, Sichuan University, Chengdu 610065, P.R. China

\*Corresponding author: xhuangscu@163.com (X. Huang)

**Table S1.** The detailed ingredients of NE1-NE6 and ME1-ME4.

Emulsion	Surfactant	Surfactant content	Oil content	Water content
NE1	SDBS/Span 80	0.01 g/0.05 g	Dodecane (100 mL)	1.0 mL
NE2	SDS/Tween 80	0.01 g/0.05 g	Octane (100 mL)	1.0 mL
NE3	CTAB/Span 80	0.01 g/0.05 g	Dodecane (100 mL)	1.0 mL
NE4	CTAB/Tween 80	0.01 g/0.05 g	Heptane (100 mL)	1.0 mL
NE5	SDBS/Span 80	0.01 g/0.05 g	Heptane (100 mL)	1.0 mL
NE6	CTAB/Span 80	0.01 g/0.05 g	Octane (100 mL)	1.0 mL
ME1	SDBS/Span 80	0.01 g/0.05 g	Dodecane (90 mL)	10 mL
ME2	CTAB/Span 80	0.01 g/0.05 g	Dodecane (90 mL)	10 mL
ME3	SDBS/Span 80	0.01 g/0.05 g	Heptane (95 mL)	5.0 mL
ME4	CTAB/Span 80	0.01 g/0.05 g	Octane (95 mL)	5.0 mL

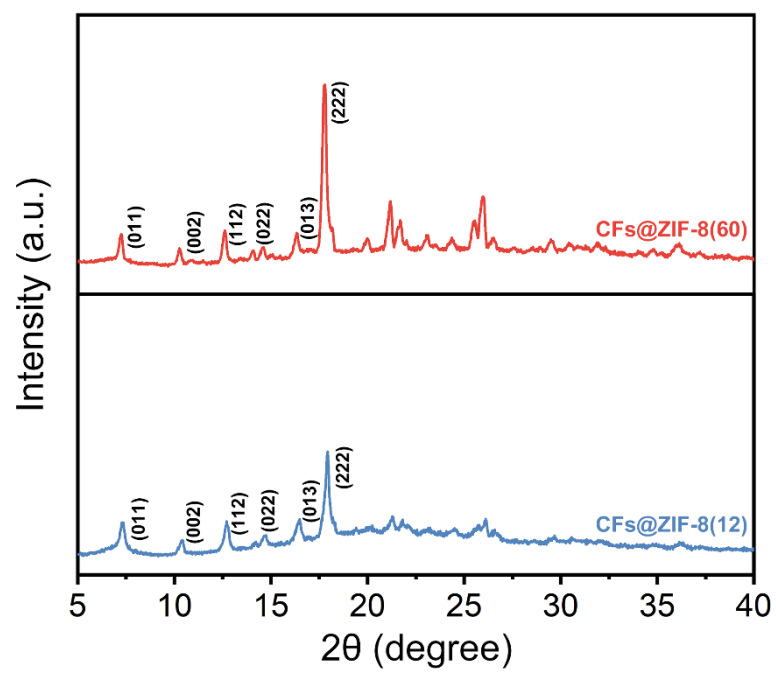
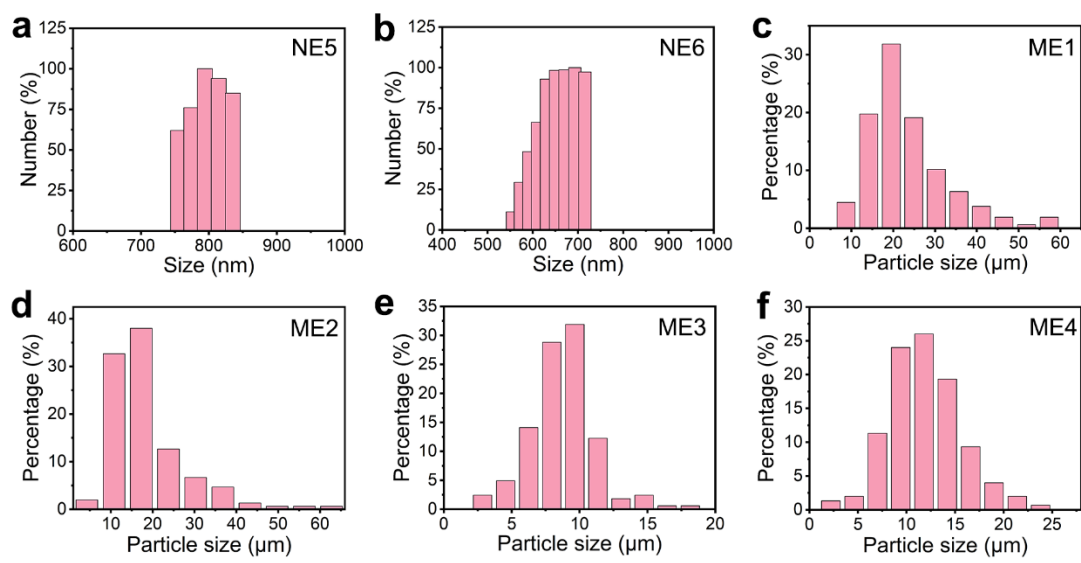
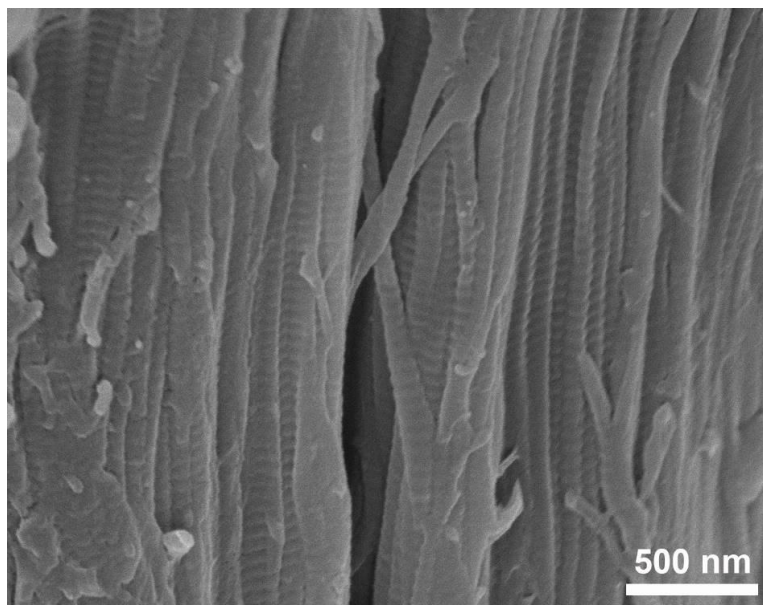


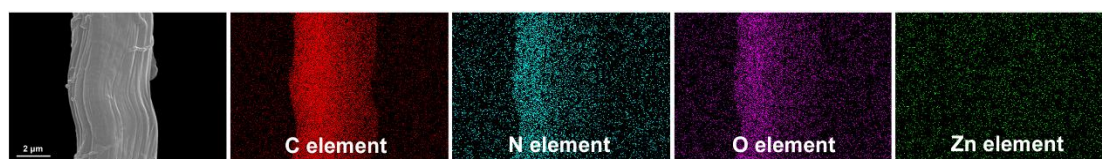
Figure S1. XRD patterns of CFs@ZIF-8(12) and CFs@ZIF-8(60).



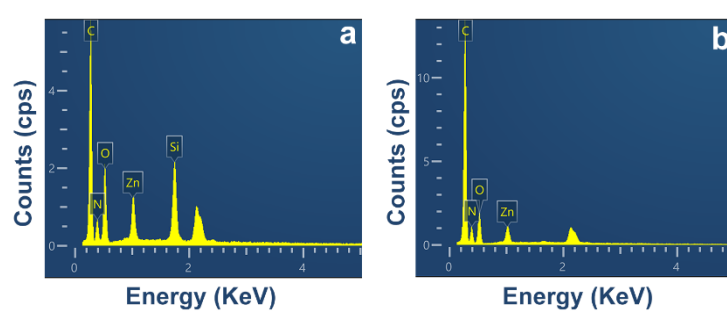
**Figure S2.** DLS curves of (a) NE5 and (b) NE6, and particle size distributions of (c) ME1, (d) ME2, (e) ME3 and (f) ME4.



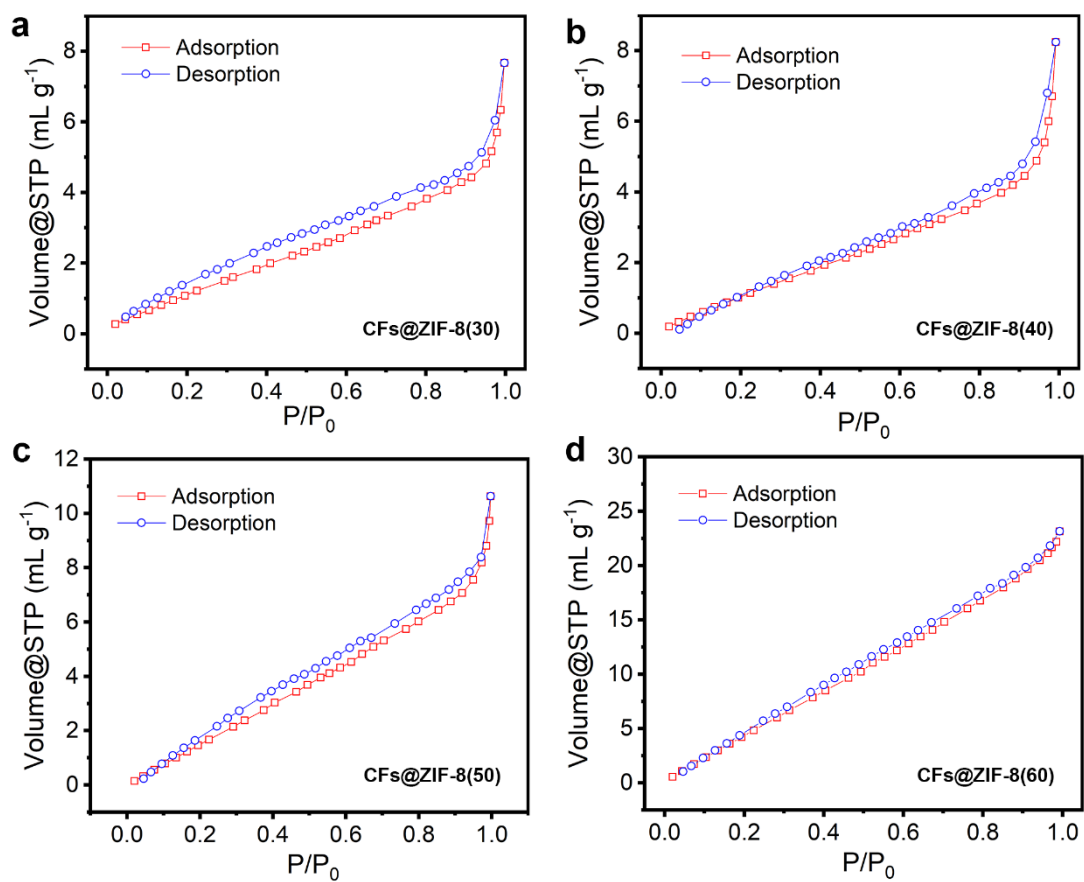
**Figure S3.** Field emission scanning electron microscope (FESEM) image of CFs.



**Figure S4.** SEM-EDS mapping images of CFs.



**Figure S5.** SEM-EDS spectra of (a) CFs@ZIF-8(30)/PDMS and (b) CFs@ZIF-8(30).

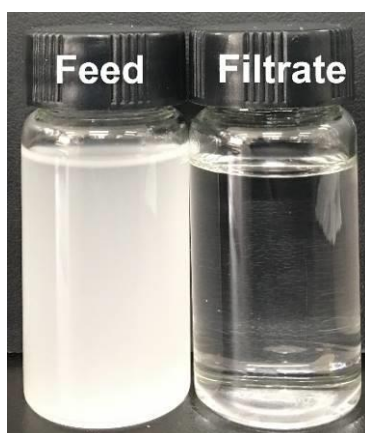


**Figure S6.** N<sub>2</sub> adsorption/desorption isotherm curves of the (a) CFs@ZIF-8(30), (b) CFs@ZIF-8(40), (c) CFs@ZIF-8(50) and (d) CFs@ZIF-8(60).

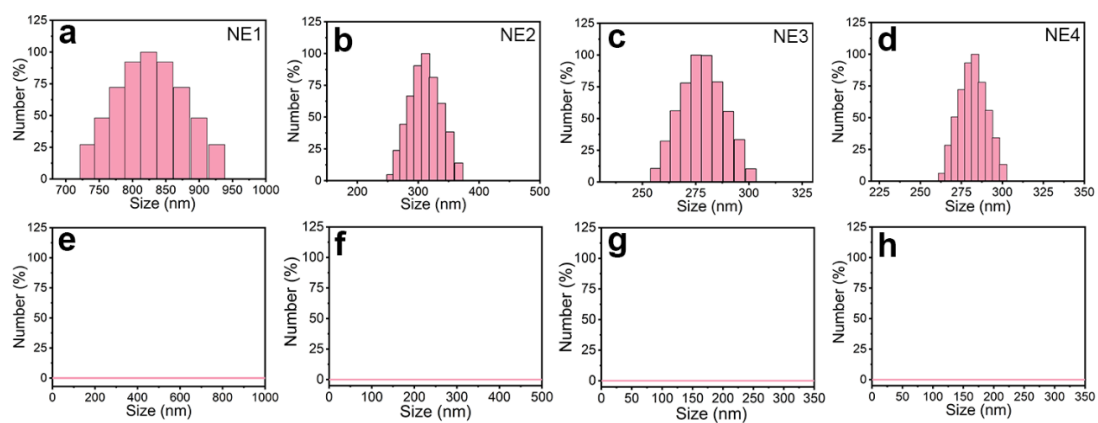




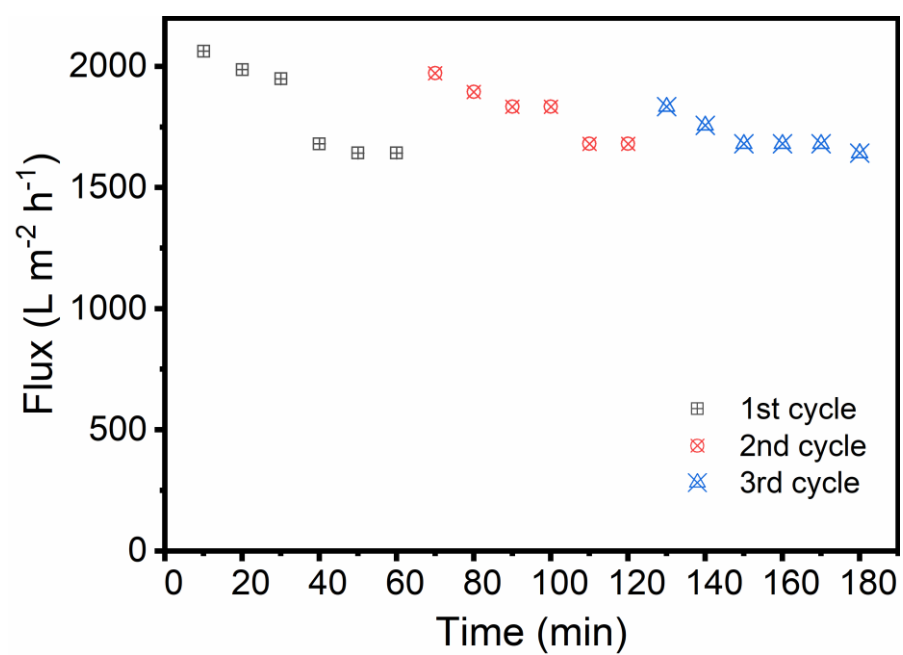
**Figure S7.** Separation of NE1 by commercial (a) double-sided PVDF membrane and (b) double-sided PTFE membrane under gravity in the H-shape separation apparatus.



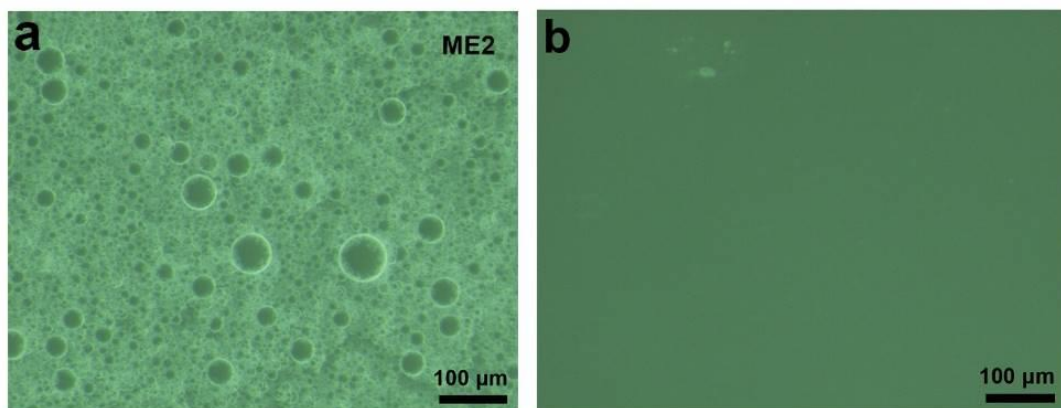
**Figure S8.** Digital photograph of NE3 before and after the separation of CFs@ZIF-8(30)/PDMS.



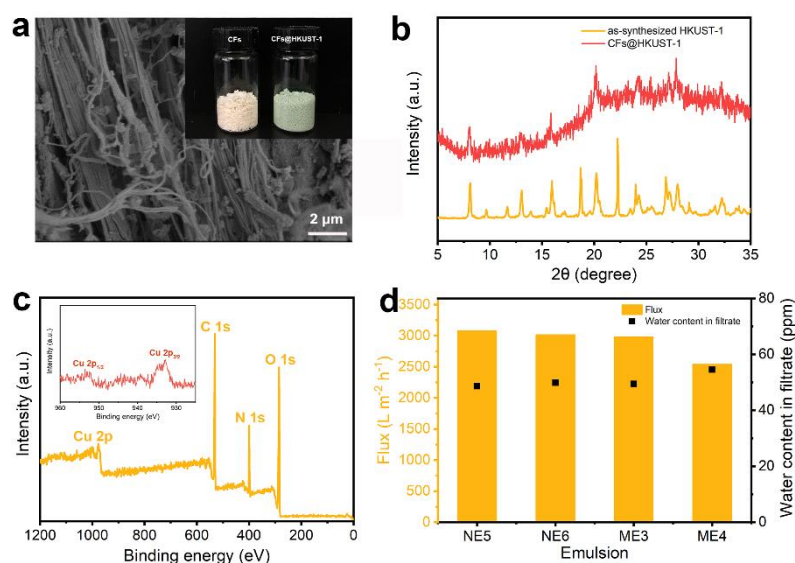
**Figure S9.** DLS curves of NE1-NE4 (a-d) before and (e-h) after the separation of CFs@ZIF-8(30)/PDMS.



**Figure S10.** Antifouling property of the CFs@ZIF-8(30)/PDMS during the separation of NE1



**Figure S11.** Optical microscopy images of ME2 (a) before and (b) after the separation of CFs@ZIF-8(30)/PDMS.



**Figure S12.** (a) FESEM image of CFs@HKUST-1 (the inset showing the digital photograph of CFs and CFs@HKUST-1), (b) XRD patterns of as-synthesized HKUST-1 and CFs@HKUST-1, (c) XPS survey scan and Cu 2p XPS spectra of CFs@HKUST-1, and (d) fluxes of NE5, NE6, ME3 and ME4 separated by the CFs@HKUST-1/PDMS and the corresponding water contents in the filtrates of NE5, NE6, ME3 and ME4.