Supporting Information

Superhydrophobic MOFs decorated on hierarchically micro/nanofibrous membranes for high-performance emulsified oily wastewater separation and cationic dyes adsorption

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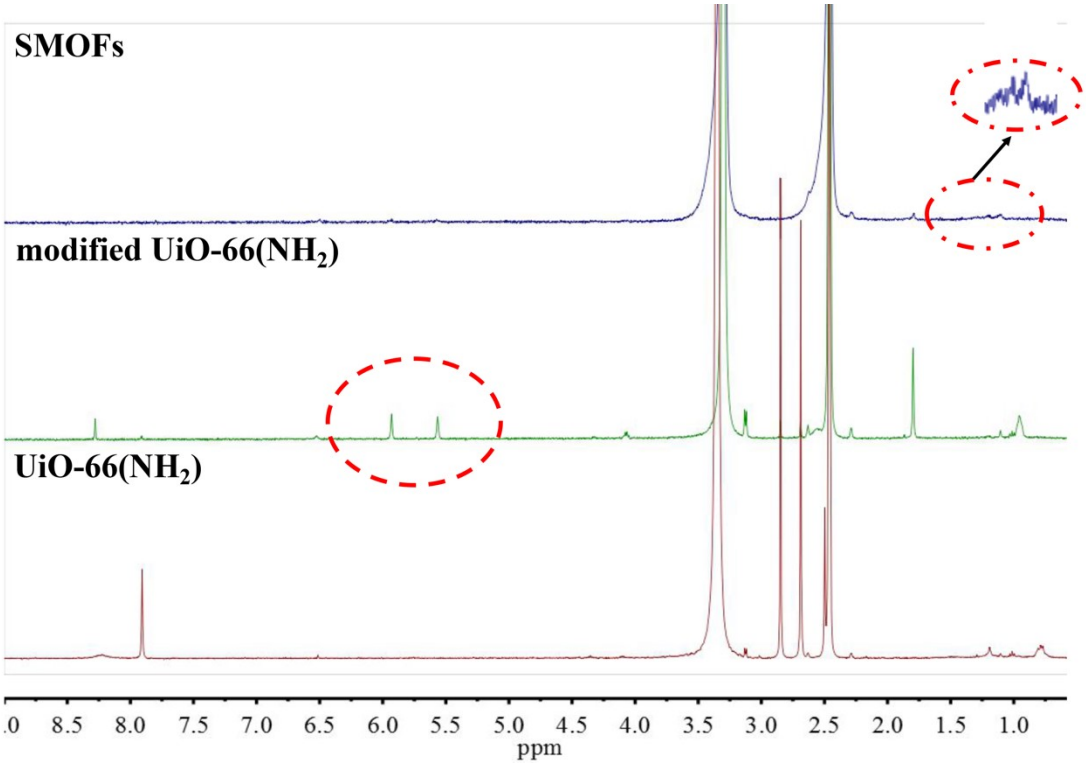

Fig.S1. ^{1}H NMR (in $CDCl_3$) spectrum of UiO-66(NH_2), modified UiO-66(NH_2) and SMOFs.

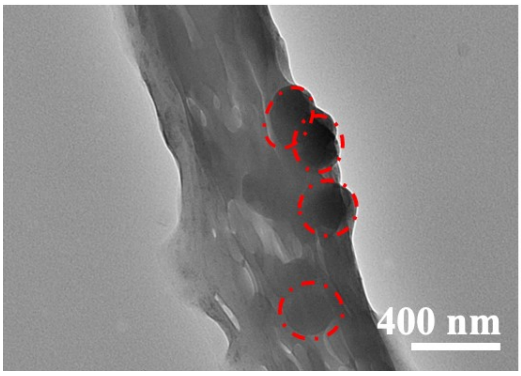

Fig.S2. TEM images of the fibers of SMOFs@PT in high magnification.

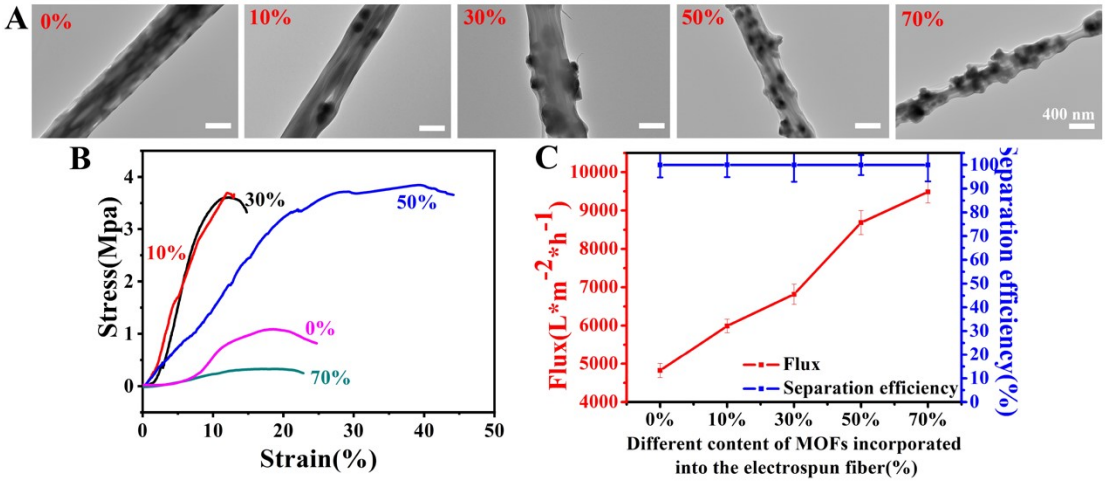

Fig S3. (A) TEM images of the composite membranes with different content of MOFs incorporated (0%, 10%, 30%, 50%, and 70%). (B) The tensile stress-strain curves of the electrospun membranes incorporated with different content of MOFs (0%, 10%, 30%, 50%, and 70%). (C) Separation efficiency and flux of the composite membranes with different content of MOFs incorporated (0%, 10%, 30%, 50%, and 70%).

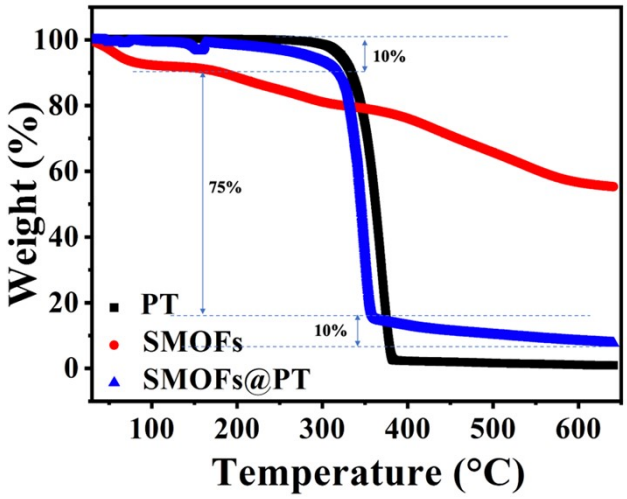

Fig S4. TGA curves of the as-prepared electrospun membranes (PT, SMOFs and SMOFs@PT)

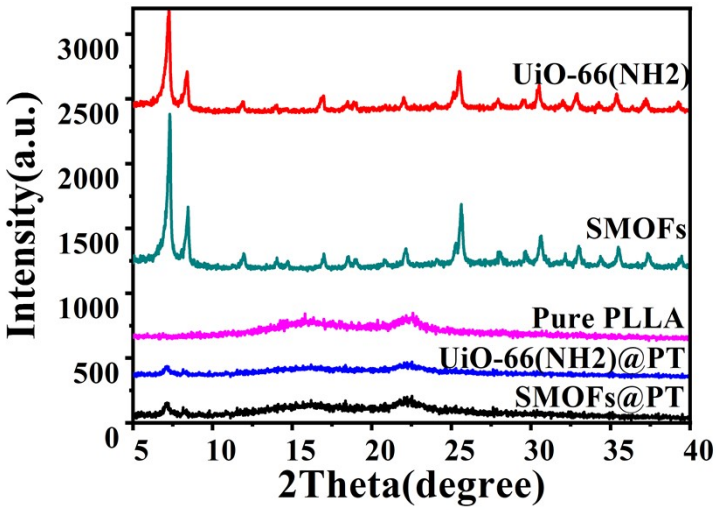

Fig.S5. X-ray diffraction spectrum of the UiO-66(NH_2), SMOFs nanoparticles, the pure PLLA, UiO-66(NH_2)@PT and SMOFs@PT electrospun membranes.

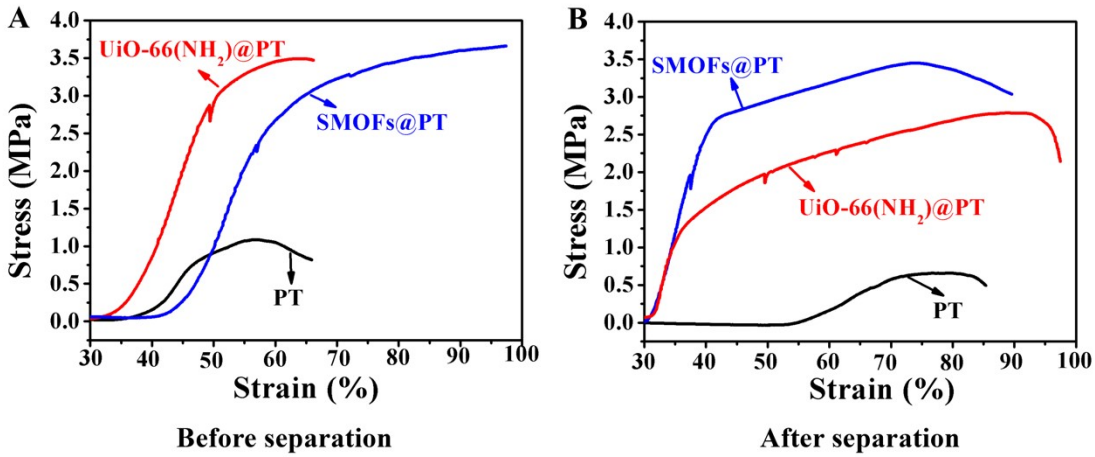

Fig.S6 Stress-strain curve of the PT, UiO-66(NH_2)@PT and SMOFs@PT before and after oil-water separation.

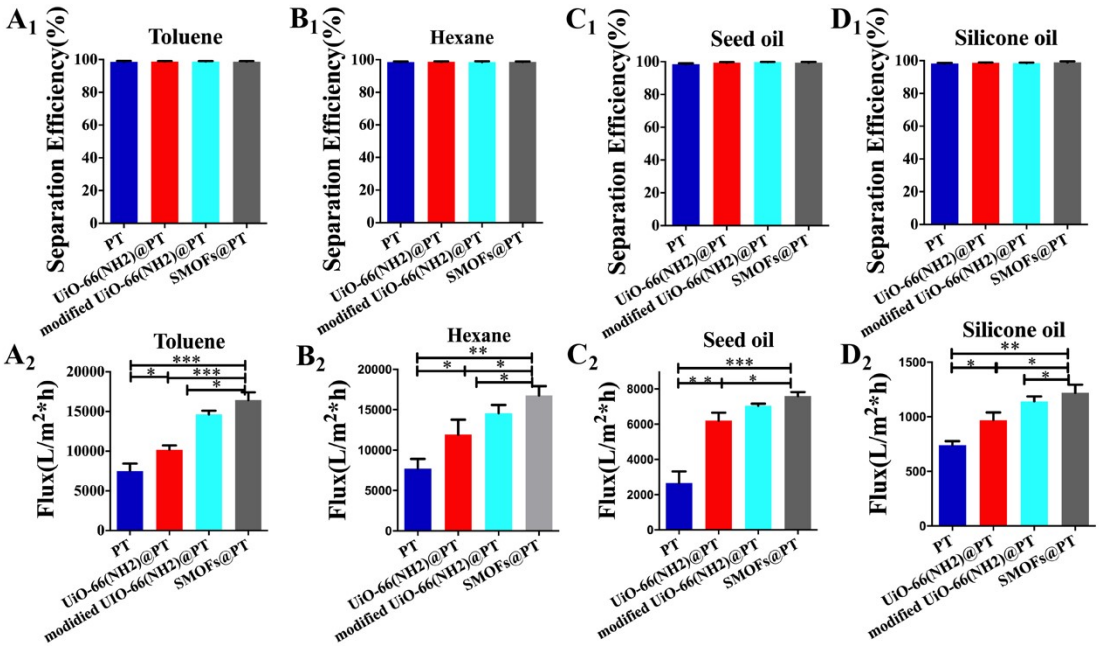

Fig.S7. Separation efficiency (A_1-D_1) and flux (A_2-D_2) of the composite electrospun membranes (PT, UiO-66(NH_2)@PT, modified UiO-66(NH_2)@PT and SMOFs@PT) in different kinds of oil-water mixture.

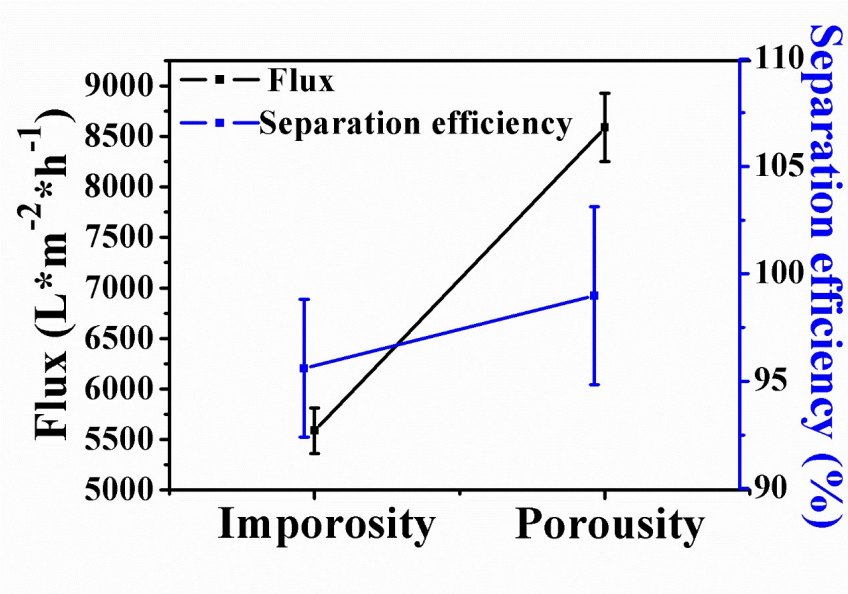

Fig.S8. The effect of porous fibers on separation efficiency and flux of the patterned electrospun membranes.

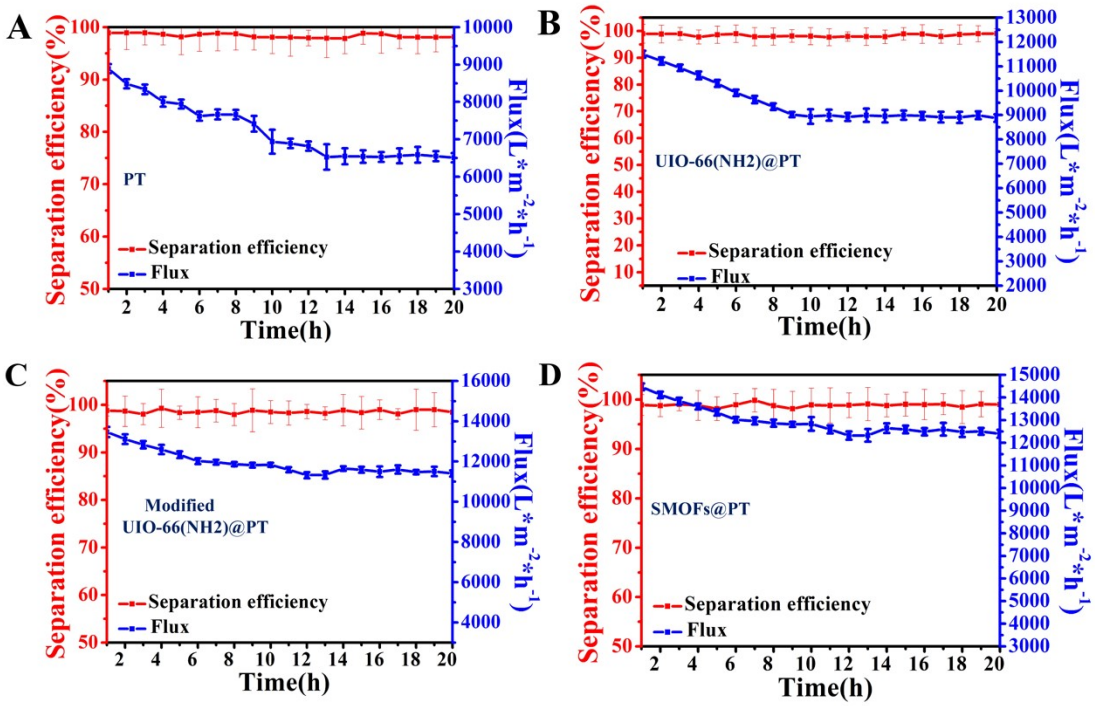

Fig.S9. The cycling experiment of the as-prepared membranes (PT, UiO-66(NH_2)@PT, modified UiO-66(NH_2)@PT and SMOF@PT) against filtration time for the separation of emulsified oily wastewater.

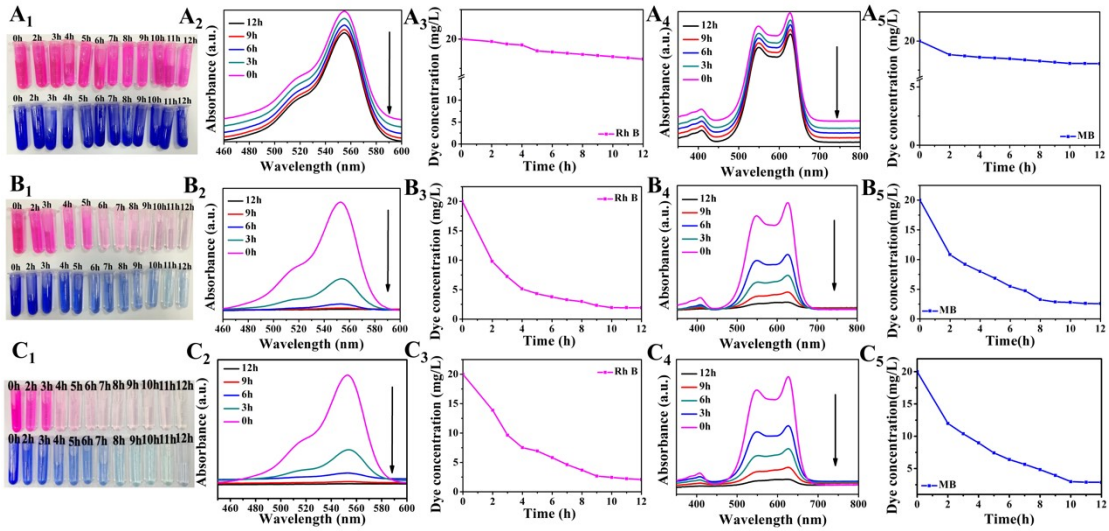

Fig.S10. The cationic dye adsorption behavior of the PT, UiO-66(NH_2)@PT and modified UiO-66(NH_2)@PT with the increase of time: (A_1, B_1, C_1) Optical images of the color change of the filtrates. The UV-vis spectra collected each 3 h during the adsorption process of RhB (A_2, B_2, C_2) and MB (A_4, B_4, C_4). The statistical analysis of the RhB (A_3, B_3, C_3) and MB (A_5, B_5, C_5) residual concentration in the filtrates.

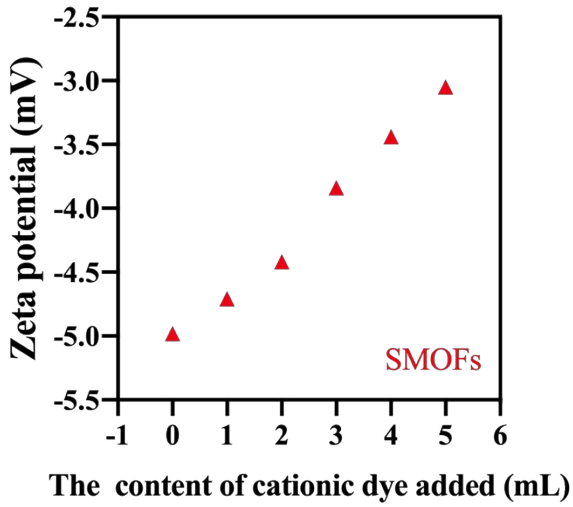

Fig.S11. The Zeta potential change of the SMOFs nanoparticles with the increase of the cationic dyes added.

Table S1. Comparison of the separation performance of emulsified oily wastewater by the membranes reported in the literatures and prepared in this work.

Types	Materials description	Operation Method/	Separation efficiency	Flux ($L•m^{-2}•h^{-1}$)	Ref

		Pressure (bar)			
polymeric electrospun membranes	PAN nanofibrous membrane with a biomimetic and sub-micrometer porous skin layer	Dead end / Gravity	>99.93%	312-5152	[54]
	A nanofibrous composite membrane consisting of a nonwoven PAN nanofibrous supporting layer and a thin PVA hydrophilic barrier layer	Cross-flow/ 0.2 MPa	99.6%	347.81	[55]
	A biomimetic nanofibrous membrane with BiOBr microspheres anchored on the SiO_2/polyaniline (PANI) core–shell fibers.	Dead end / Gravity	——	6140	[59]
Polymeric electrospun membranes modifying with ingoranic particles	A PLA-based electrospun membrane with homogeneous dispersion of maghemite γ-Fe_2O_3 nanoparticles on the fiber surface and dual-scaled micro/nanopores in membrane.	Dead end/ Gravity	——	2925	[1]
	The surface of the PLA membranes was spinned with TiO_2 particles	Dead end / 1 MPa	——	102	[58]
	The surface of the membranes was polymerized with F-PBZ functional layer that incorporated SiO_2 NPs.	Dead end / Gravity	——	——	[79]

Polymeric membranes modifying with metal organic frameworks	A nanofibrous polyacrylonitrile membrane decorated with UiO-66(NH_2).	Dead end / Gravity	>99%	2107	[2]
	The PAN membranes with ZIF-8 nanoparticles incorporated.	Dead end / Gravity	>99%	>900	[7]
	The MOFs was loaded on the surface of stainless steel mesh through PDA modification technology	Dead end / Gravity	——	350	[47]
	The membrane surface was decorated by UiO-66(NH_2)	Dead end / 0.1 MPa	>86%	2330	[14]
	The patterned membranes constructed with porous fibers, in which the superhydrophobic SMOFs were incorporated.	Dead end / Gravity	>99%	>15000	This work