Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Super hydrophobic and super lipophilic LDH flower/cellulose membrane for efficient oil-water separation

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Supplementary figure and movie captions:

Movie S1 Continuous droplets slip off the surface of the modified LDH/cellulose membrane.

Movie S2 The separation process of oil/water mixture (model oil is n-hexane).

Movie S3 The separation process of oil/water mixture (model oil is chloroform).

Fig. S1 The SEM imagines cellulose fiber on the surface of filter paper.

Fig. S2 XRD patterns of the powder, modified LDH/cellulose membrane and Ni-Al LDH/cellulose membrane.

Fig. S3 FT-IR spectra of cellulose membrane, Ni-Al LDH/cellulose membrane and the modified LDH/cellulose membrane.

Fig. S4 Removal of n-Hexane from the water surface (A-C) and chloroform from the bottom of water (D-E). The two oils were labeled with Sudan III for easy observation.

Fig. S5 Separation efficiency and flux of different cycles.

Table 1 Comparisons of several separate membrane materials for oil removal

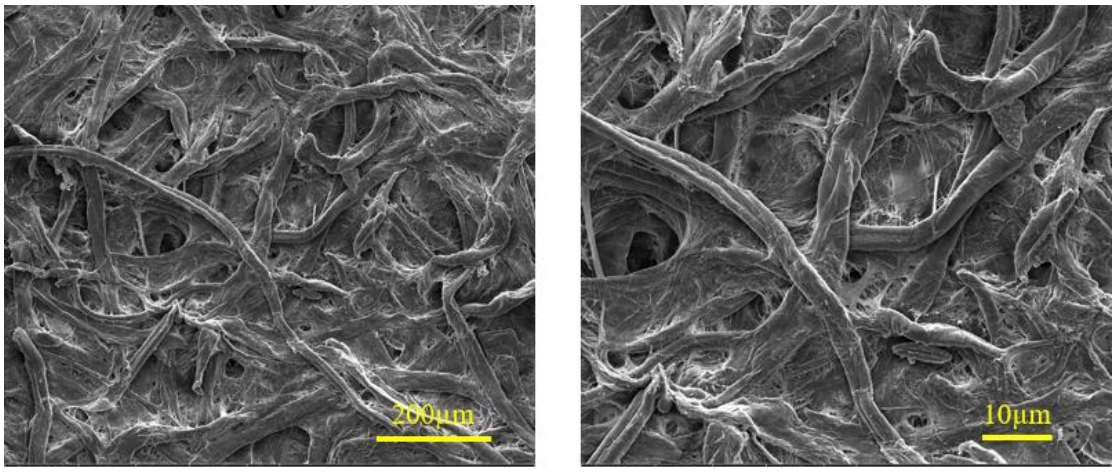

Fig. S1 The SEM imagines cellulose fiber on the surface of filter paper.

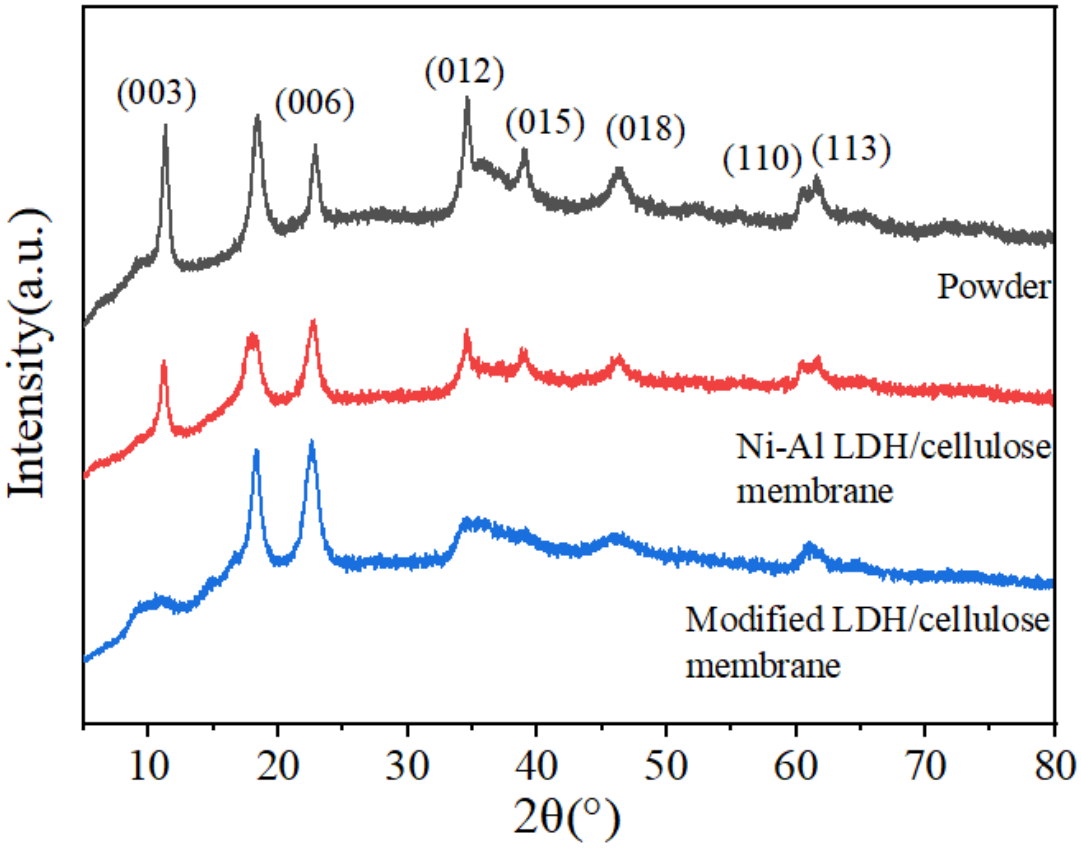

Fig. S2 XRD patterns of the powder, modified LDH/cellulose membrane and Ni-Al LDH/cellulose membrane.

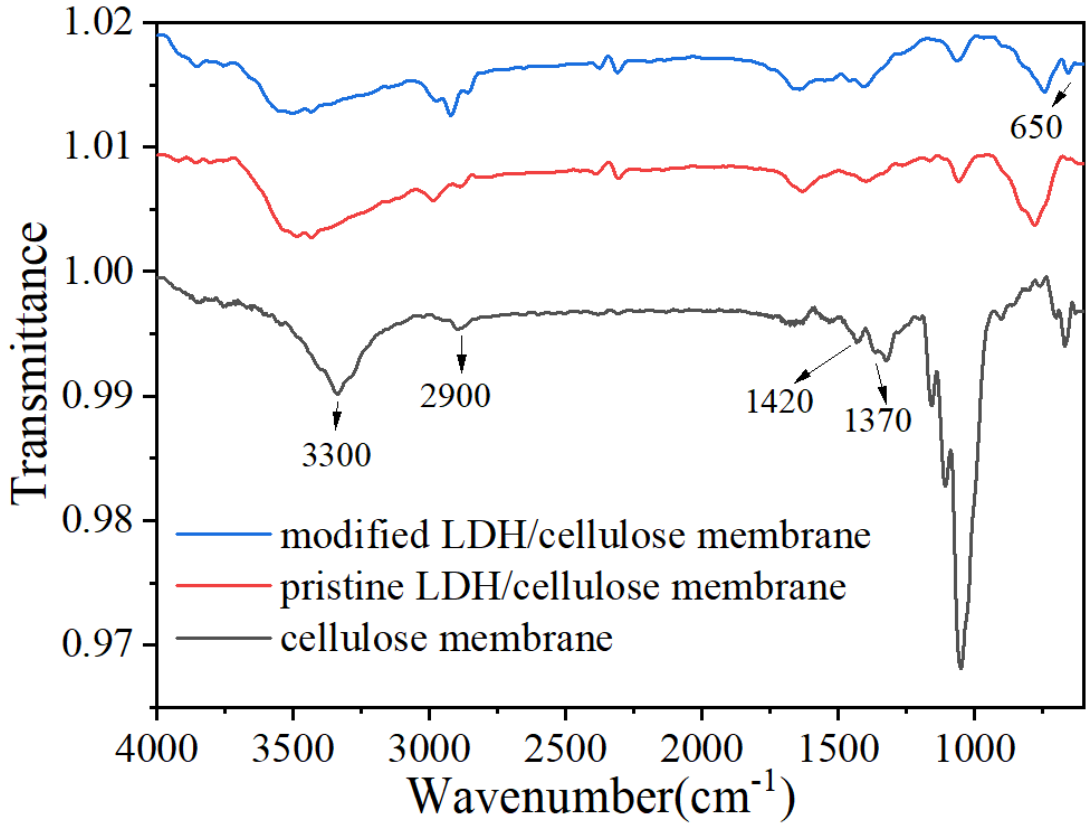

Fig. S3 FT-IR spectra of cellulose membrane, Ni-Al LDH/cellulose membrane and the modified LDH/cellulose membrane.

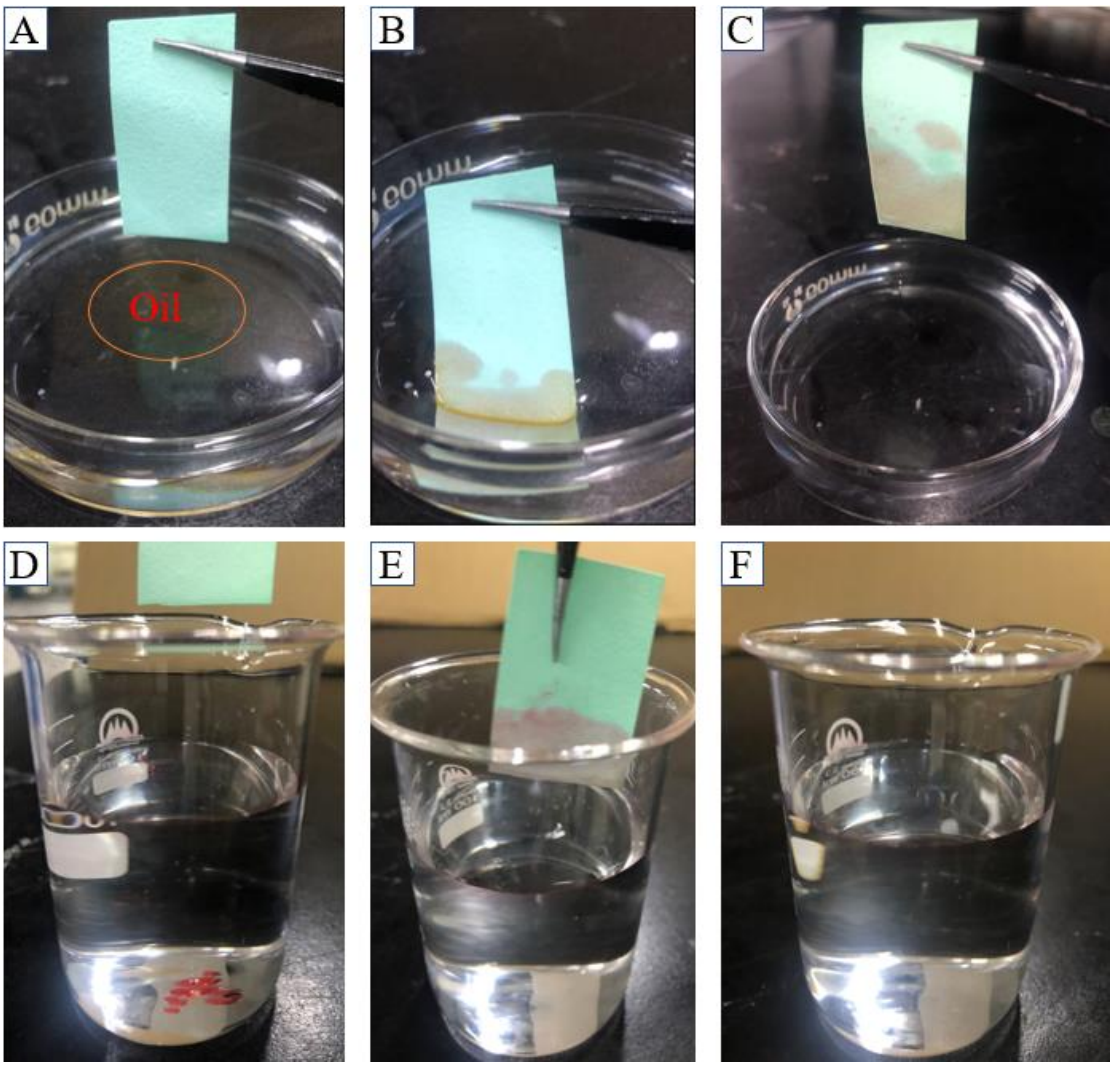

Fig. S4 Removal of n-Hexane from the water surface (A-C) and chloroform from the bottom of water (D-E). The two oils were labeled with Sudan III for easy observation.

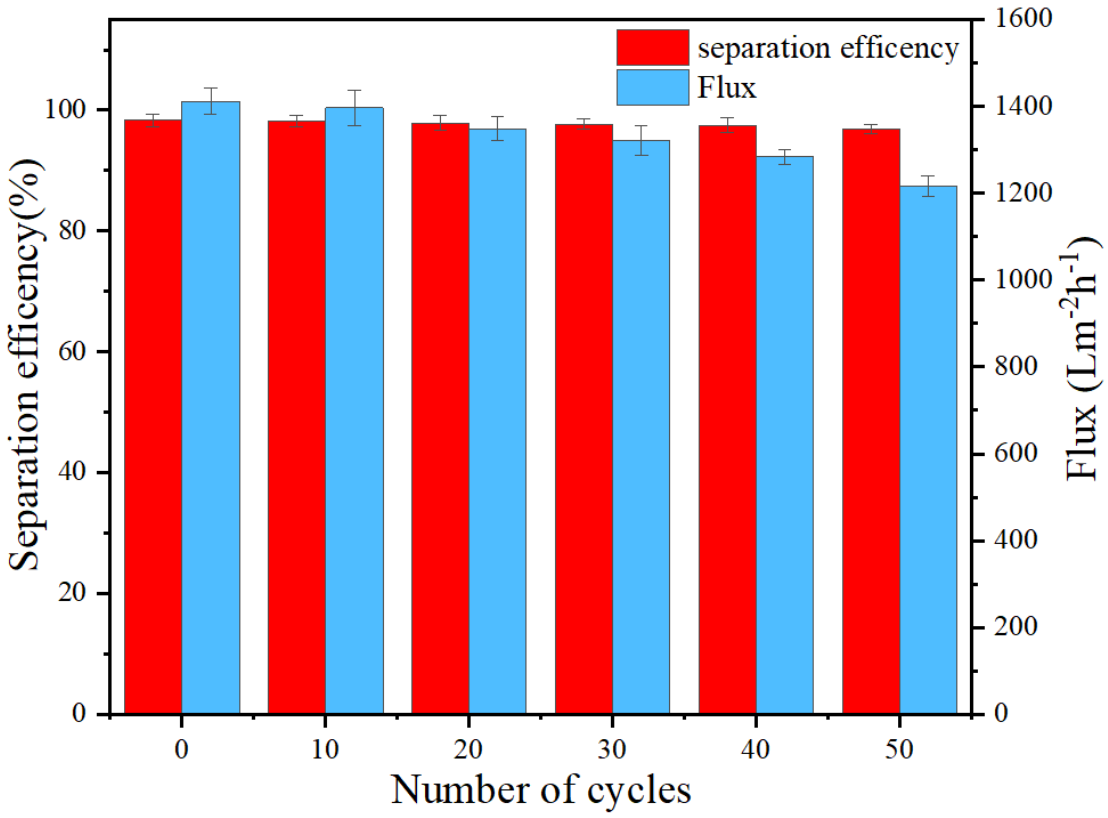

Fig. S5 Separation efficiency and flux of different cycles.

Table 1

Comparisons of several separate membrane materials for oil removal

Oil water separation membrane	Separation efficiency (%)	Flux($Lm^{-2}h^{-1}$)	References
T-COF-CF3 coating membrane	99 %	22000	[1]
CuO-n-dodecanethiol copper mesh	⩾96.6%	85.02-87.71	[2]
γ-AlOOH/OTS coated CFs	97.0%	1210	[3]
LDH/cellulose membrane	99.6%	1412	This work

References

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2. Z. Zhang, P. Zhang, Y. Gao and J. Yun, *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 2022, **642**.

3. Y. Wang, D. Yin, Q. Guo and J.-T. Huang, *Industrial Crops and Products*, 2022, **182**.