Green preparation of carboxymethyl cellulose coated membrane for highly efficient separation of crude oil-in-water emulsion

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Relationship between volume rate and separation performance of the membrane

Through adjusting the volume ratio of PDA@ZIF and CMC, the as-prepared membrane exhibits different separation performance. Finally, considering the separation performance of the CPZP membrane, a mixed suspension with a volume ratio of 20:1 was selected to coat the PTFE membrane.

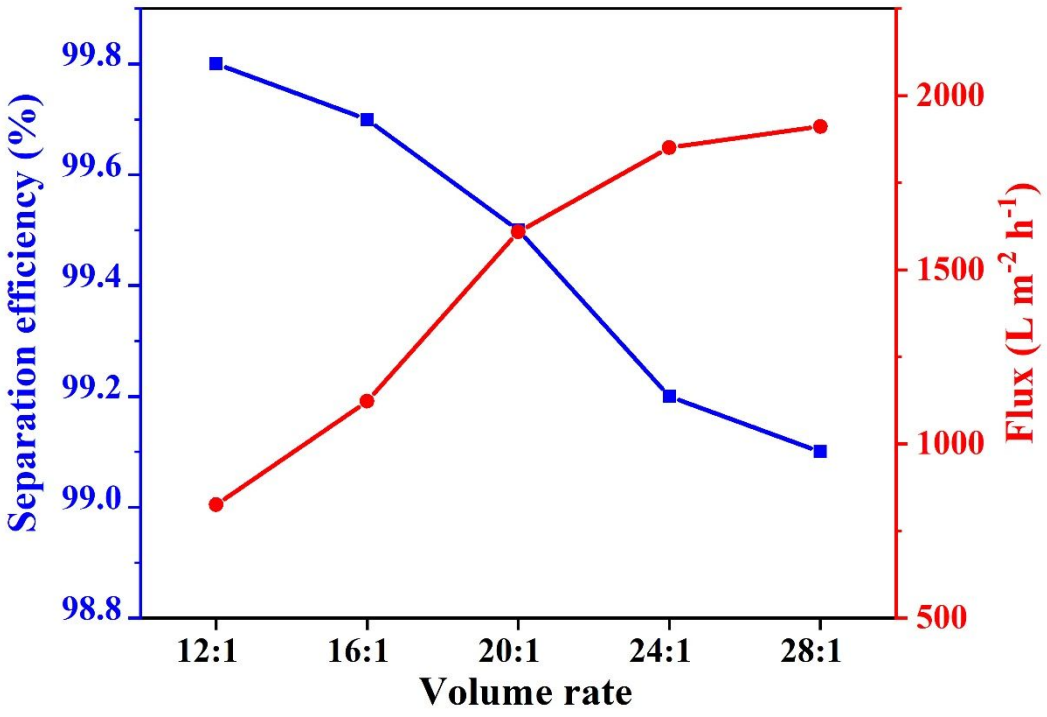

Figure S1. Relationship between the volume rate and the Flux and separation efficiency of the membrane.

Cross-sectional of the CPZP membrane

The cross-sectional of the CPZP membrane shows the coated-layer thickness of about 41.4 μm.

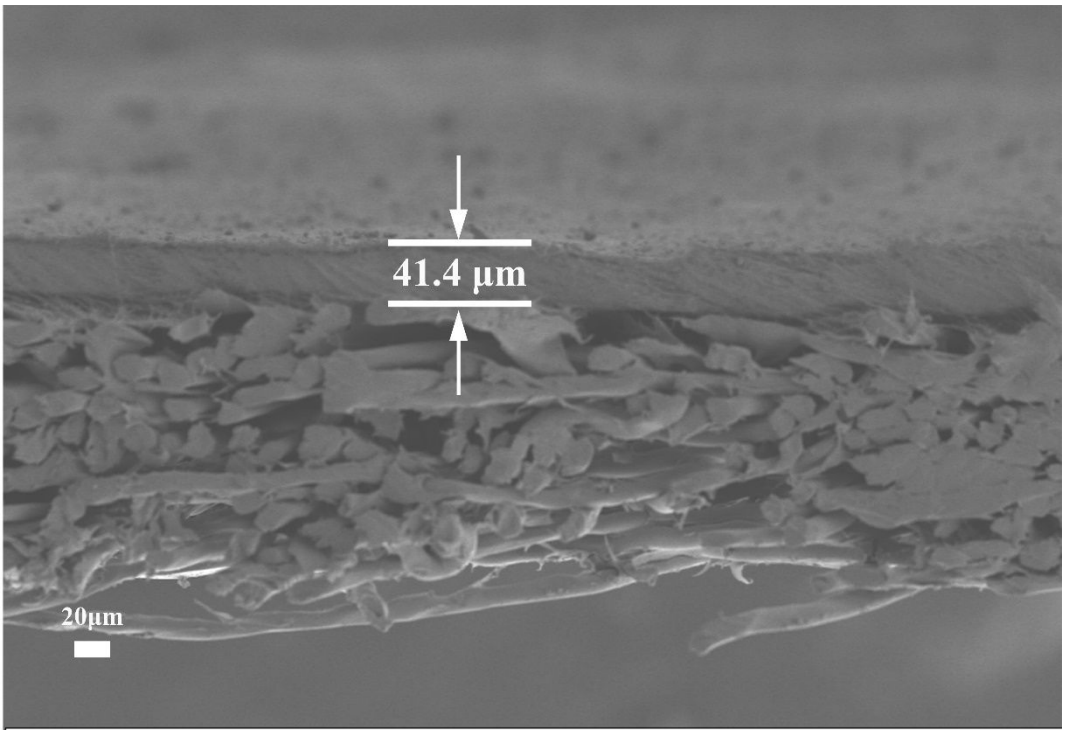

Figure S2. Cross-sectional of the CPZP membrane.

Optical microscope images, photographs, and droplet size measurements of different stabilized emulsions

It can be seen from Figure S3 that various emulsions are basically separated cleanly after separation through CPZP membrane.

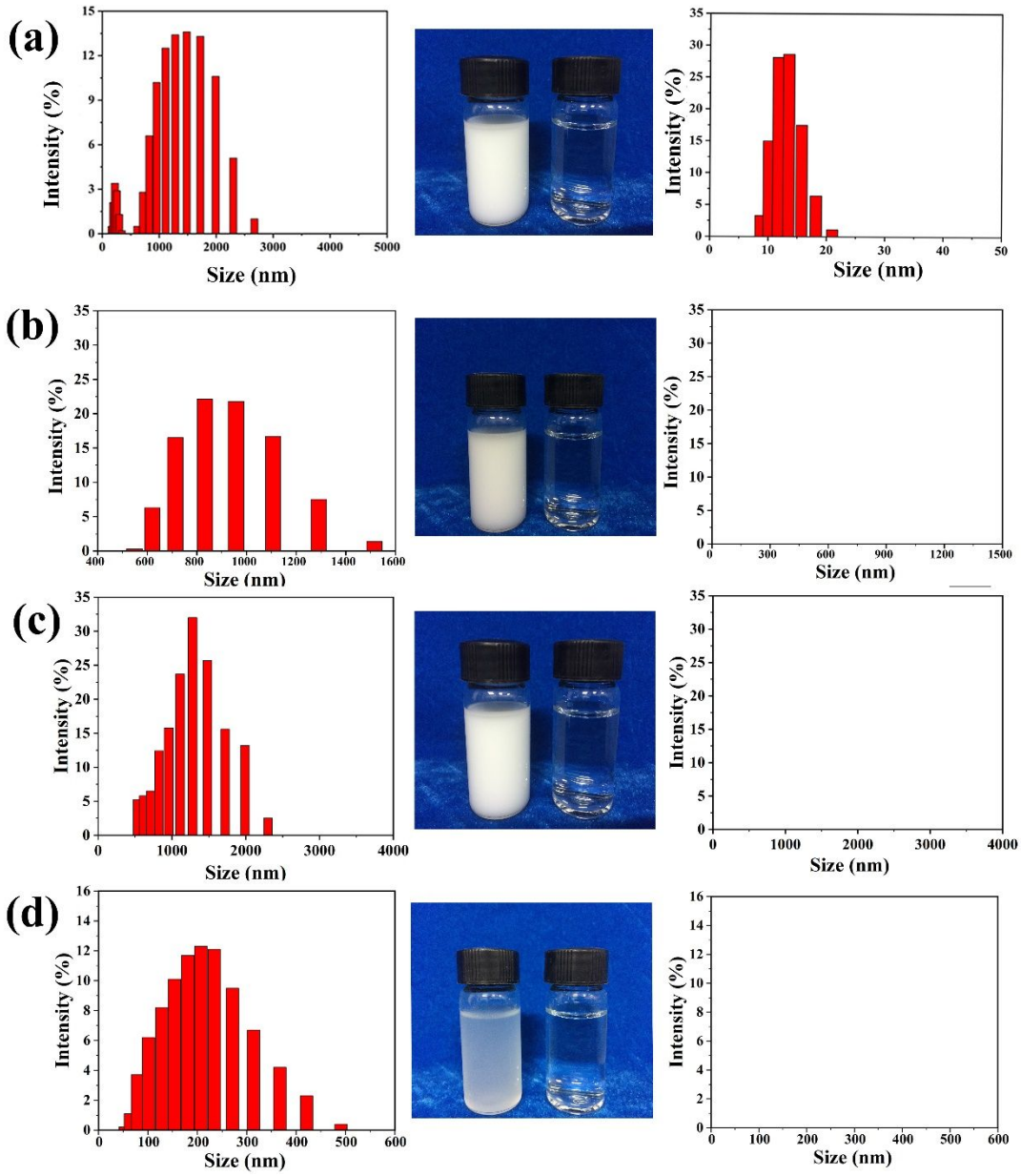

Figure S3. Optical microscope images, photographs, and droplet size measurements of different stabilized emulsions; (a) Crude oil (b) Heptane-in-water (c) Hexane-in-water (d) Petroleum ether-in-water.

SEM image of the CPZP membrane after sandpaper friction

It can be observed that the surface morphology of the CPZP membrane hardly changes after sandpaper friction (Figure S4).

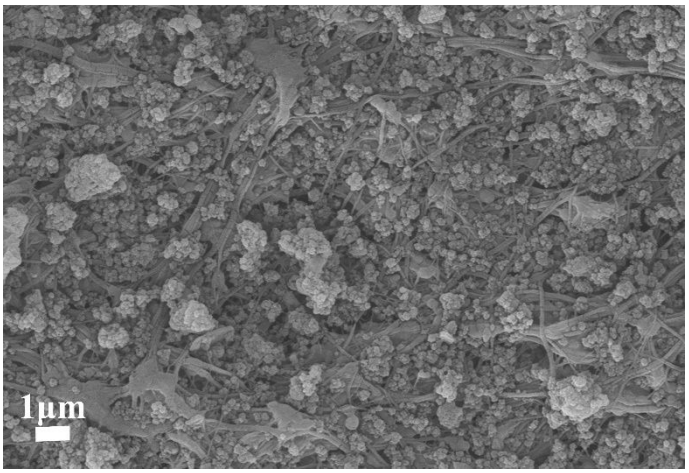

Figure S4. The SEM image of the CPZP membrane after sandpaper friction.