# Supporting information

## High-flux, continuous oil spills collection by a nanofibrous hydrophobic/oleophilic container

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## Experimental section

Materials

Poly(vinylidene fluoride-hexafluoropropylene) (PVDF-HFP, Mw≈400000) used in this study were purchased from Sigma-Aldrich. Stainless steel meshes (100 meshes) were supplied by Shanghai Screen Mesh manufacturer. Polycarbonate (PC) was provided by SUNNEX. Ethanol, dimethylformamide, acetone, hexane, petroleum ether, dimethylbenzene, sodium hydroxide (NaOH), hydrochloric acid (HCl) and sodium chloride (NaCl) were obtained from Beijing Chemical Works. Gasoline and diesel were provided by Beijing petroleum chemical industry company.

Preparation of hydrophobic fibrous container

First, PVDF-HFP was dissolved in a mixture of acetone and dimethylacetamide (weight ratio of 7:3) to obtain 19 wt% solution. Then, the PVDF-HFP nanofibrous membrane was electrospun onto the stainless steel meshes. The dual-layer films were fixed on the polycarbonate framework, forming a fibrous container. Subsequently, a system was designed for the *in situ* oil spills cleanup, which was composed of hydrophobic fibrous container, pump and collector.

The separation ability tests of the fibrous container

The membrane fluxes (gasoline flux was measured) were measured every 4 h. After then, the PVDF-HFP membrane was immersed into the gasoline for 4 h to carry out next test. The separation efficiency R (%) was calculated according to the equation: R (%) = (Wa + Wc)/Wo×100%, where R was the separation efficiency of oil, Wo was the origin weights of the original oil, Wa and Wc were the weight of the oil absorbed in the container and collected by the container, respectively. After separation, the purities of collected oils were also measured.

Corrosion resistance test of the fibrous container

In order to test the durability of the fibrous container in corrosive environment, The WCAs of PVDF-HFP membranes were measured every 4 h which the membranes were immersed in various corrosive solutions, such as: 1 M HCl solution (pH = 0), 1 M NaOH solution (pH = 14), and 1 M NaCl aqueous solution. Furthermore, the gasoline - corrosive solution separation tests (gasoline - 1 M HCl solution, gasoline - 1 M NaOH solution, gasoline - 1 M NaCl solution) were designed. And the purities of collected oil in the beaker were measured every 4 h during the separation process.

Instruments and characterizations

The surface morphologies of the membranes were characterizated by an environment scanning electron microscope (Quanta 250 FEG, FEI). The values of the water angle angles were acquired by OCA 20 instrument (Data-physics, Germany) via averaging the measurements at 5 different positions on one sample. The pump used for the continuous oil spills cleanup was Longer Pump (Y1515x). The viscosities of the oils were measured by Rheometer (MCR302).The purities of filtrated oils were measured by Karl Fischer titrator. The tensile tests were measured using universal mechanical testing machine (AGS-X 1KN) under the load rate of 5 mm $min^{-1}$.

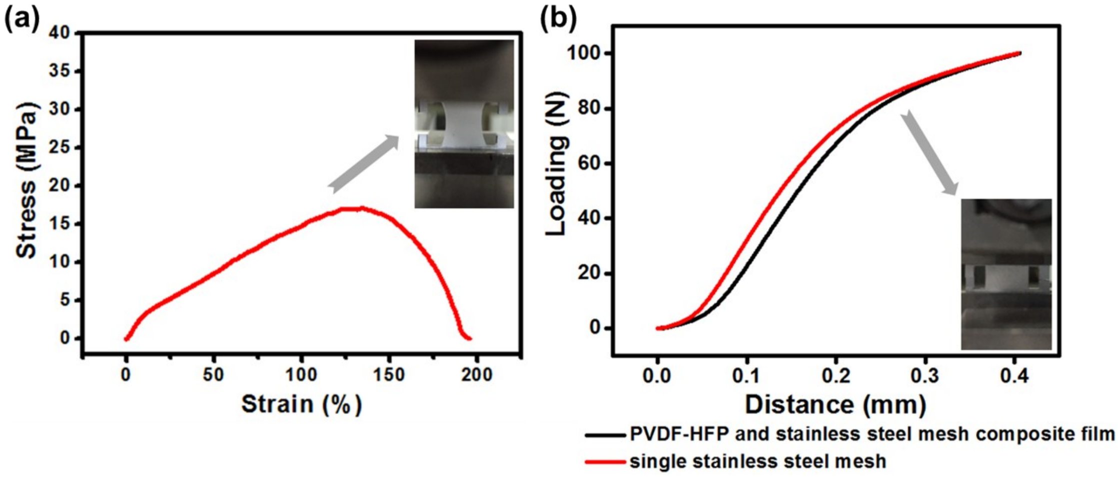


**Figure S1**: The mechanical properties characterization of single PVDF-HFP membrane, single stainless steel mesh as well as the dual-layer of the PVDF-HFP and stainless steel mesh composite film. (a) The tensile behavior of the sing-layer PVDF-HFP membrane, which shows the tensile strength of about 17 MPa and an elongation at break of approximate 133%. (b) The tensile behavior of the single stainless steel mesh (width: 1 cm, thickness: 75 μm) as well as the dual-layer composite film (width: 1 cm, thickness: 165 μm).

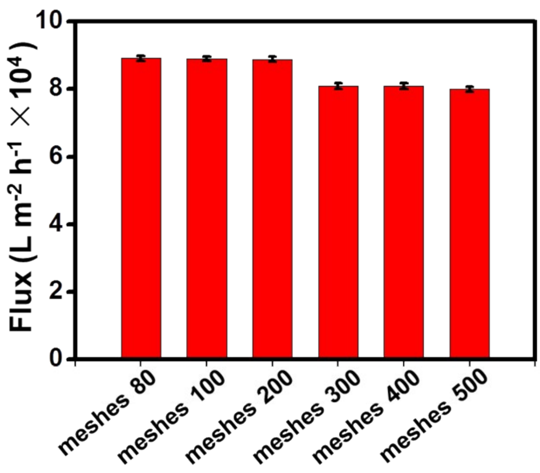


**Figure S2**: The fluxes of gasoline on the dual-layer films (PVDF-HFP membranes on the stainless steel nets with 80 meshes, 100 meshes, 200 meshes, 300 meshes, 400 meshes and 500 meshes).


**Figure S3**: The wetting behavior for different kinds of oils on PVDF-HFP membrane

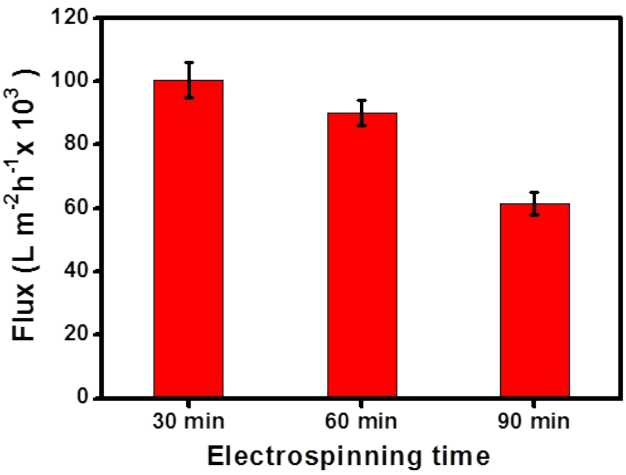


**Figure S4**: The gasoline fluxes of the PVDF-HFP membranes for electrospinning 30 min, 60 and 90 min.

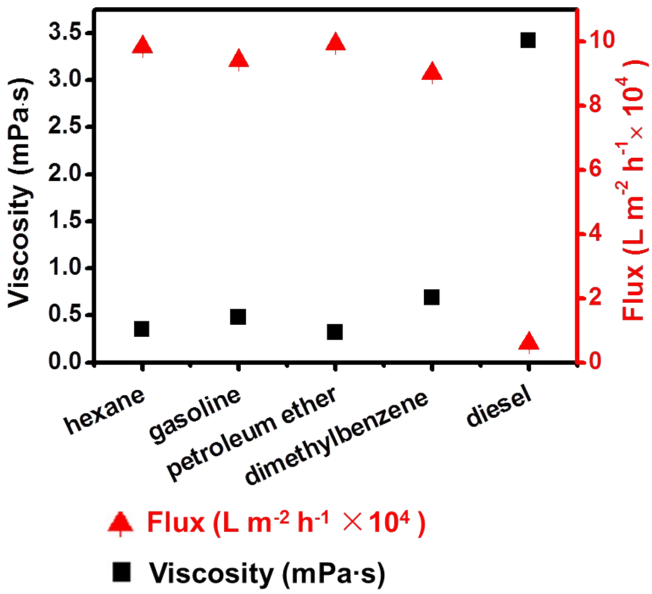


**Figure S5**: The flux and viscosity characterization of the PVDF-HFP membrane for different kinds of oils.

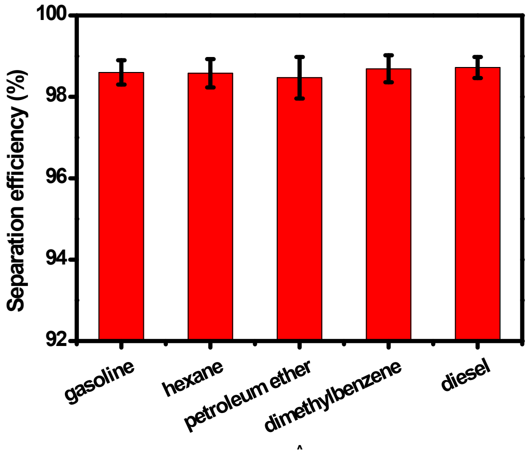


**Figure S6**: The separation efficiencies of the fibrous container for kinds of oils in the sealed condition. The separation efficiencies are 0.29~1.01% higher than the separation efficiencies in the ambient environment.