Electric Supplementary Information

Facile Synthesis of Smart Magnetically Driven fibrous films for Remote Controllable Oil Removal

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S1: Measurements of the water contact angles and oil contact angles of PVDF fibrous before and after Fe_3O_4 anchoring and fluorination.

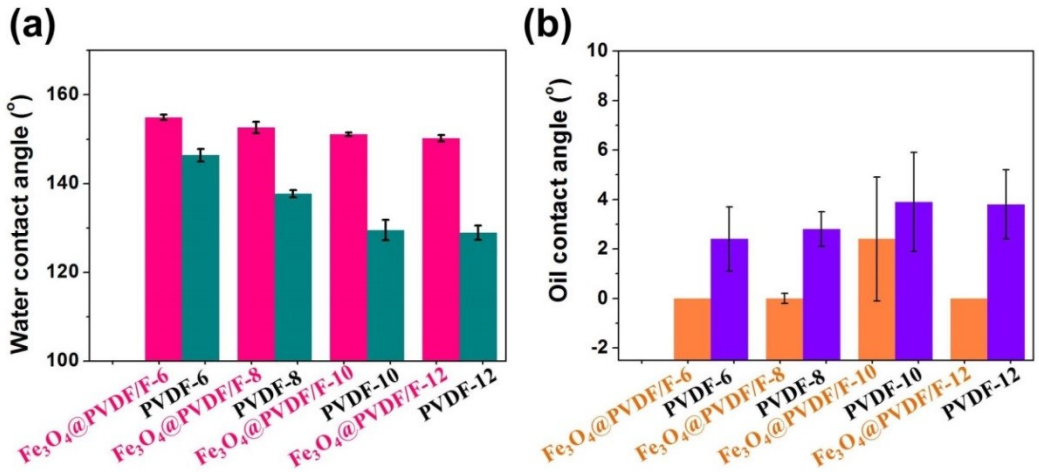

Fig. S1 (a) Water contact angles compared between Fe_3O_4@PVDF/F fibrous films and pure PVDF fibrous films. (b) Oil (1,2-dichloroethane, 2 μL)contact angles compared between Fe_3O_4@ PVDF/F fibrous films and pure PVDF fibrous films.

S2: The mechanical property of Fe_3O_4@PVDF/F-6 film was measured by microcomputer control electronic universal testing machine CMT8501 (MTS Co. USA). The samples were cut into ten strips (8 cm in Length, 0.5 cm in width). After testing for ten times, the average tensile strength and elongation at break are 22.54±1.12 MPa and (57.47±3.33)%, respectively. The details of one sample are given in Fig. S1 and Tab.S1.

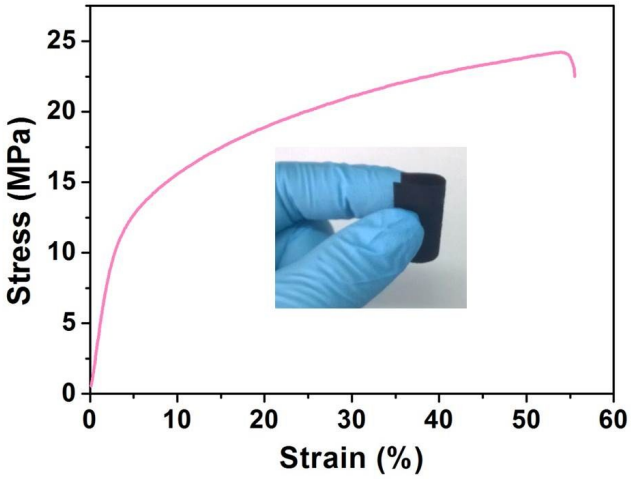

Fig. S2 Stress-strain curve of Fe_3O_4@PDA@PVDF/F-6 film

Tab. S1 Details of the testing results

Sample	Elasticity modulus (MPa)	Elongation at break (%)	Tensile break stress (MPa)	Tensile strength (MPa)	Tensile strength at stress (MPa)
Fe_3O_4@PDA@PVDF-6/F	**442.75**	**55.52**	**22.49**	**24.23**	**23.45**

S3: Fe 2p XPS spectrum of Fe_3O_4@PVDF/F sample

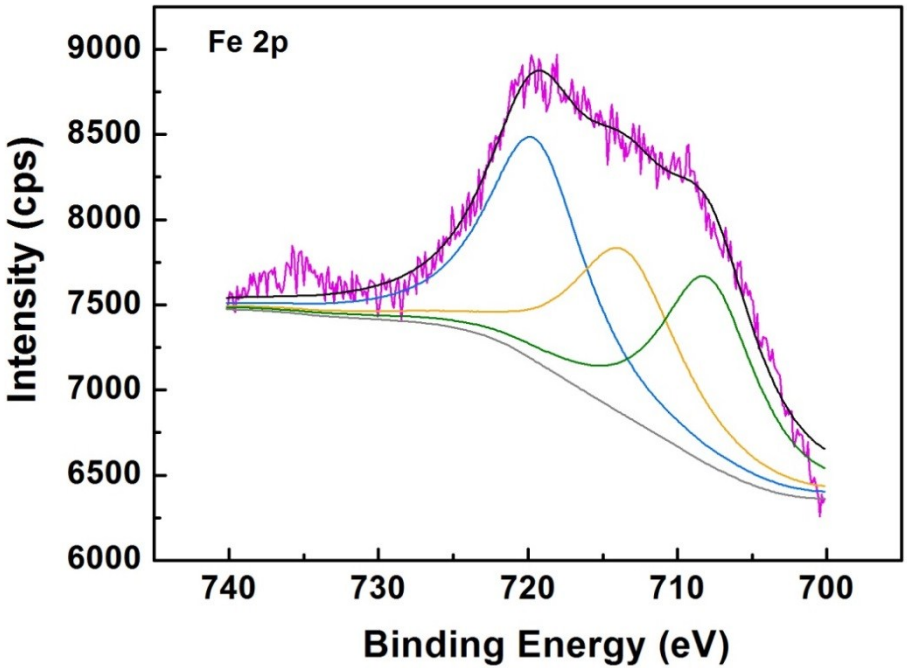

Fig. S3. Fe 2p XPS spectrum of Fe_3O_4@PVDF/F sample shown in details.

S4: Surface tension and viscosity of used oils in this work

Tab. S2 Surface tension and viscosity of used oils

	Surface tension ($\mu N \cdot m^{-1}$)	Viscosity (Pa·S)
Soybean oil	23.17	0.20
Motor oil	23.53	0.29
Silicon oil	19.61	0.13
Diesel oil	24.39	0.05
Gasoline	21.13	3.2×10^{-4}
n-Hexane	20.4	4×10^{-4}

S5: Structure comparison of the Fe_3O_4@PVDF/F samples before and after oil removal.

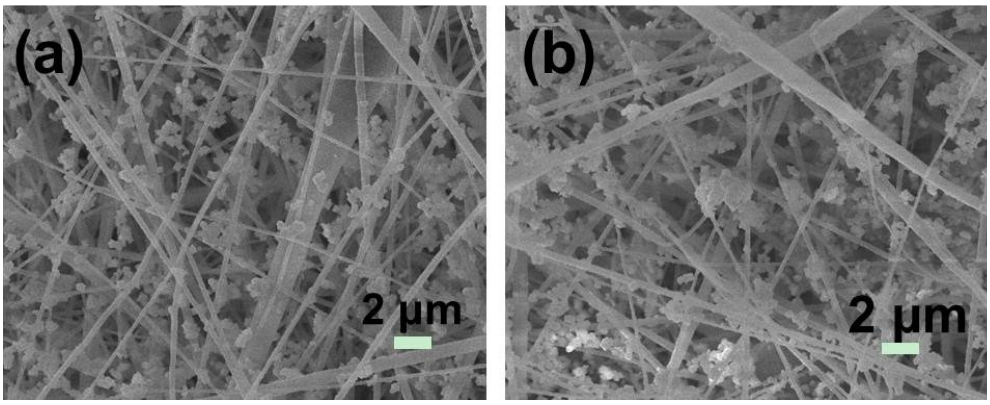

Fig. S4. (a) The SEM image of The Fe_3O_4@PVDF/F sample before oil adsorption (Oil: n-hexane). (b) SEM image of the above sample after oil adsorption reused for 5 cycles. The sample was wash by ethanol and diluted water for 5 cycles. There is no observed structure change before and after oil removal.

S6: Water contact angles before and after utilization. The variation of water contact angles and oil contact angles during 5 recycles usages are shown in Fig. S3. All water contact angles of the sample are over 150^{o} , and oil contact angles stability keep near to 0^{o}.

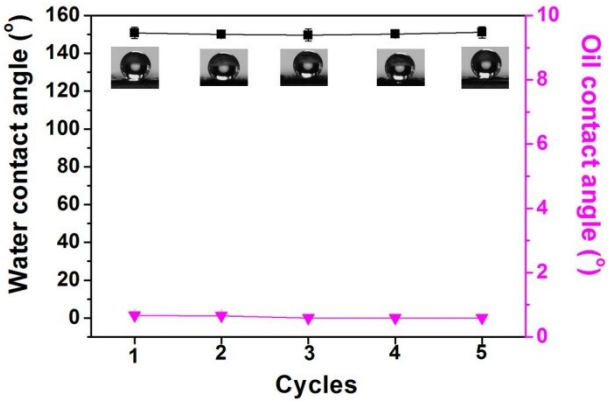

Fig. S5. Water contact angles and oil (1,2-dichloroethane, 2 μL)contact angles of Fe_3O_4@PVDF/F-6 during 5 cycles reutilization

S7: Water sliding angles of Fe_3O_4@PVDF/F-6 before and after five cycles reutilization

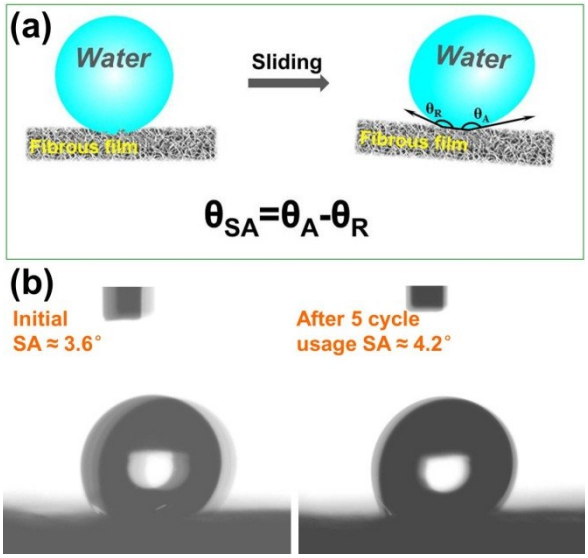

Fig. S6 (a) Scheme of mechanism of water sliding angle. (b) Comparison SA before and after 5 cycles usage.