Supporting Information

Furfuryl alcohol modified melamine sponge for high-efficient oil spill clean-up and recovery

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Oils and organic solvents sorption test

The adsorption capacity was investigate by the following procedure. A weight measured modified melamine sponge was completely filled with oils or organic solvents for 30 s (for heavy oils, 1-2 minutes were needed). Then the absorbed sponge was taken out with tweezers for weight measurement. The absorption capacity is defined as the weight of absorbed substance per unit weight of the dried melamine sponge. Each oil or organic solvent was tested at least three times. For the cyclic absorption measurement, the absorption capacity was obtained through the same method and the absorbed sponge was recovered by squeezed out the oils or organic solvents from sponge.

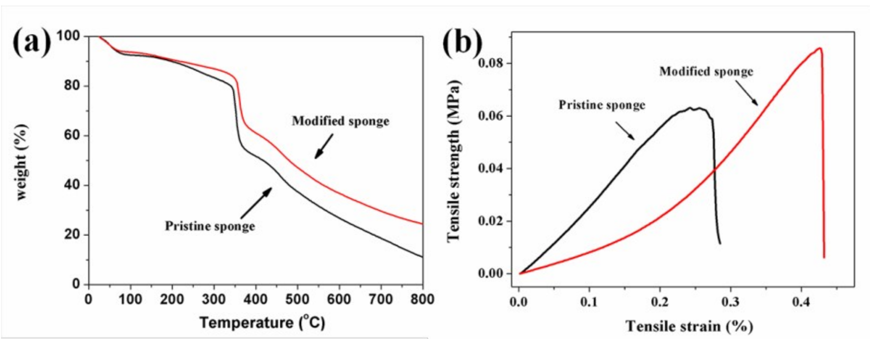

Fig. S1 (a) TGA spectra and (b) mechanical properties of pristine and modified MS

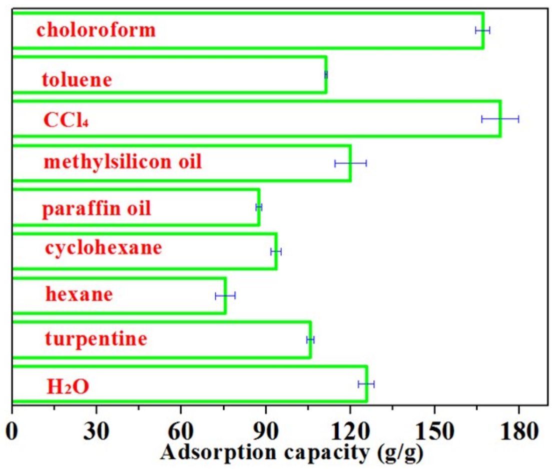

Fig. S2 Sorption capacities of the pristine MS for water and various oils and organic solvents. Pristine MS can absorb both H_2O and oils, showing no separation abilities for H_2O and oils.

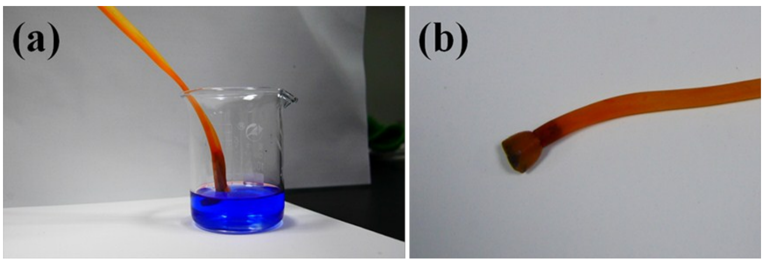

Fig. S3 (a) digital picture showing the modified MS was forced into water and still no water was sucked into tube under vacuum and (b) optical view of modified MS after oil-collecting test and the modified MS was only dyed red without blue, indicating that no water passed MS and flowed into tube.

Table S1. Effects of FA concentration (soaking time was fixed to be 2h) and soaking time (FA concentration was fixed to be 20 mg/mL) on the sorption capacities of FA modified MS

FA concentration, mg/mL	5	10	20	
Hexane, g/g	74±1.2	77.8±0.8	78±0.6	
Turpentine, g/g	100±2.0	100±1.5	102±3.8	
Soaking time	2 h	4 h	6 h	12 h
Hexane, g/g	78±0.6	77.8±0.7	78±0.8	77.9±0.2
Turpentine, g/g	102±3.8	100±4.5	102.5±2.0	101.5±1.8

Table S2. Comparison of oil sorption capacities of different oil absorbents

Absorbent materials	Sorption capacity, g/g	Ref.
FA modified MS	n-hexane, 78 Cyclohexane, 85 Toluene, 82 Chloroform, 160	In this work
rGO/ethylenediamine coated melamine sponge	n-hexane, 58 Chloroform, 150 Methylbenzene, 70 Soybean oil, 75	[1]
Graphene-based melamine foam	Acetone, 60 Hexane, 50 Paraffin, 75 Toluene, 65	[2]
3-MPTES modified melamine foam	Hexane, 75 Chloroform, 160	[3]
Poly (divinylbenzene)-coated melamine foam	Hexane, 40 Acetone, 50 Chloroform, 120 Toluene, 50	[4]
Dimethylsiloxane-coated melamine sponge	Hexane, 45 Toluene, 75 Silicone oil, 50	[5]
Carbonized melamine sponge	n-hexane, 80-90 Toluene, 110	[6]
Ligin-coated melamine sponge	Toluene, 125 Hexane, 100 Chloroform, 200 Hexadecane, 100	[7]
rGO-coated melamine sponge	Hexane, 55 Toluene, 65 Dedocane, 60 Chloroform, 125 Acetone, 70	[8]
ZIF-8 coated carbonized melamine sponge	Toluene, 77 Acetone, 57 Hexane, 61 Chloroform 136	[9]
Polyurethane@Fe_3O_4@SiO_2@Fluoropolymer Sponges	n-hexane, 20 Chloroform, 20 Toluene, 20	[10]

graphene/PDMS-coated melamine sponge	Hexane, 55 Motor oil, 90	[11]
Ag/polydopamine-coated melamine sponge	Hexane, 60 Toluene, 95	[12]
polydopamine/1H,1H,2H,2H-per uorodecanethiol-coated melamine sponge	Hexane, 80 Toluene, 112	[13]
PDMS-functionalized melamine sponge M8	Hexane, 45.4 Toluene, 71.5 Octadecene, 55.4 Silicone oil, 61.4 Motor oil, 46.3	[5]
TiO_2 sol/n-octadecylthiol PU	Engine oil, 83 Chloroform, 110	[14]
Poly(dimethylsiloxane) sponge with NaCl	Chloroform, 21	[15]
Soot dipped PU	Silicon Oil, 43 Chloroform, 82	[16]
Hydrophobic bacterial cellulose aerogel	Hexane, 86 Chloroform, 185	[17]
Carbon nanotube sponge	Hexane, 78 Chloroform, 176	[18]
Spongy graphene	Chloroform, 86	[19]
Twisted carbon fibers from cotton	Chloroform, 115	[20]
Graphene-carbon nanotube sponge	Chloroform, 568	[21]
MTCS-coated chitin sponge	Cyclohexane, 30 Toluene, 32 Chloroform, 54	[22]
Carbon nanotubes/graphene hybrid aerogel	Hexane, 150 Chloroform, 270	[23]
Carbonaceous aerogel	Hexane, 3.5 Engine oil, 12 Crude oil, 10	[24]
Carbon fiber aerogel	Chloroform, 80	[25]

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