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Electronic Supplementary Information

A Novel Solution-Controlled Hydrogel Coated Mesh for Oil/Water Separation Based on Monolayer Electrostatic Self-Assembly

Weifeng Zhang,‡ Yingze Cao,‡ Na Liu, Yuning Chen and Lin Feng*

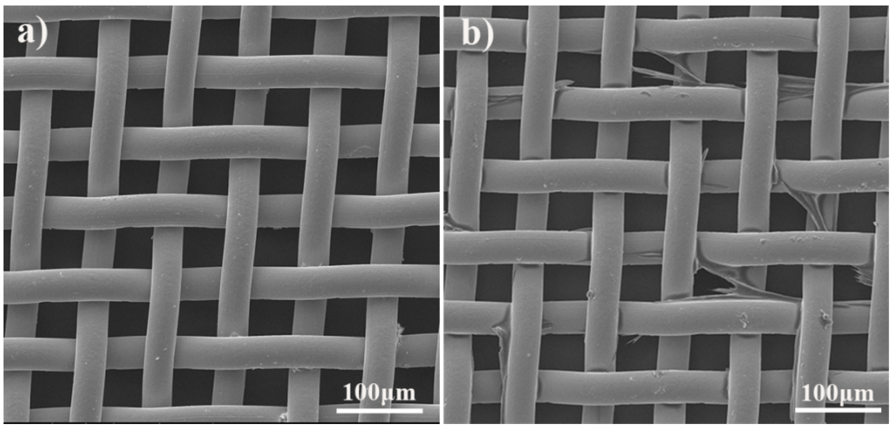

Fig.S1 SEM images of the (a) smooth mesh and (b) PDMAEMA hydrogel coated mesh without electrodeposition of copper. Compared with the mesh after deposition, the amount of PDMAEMA hydrogel covered on the smooth mesh was much less.

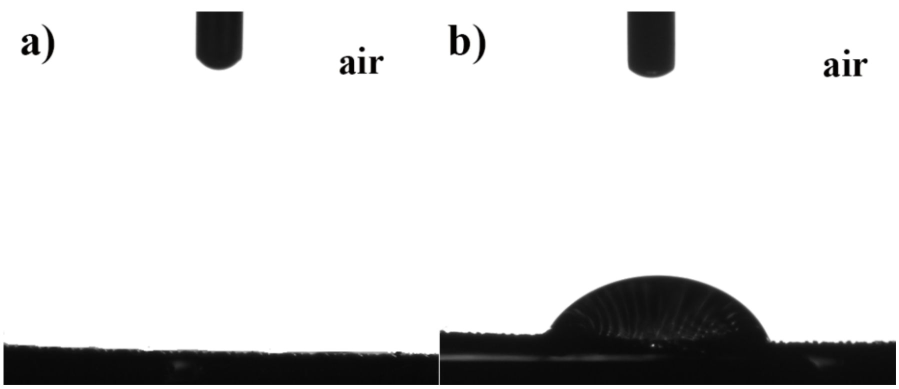

Fig.S2 The wettability of the PDMAEMA hydrogel coated mesh without electrodeposition of copper at different positions: (a) In some areas, the WCAs angles are nearly 0°, exhibiting superhydrophilicity. (b) While in other positions, the wettability of the mesh is not superhydrophilicity, indicating that the hydrogel coated on the mesh is not uniform.

Table.S1 Water contact angles (WCAs) of the PDMAEMA hydrogel coated mesh without electrodeposition of copper after stearic acid modification and after the immersion in NaOH solution, respectively. Besides, the WCAs of the smooth stainless steel mesh was also measured. Without the process of the electrodeposition, the wettability of the hydrogel coated mesh could not be transferred because of the weak adhesion, the hydrogel could be easily wash off by the solution.

	After stearic acid modification	After immersion in NaOH solution	Smooth stainless steel mesh
WCAs /°	100±9.74	86.98±3.86	96.42±12.60

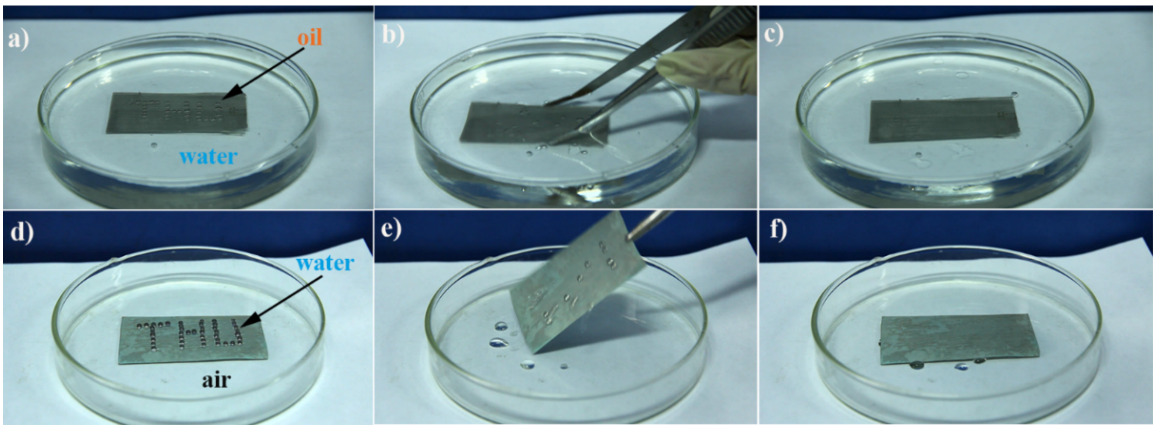

Fig.S3 Low adhesion force experiments: (a-c) The PDMAEMA hydrogel coated mesh was placed underwater, oil droplets exhibited spherical and could roll off easily. (d-f) The stearic acid modified mesh was placed in air. Similarly, water droplets maintained ball-shape and could roll off quickly.

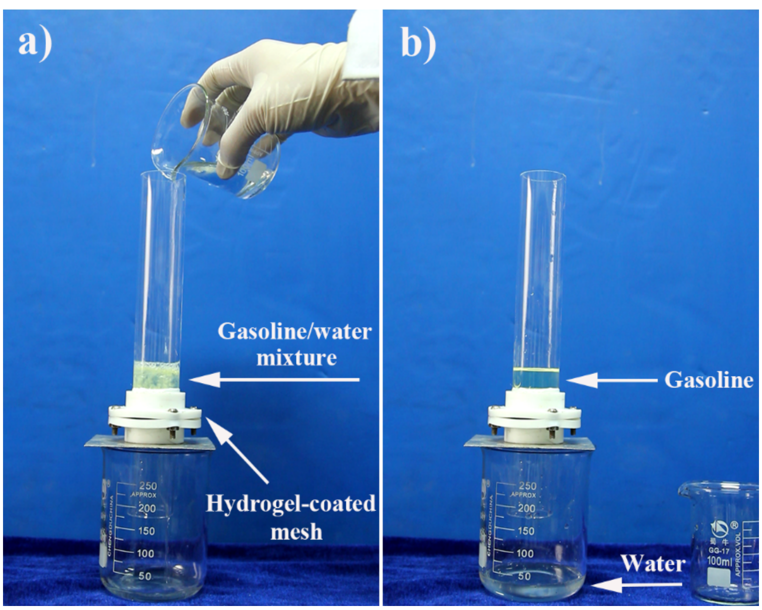

Fig.S4 Oil/water separation experiments of the PDMAEMA hydrogel coated mesh: (a) The mesh was fixed between two Teflon fixtures attached with glass tubes, the whole device was placed vertically; (b) The gasoline/water mixtures were poured onto the surface, water passed through the mesh quickly while gasoline was blocked above the surface.

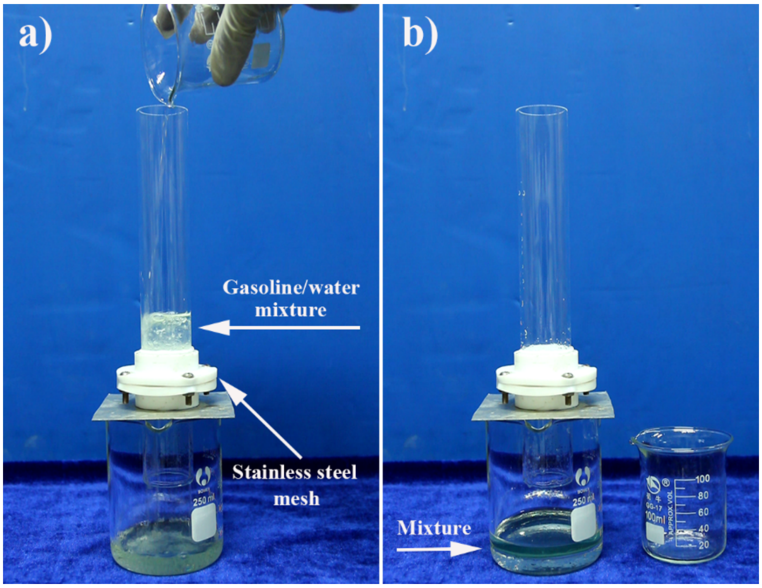

Fig.S5 Oil/water separation experiments of the stainless steel mesh as a control: (a) The mesh was fixed between two Teflon fixtures attached with glass tubes, the whole device was placed vertically, the gasoline/water mixtures were poured onto the surface. (b) Both the gasoline and water passed through the mesh quickly, indicating that the stainless steel mesh did not have the capacity of oil/water separation.

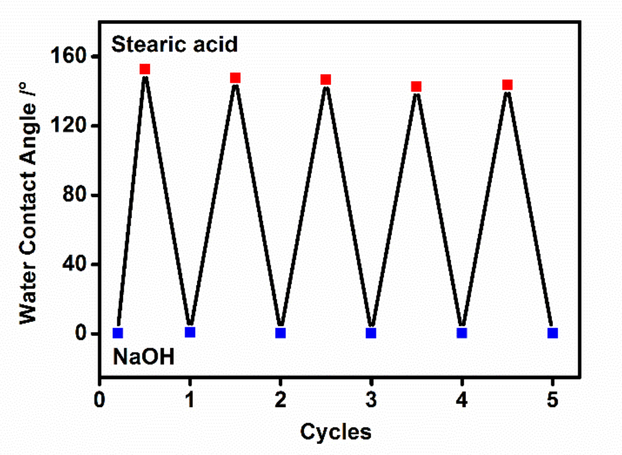

Fig.S6 The recycling experiments of the as-prepared hydrogel coated mesh. The wettability of the as-prepared mesh could be transited for several times, between superhydrophilicity of WCA nearly 0° and highly hydrophobicity of WCAs larger than 140°.

Video.S1 Gasoline/water separation experiment of the PDMAEMA hydrogel coated mesh: water permeated the mesh, while oil was kept in the upper glass tube.

Video.S2 Gasoline/water separation experiment of the stearic acid mesh followed by adding NaOH solution: gasoline could pass through the stearic acid modified mesh while water stayed on the upper glass tube; after adding a small amount of NaOH solution into water, the mixtures penetrated the mesh quickly.

Video.S3 Gasoline/water separation experiment of the mesh after immersion in NaOH solution, the mesh returned to the original state, water could pass through the mesh freely while gasoline was blocked above the surface