Supporting Information

Janus Oil Barrel with Tapered Microhole Arrays for Spontaneous High-flux Spilled Oil Absorbing and Storing

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Keywords: (Janus oil barrel, tapered microhole arrays, oil spill remediation, oil-in-water emulsions, unidirectional transferability)

Table S1. The water and oil contact angles on upper surface and lower surface after three processing steps. The sample is a microhole arrayed aluminum foil with diameter (D_2) of 40.3 μm and interval of 100 μm.

	CAs after step 1	CAs after step 2	CAs after step 3
	Upper surface		
Water in air	~0°	~166.7°	~158.4°
Oil in air	~0°	~0°	~5.4°
Oil in water	~163.5°	~7.5°	~36.1°
	Lower surface		
Water in air	~0°	~154.7°	~4.2°
Oil in air	~0°	~0°	~0°
Oil in water	~156.4°	~3.7°	~150.7°

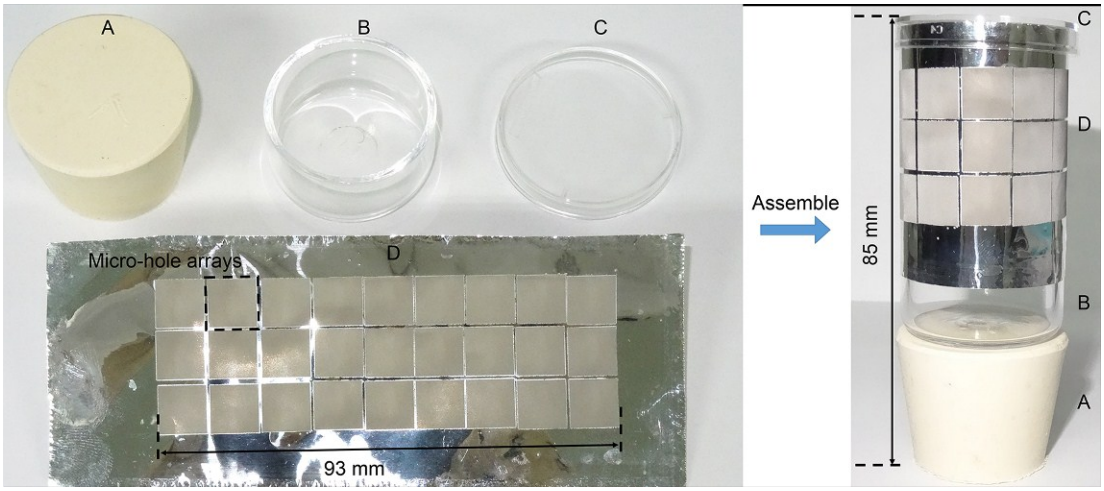

Figure S1. The compositions of an oil barrel. A is a rubber plug for keeping balance of the barrel on water surface. B is a home-made glassware. C is a plastic cap. D is our Janus aluminum foil with large area microhole arrays. The right picture is the assembled Janus oil barrel.

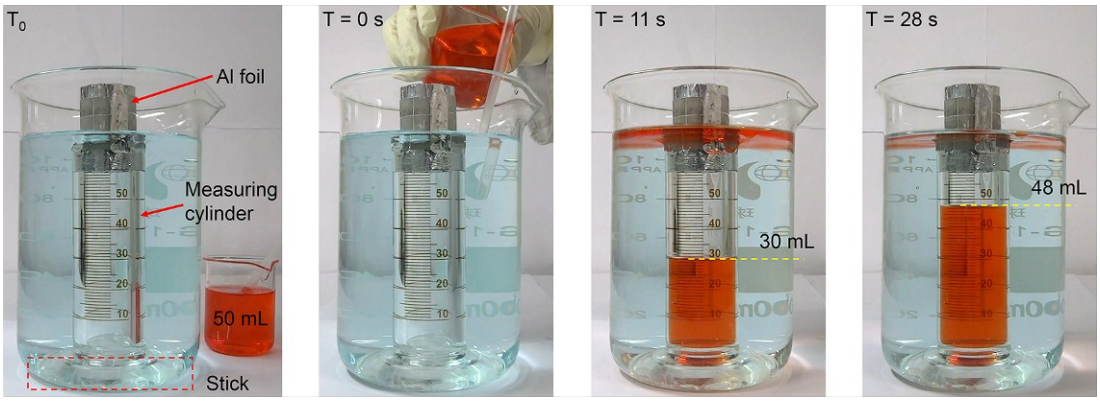

Figure S2. The measuring system for absorption speeds. A measuring cylinder assembled with a microhole arrayed aluminum foil was stuck in the bottom of the baker. The volume of absorbed oil were got by reading the scale mark.

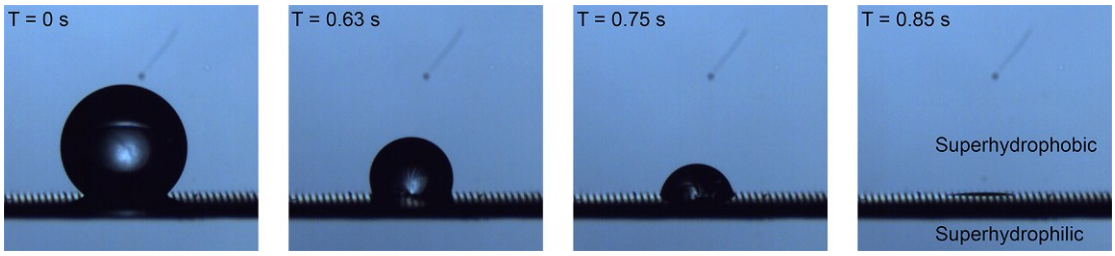

Figure S3. The optical images of a water droplet pass through the micro-holes from superhydrophobic surface to superhydrophilic surface (Janus system a1 in Figure 5). Because the inwall of the holes is superhydrophilic, the superhydrophobic surface cannot block water, leading to zero intrusion pressure. The Janus system a1 in Figure 5 cannot be used for oil/water separation but can be used for liquid transport.

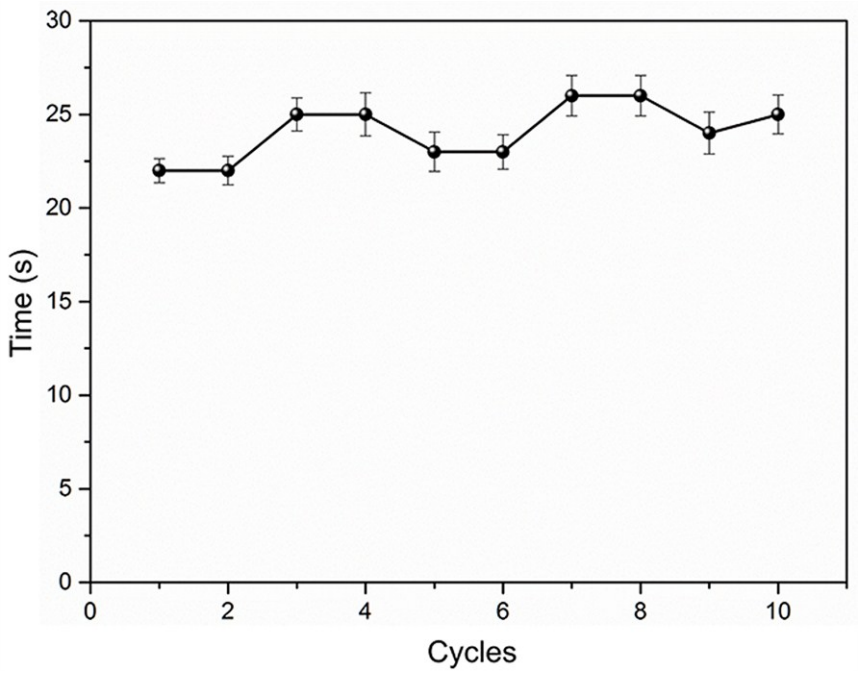

Figure S4. The recyclability of Janus oil barrel (sample 4) for oil spill. The volume of spilled oil is 30 mL. The absorption times of the barrel show a little increase, demonstrating good recyclability.

Supporting Information, Movie S1 The side-view of oil (C8H8) spill remediation. 30 mL dyed oil was absorbed into the Janus oil barrel in about 30 s.

Supporting Information, Movie S2 The top-view of oil (C8H8) spill remediation.

Supporting Information, Movie S3 The comparison between Janus oil barrel and double-faced superhydrophobic oil barrel. The Janus oil barrel with pre-wet inside wall can eliminate secondary leakage.

Supporting Information, Movie S4 The absorption of oil from surfactant-free oil-in-water emulsions. The oil/water mixture was stirred by a magnetic stirrer at speed of 400 r/min for 2 mins to prepare oil-in-water emulsion. Then, a Janus oil barrel was put into the emulsion at stirring speed of 200 r/min.

Supporting Information, Movie S5 The transfer of absorbed oil by siphon principle.

Supporting Information, Movie S6 The measuring system for the volume of absorbed oil.