Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A

Supporting Information

Polydopamine-Based Superhydrophobic Membranes for Biofuels Recovery

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Figure S1

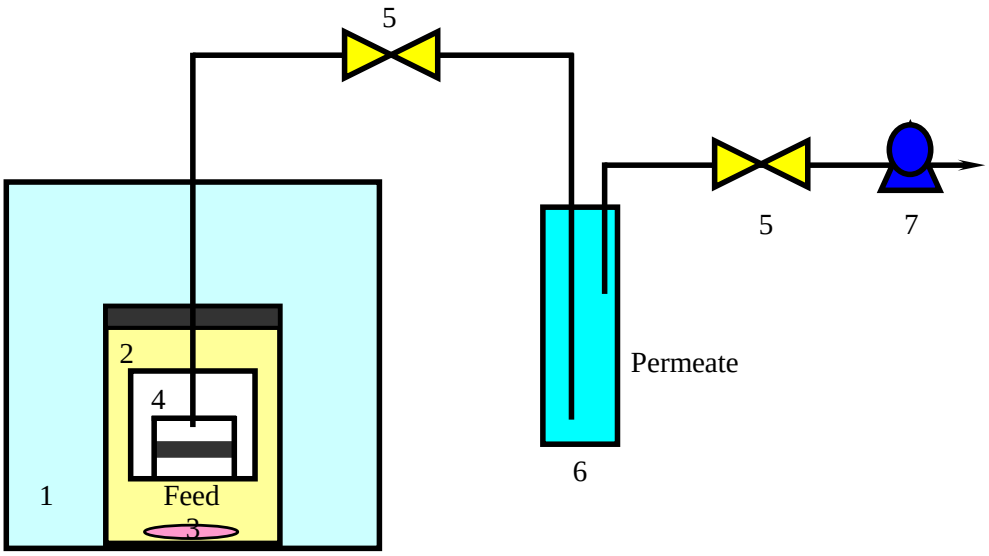

Figure S1. Schematic diagram of experimental apparatus for pervaporation. (1) water bath; (2) liquid tank; (3) stirrer; (4) membrane model; (5) ball value; (6) cold trap; (7) vacuum pump

Figure S2

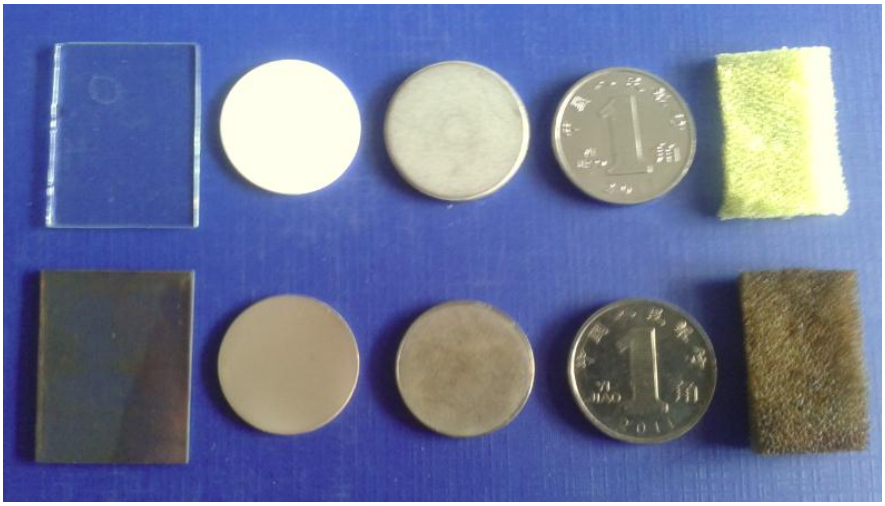

Figure S2. Photographs of various non-modified (top) and polydopamine-modified substrates (bottom). From left to right： glass plate, alumina disk, stainless steel disk, Chinese coin, and sponge.

Figure S3

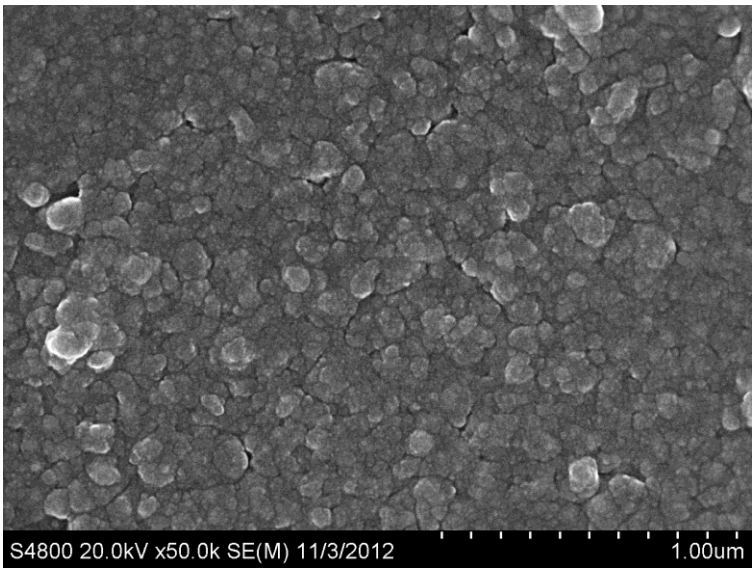

Figure S3. Top view SEM image of the PD layer on the Al_2O_3 disk.

Figure S4

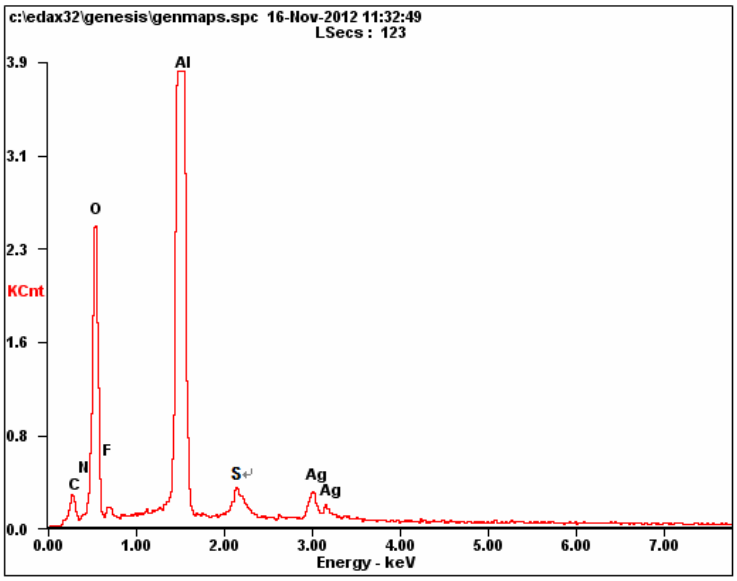

Figure S4. EDXS pattern of the F-Ag-PD@Al_2O_3 membrane.

Figure S5

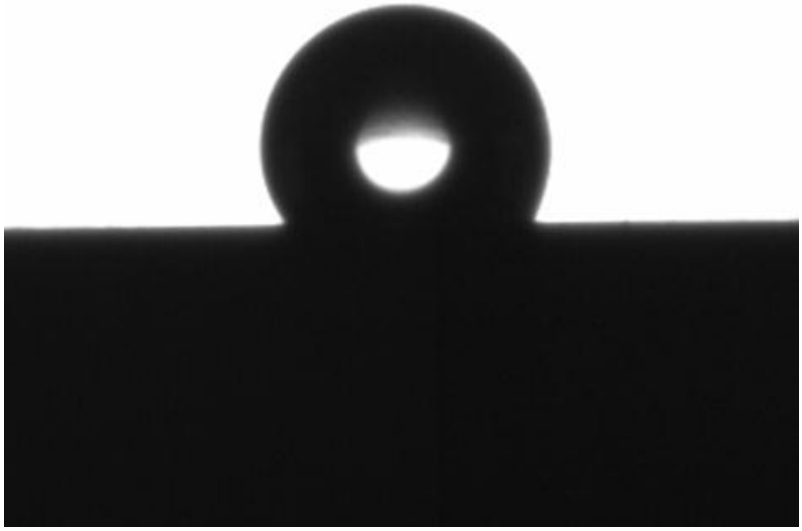

Figure S5. Photograph of a water droplet standing on the surface of F-PD@Al_2O_3 layer, i.e., the PD layer was directly modified with 1H, 1H, 2H, 2H-perfluorodecanethiol (without react with Ag^+), showing a water CA of about 132 °.

Figure S6

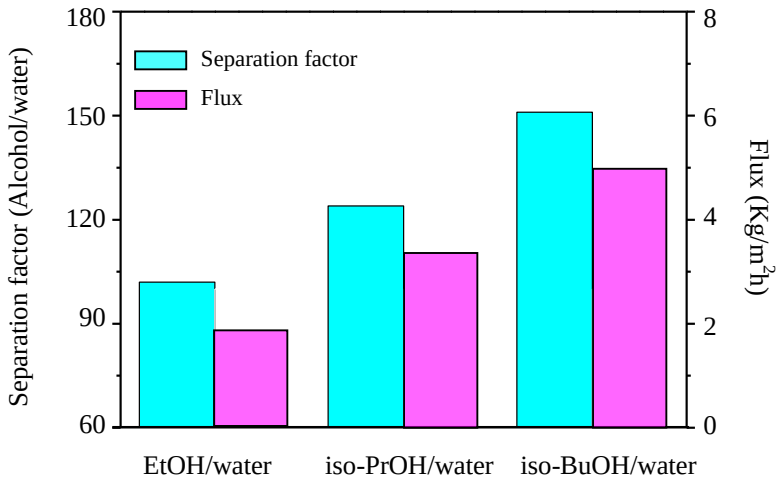

Figure S6. Separation factor and flux of the F-Ag-PD@Al_2O_3 superhydrophobic membrane for the separation of different alcohols at 50 °C with alcohols concentration of 5.0 wt.% in feed.

Table S1

Table S1. Comparison of the pervaporation performances for the separation of alcohol/water.

Membrane	Membrane thickness (μm)	Feed [a] (wt.%)	Temperature (°C)	Alcohol/water separation		Reference
				Flux [(Kg/(m^{2}h)]	Separation factor ($\alpha_{alcohol/water}$)	
Silicalite-1	/	5 [b]	30	0.22	59	1
Silicalite-1	20	5 [b]	60	0.9	106	2
Silicalite-1	25	4.65 [b]	30	0.5	64	3
Silicalite-1	12	3 [b]	60	2.9	66	4
Silicalite-1	30	3 [b]	60	0.58	95	5
ZSM-5	20	5 [b]	60	0.97	62	6
Ge-ZSM-5	/	5 [b]	30	0.22	47	7
		5 [c]	30	0.02	19	
PTMSP	22	1.5 [c]	70	1.03	70	8
		6 [c]	25	0.436	61	
PVDF	110	7.5 [c]	40	2.34	5.2	9
silicalite–silicone	300	1 [c]	30	0.008	31	10
PERVAP-1070d	29	1 [c]	30	0.050	44	11
silicone	50	1 [c]	30	0.528	42	
silicalite-filled silicone	80	1 [c]	70	0.610	93	12
PDMS	140	1 [c]	50	0.132	32	13
ZIF-8-filled PMPS	2.5	1 [c]	80	6.4	34.9	14
		3 [c]	80	8.6	40.1	
F-Ag-PD@Al_2O_3 membrane	0.2	5[b]	50	2.5	102	This work
		3 [c]	50	4.5	136	
		5 [c]	50	5	152	
		8 [c]	50	6.4	150	

[a] Feed alcohol concentration, [b] Ethanol aqueous solution, [c] Butanol aqueous solution.

Reference

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