Supplementary information

Self-roughened superhydrophobic coatings for continuous oil-water separation

Chao-Hua Xue, *[ab] Ya-Ru Li, [a] Jin-Lin Hou [a], Lei Zhang,[a] Jian-Zhong Ma,[a] and Shun-Tian Jia [a]

College of Resource and Environment, Shaanxi University of Science and Technology,

Xi'an710021

Shaanxi Research Institute of Agricultural Products Processing Technology, Xi'an 710021,

China.

E-mail: xuech@zju.edu.cn

Telephone: +86 29 86132768

S1.1 Laundering of S-PET

The washing durability of treated polyester textiles were evaluated by a standard procedure according to AATCC Test Method 61-2003 test No 1A. Samples were washed using a laundering machine (SW-12 AII, Da Rong, China)) at 40℃ in presence of 10 stainless steel balls with the existence of 0.38 wt.% soap powder. One washing cycle (45 min) is approximate to five times of commercial laundering. The washed fabrics were rinsed by abundant water to remove the residual detergent, and dried at 35℃ without any tension.

S1.2 Abrasion of S-PET

The abrasion resistance was tested using a modified procedure based on the AATCCA Test Method 8-2001 according our previous reported method. Using a pure nylon fabric cloth as the abrasion partner, the testing was performed with a loaded pressure of 45 kPa and a moving path of 100 mm. In the test, two moving paths form one cycle.

S2 Hydro Head Measurement of the S-PET

Figure S1 shows the apparatus used to determine resistance to external water pressure. A tube was used as a graduated column of water for measuring hydrostatic pressure in millimeters (hydrohead). The water added from the top of the tube. For a given test, samples were cut and screwed at the lower end of the tube. Water was then added slowly in the rising liquid column. When the water breakthrough appeared at the point of first penetration, the height of the water column at breakthrough designated the maximum hydrohead that a sample could tolerate reliably. This process was repeated at least 5 times for a given test sample, and the pressures were then averaged to determine the final resistance pressure and the accompanying standard deviation.
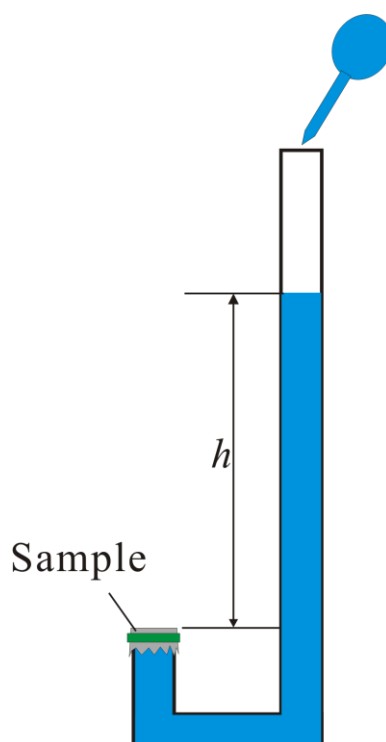

Figure S1. Schematic of the hydro head apparatus. The water column is filled slowly from the tube top until breakthrough is seen with naked eyes.
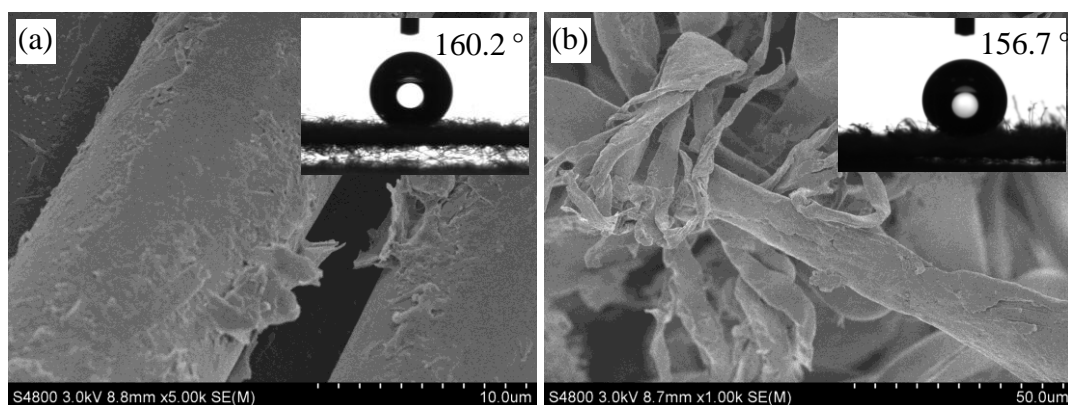
S3 Caculation of Separation Efficiency

The separation efficiency (η) was calculated by :

$$\eta\ (\%)\ =\ \frac{W_0 - (m - m_0)}{W_0} \times 100$$

where W_0 is the weight of oil, m stands for the weight of water after separation, and m_0 is the

mass of the water before adding oil.
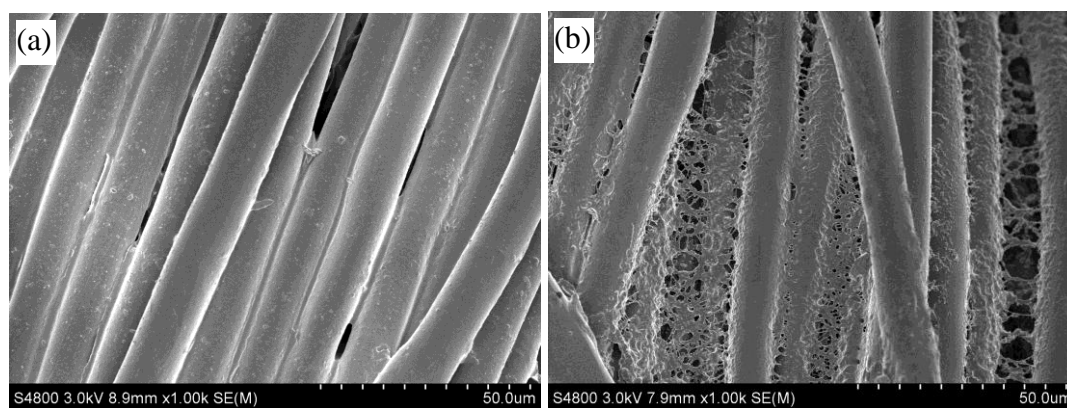
Figure S2. SEM images of PVC coated textiles: (a) without ethanol pretreatment, (b) with

ethanol pretreatment.

Figure S3. SEM images of PDMS/PVC treated PET textiles: (a) after laundering test of 180 cycles and (b) after the abrasion test of 5000 cycles.