Electronic Supplementary Material (ESI) for RSC Advances.
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Surface scaly structure bionic building on polyester fabric with anti-fouling and anti-bacterial properties for highly efficient oil-water separation

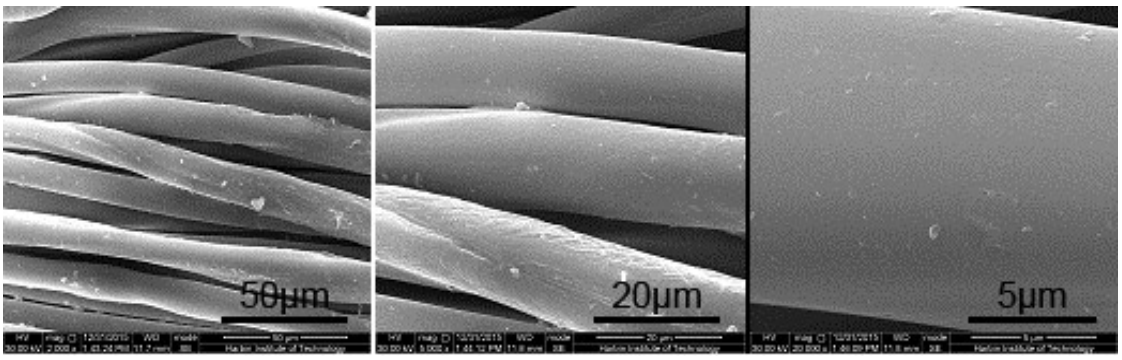

Figure S1. The SEM images of fabric coated with ZnO seeds. The surfaces coated with some nanopartials sporadically

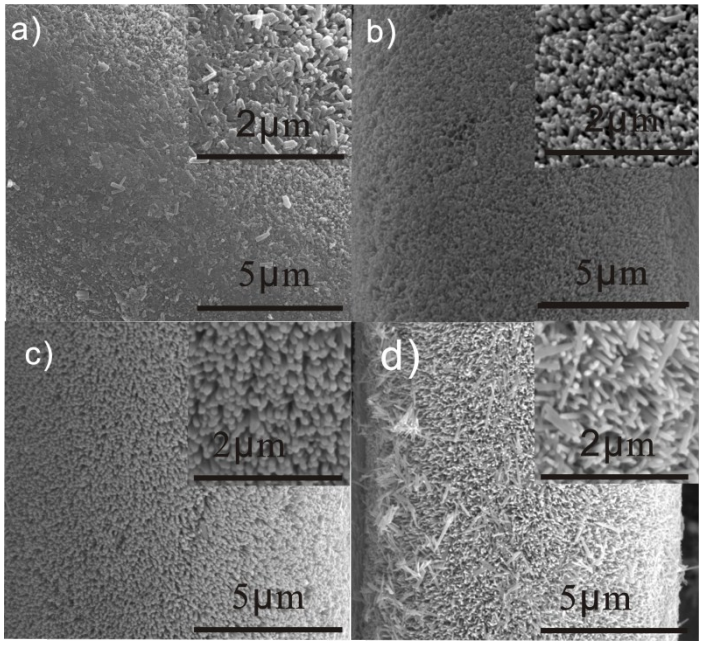

Figure S2. SEM images of polyester/ZnO fabrics after hydrothermal reaction for different times: a) 1h; b) 2h; c) 4h; d) 6h. From these pictures it could be observed that more nanorobs produced on the substrates with the increase of reaction time. And ZnO nano-rode could optimal distribution on the polyester when the reaction time was 4h.

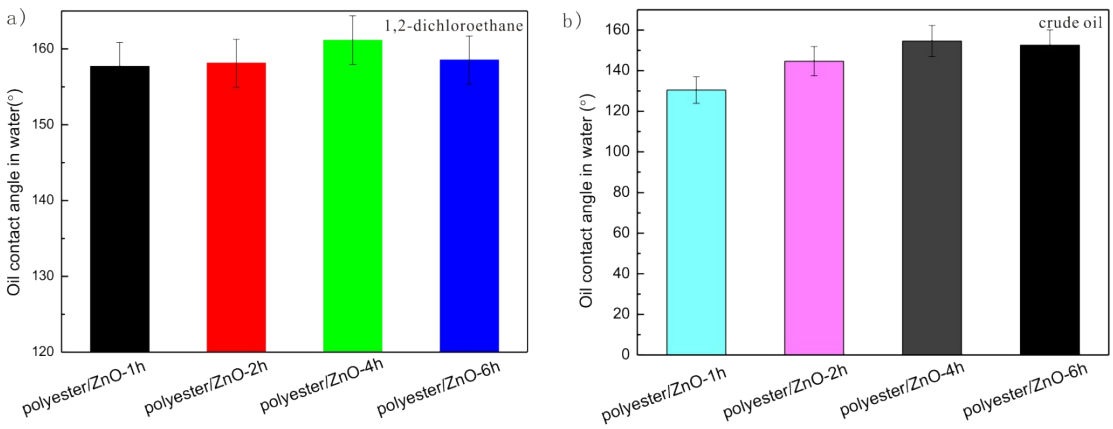

Figure S3. (a) The oil (1,2-dichloroethane) CAs in water of polyester/ZnO fabrics after hydrothermal reaction for different times. It could be observed that all the oil CAs in water were above 155º and the polyester/ZnO-4 h reached the maximum of 161.2º. It was clearly showed that the fabrics were superoleophobic underwater. (b) The oil (crude oil) CAs in water of polyester/ZnO fabrics after hydrothermal reaction for different times. It showed that after coated with the ZnO, the CAs in water was increased. Besides, it also showed that the polyester/ZnO-4 h reached the maximum of 154.61º. Therefore, in this work, the hydrothermal reaction time was fixed at 4 h for later decoration.

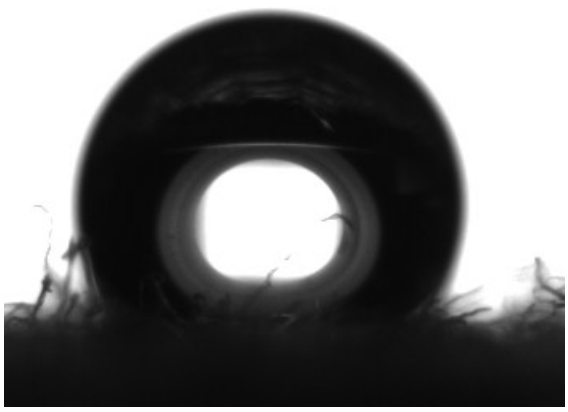

Figure S4. Water CA in air of polyester fabric. It showed that the polyester fabric was hydrophobic.

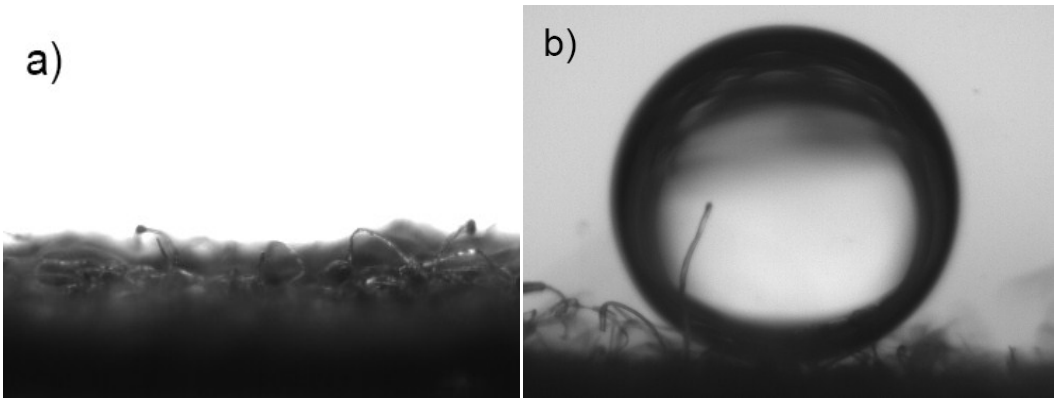

Figure S5. (a) Water CA in air of polyester/ZnO/PEI fabric was about zero after 10 oil-water mixture separation circles. It showed that even after 10 separation circles, polyester/ZnO/PEI still remained superhydrophilicity, so that water could infiltrate the fabric totally. (b) Oil (1,2-dichloroethane) CA in water of polyester/ZnO/PEI fabric after 10 oil-water mixture separation circles. It showed that polyester/ZnO/PEI still remained superoleophobicity after 10 separation circles.

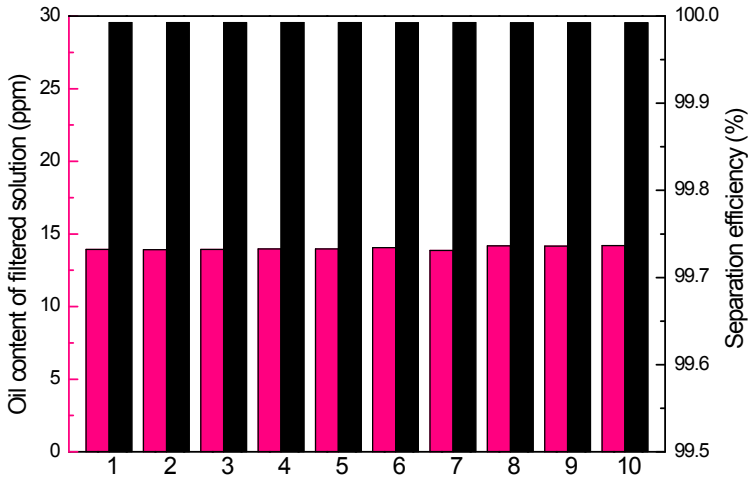

Figure S6 Oil content of filtered solution and the separation efficiency of polyester/ZnO/PEI fabric for each circle

Figure S7 after 10 separation circles, the polyester/ZnO/PEI fabric was easy-cleaning only by flow water fabric and still kept clean as origin, it was shown that the fabric have excellent stability.

The test about the wettability of the fabrics by water were made as follows: put the end of the fabric (20*30mm) immersed in deionized water, recording the fabric adsorption capacity and the time that reached the equilibrium adsorption capacity simultaneously.

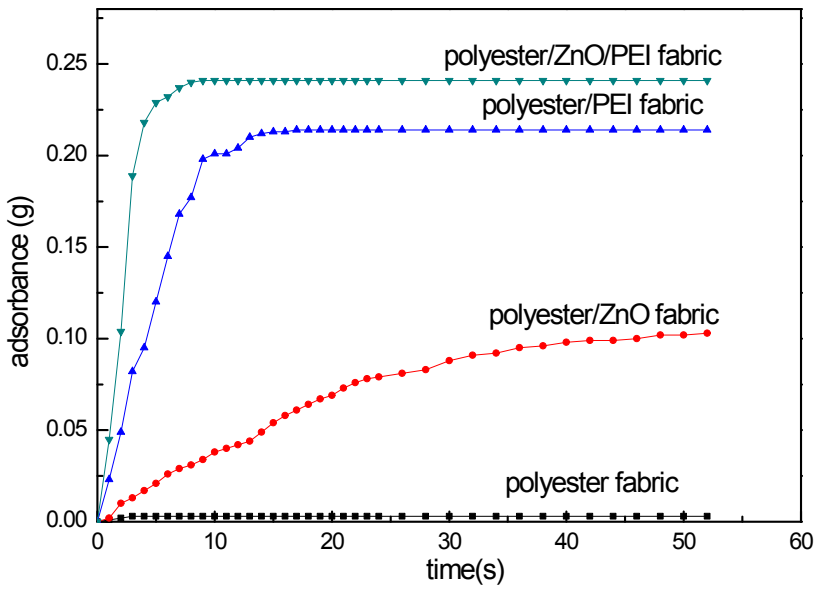

Figure S8 the wettability of different fabrics by water

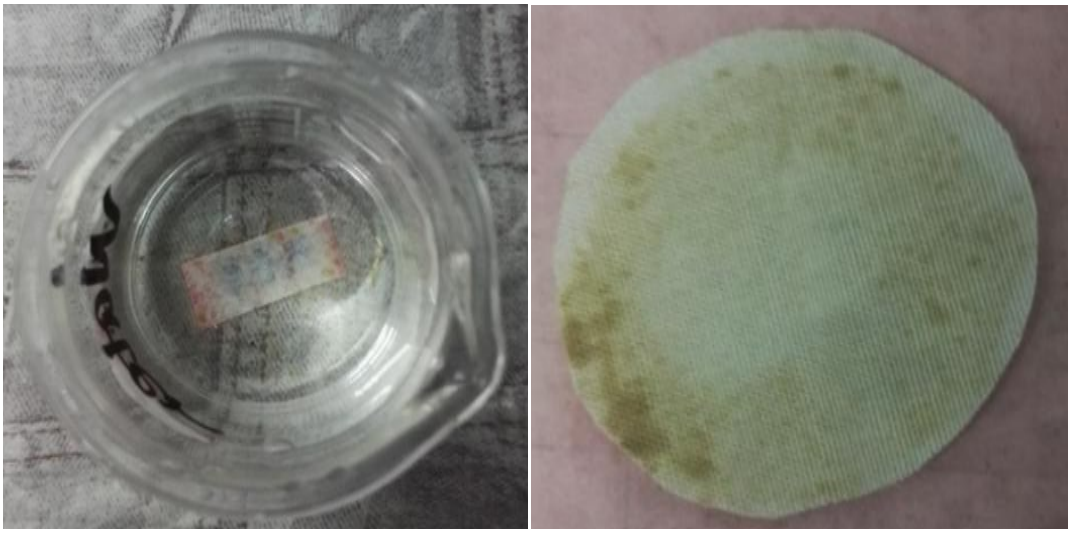

Figure S9 using polyester/PEI fabric for separation process, a) the oil droplet could be found in filtered solution and b) the fabric could not be cleaned by flowing water

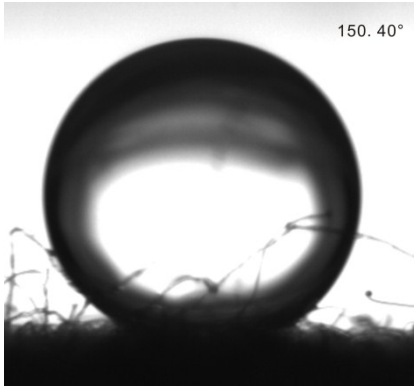

Figure S10 the oil (1,2-dichloroethane) CA under water of polyester/PEI fabric. It was lower than that of polyester/ZnO/PEI fabric.