Supporting Information

One-step fabrication of eco-friendly superhydrophobic fabrics for high-efficiency oil/water separation and oil spill cleanup

Haiyang Yu [a,#], Min Wu [b,#], Gaigai Duan [c], Xiao Gong*[a]

a. State Key Laboratory of Silicate Materials for Architectures, Wuhan University of Technology, Wuhan 430070, P. R. China.
b. Huaxi MR Research Center (HMRRC), Department of Radiology, Functional and Molecular Imaging Key Laboratory of Sichuan Province, West China Hospital, Sichuan University, Chengdu, 610041, China
c. Jiangsu Co-Innovation Center of Efficient Processing and Utilization of Forest Resources, International Innovation Center for Forest Chemicals and Materials, College of Materials Science and Engineering, Nanjing Forestry University, Nanjing, 210037, China.

* Corresponding author:

E-mail address: xgong@whut.edu.cn (X. Gong)

# equal contribution

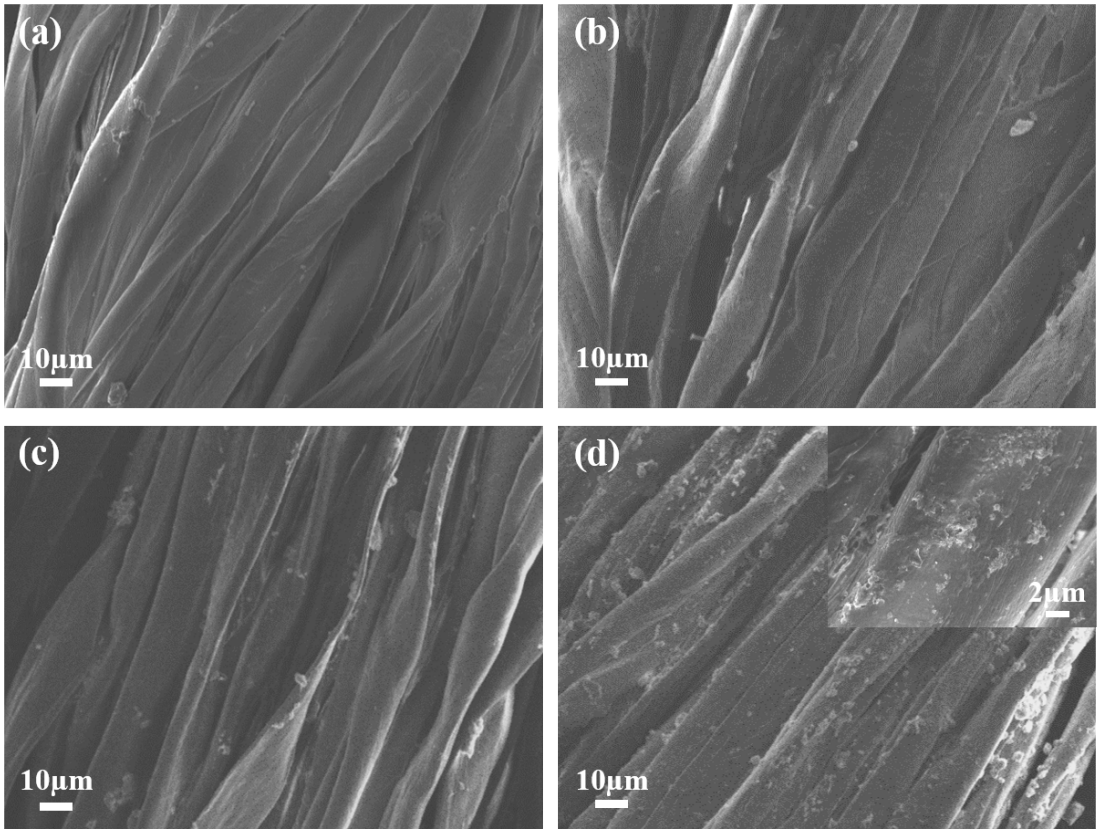

Figure S1. SEM images of the coated fabrics with different SiO_2 concentrations: (a) 0, (b) 2.5 mg/mL, (c) 5 mg/mL and (d) 10 mg/mL (the inset shows the enlarged image).

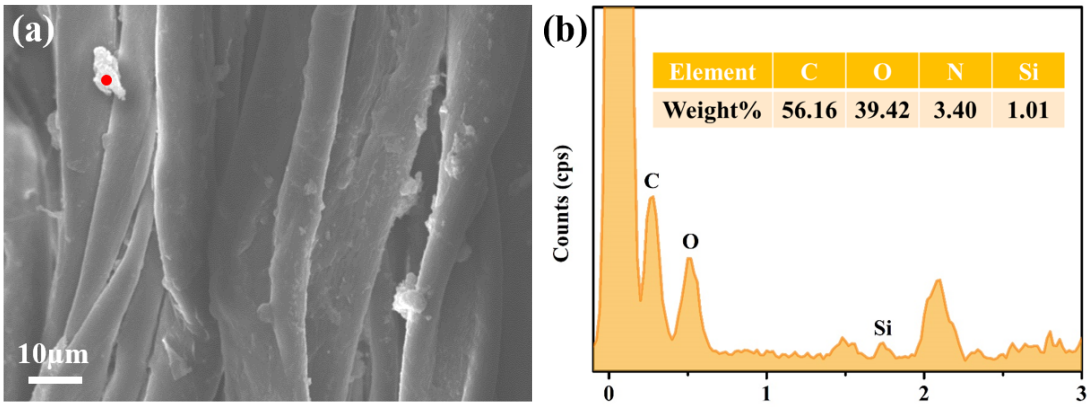

Figure S2. (a) Point scan and (b) EDS spectrum of the coated fabric.

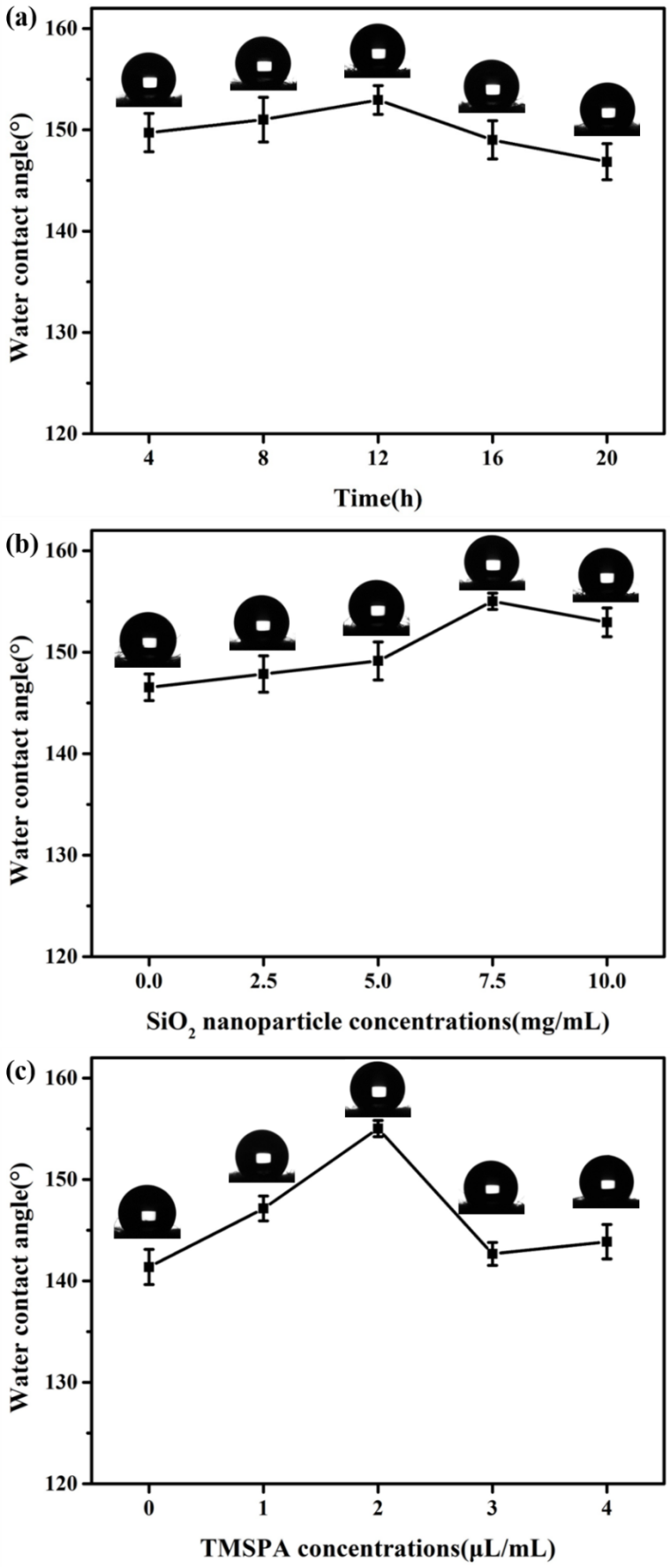

Figure S3. Effect of (a) reaction time, (b) SiO_2 nanoparticle concentrations and (c)

TMSPA concentrations on WCA of the coated fabric. (The concentration of SiO_2 nanoparticles was set at 10 mg/mL and TMSPA was 2 μL/mL, and the relationship between reaction time and WCA was studied. The reaction time was set as 12 h and TMSPA concentration was 2 μL/mL, and the effect of SiO_2 nanoparticles concentration on WCA of the coated fabric was investigated. At the same time, the reaction time was set as 12 h, and the concentration of SiO_2 nanoparticles was 7.5 mg/mL to study the effect of TMSPA concentration on the coated fabric WCA.)

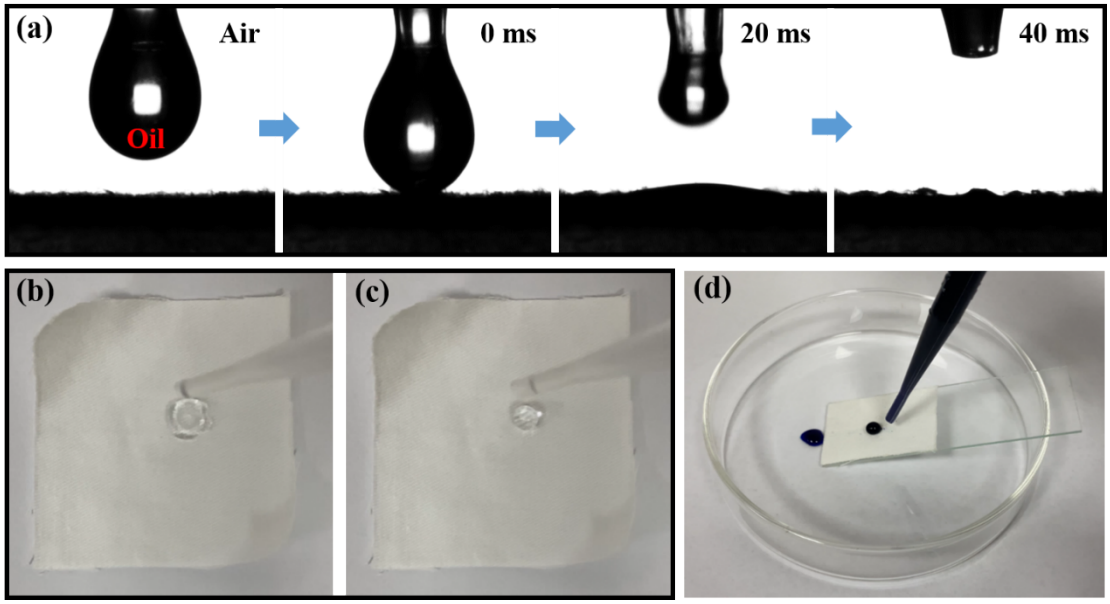

Figure S4. (a) Continuous image of oil droplets rapidly infiltrating coated fabric in air. (b) The water drop first deforms into a flat pie shape at the moment of contact with the coated fabric, (c) and then returns to a sphere. (d) Water was dropped onto the surface of the coated fabric after oil contamination to assess the superhydrophobic ability.

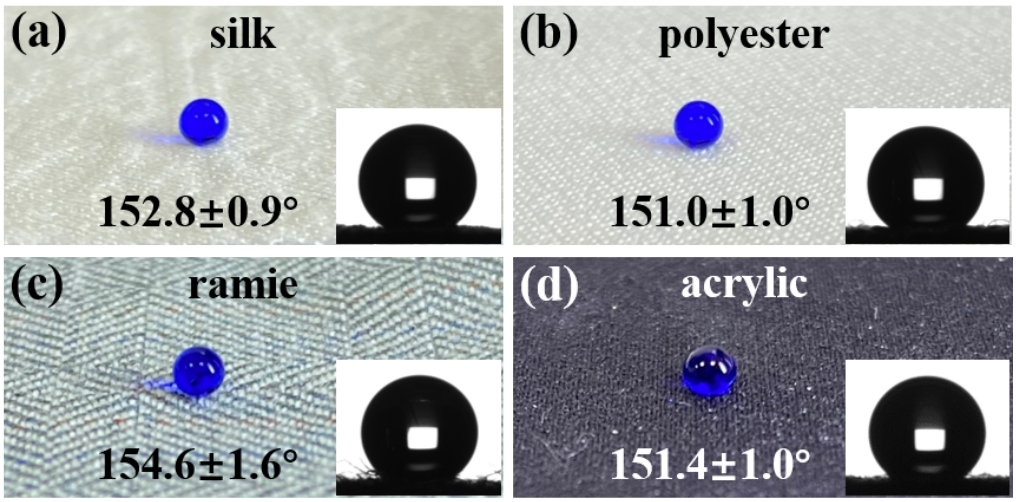

Figure S5. Photographs of water droplets (dyed using methyl blue) on the superhydrophobic (a) silk, (b) polyester, (c) ramie and (d) acrylic. Insets in panels (a-d)

are the corresponding WCAs.

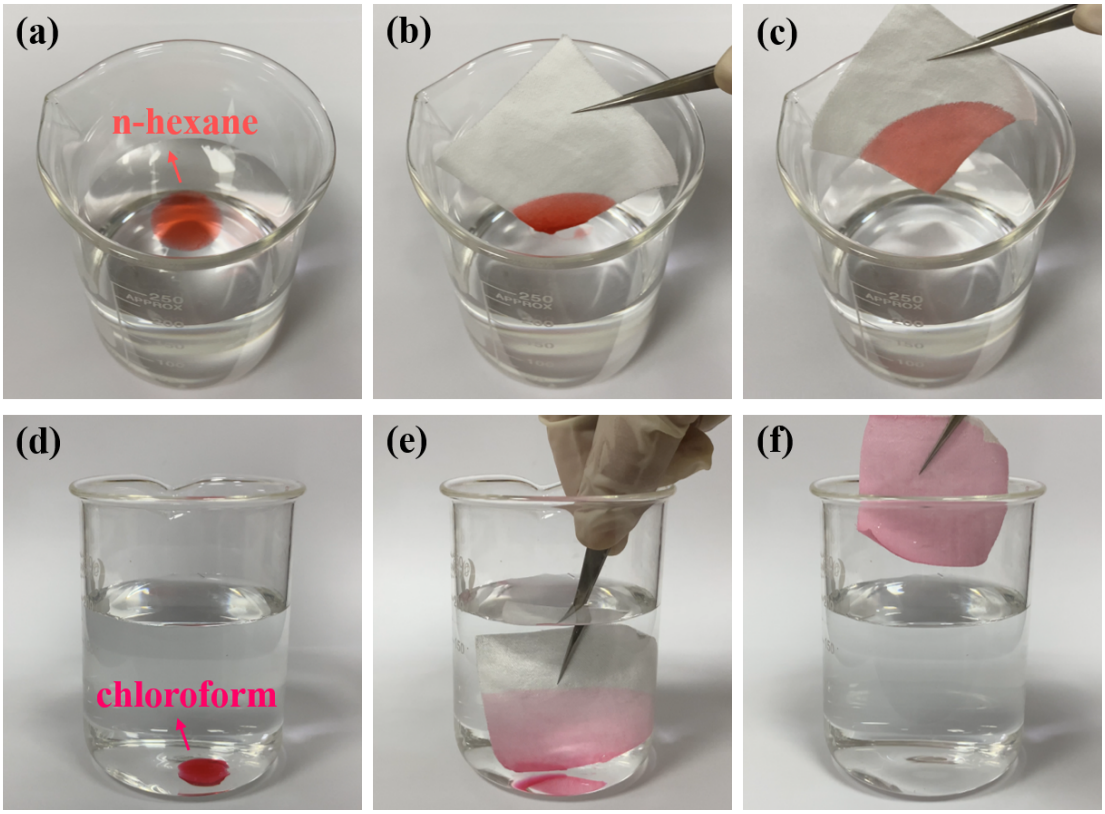

Figure S6. Photographs of selective absorption of (a-c) n-hexane and (d-f) chloroform from water using the coated fabrics, respectively.

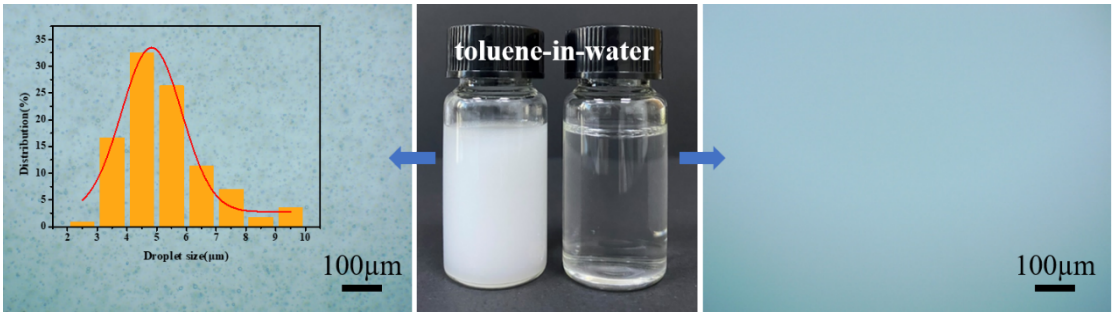

Figure S7. Photographs and optical microscope images of toluene-in-water emulsion before (left) and after separation (right). The droplet size distribution of oil droplets in toluene-in-water emulsion before separation (left).

Movie S1: Separation process of oil/water mixtures using superhydrophobic fabric.
Movie S2: Load-bearing capacity of superhydrophobic mini boat on the surface of water.
Movie S3: Oil spill cleanup process of superhydrophobic mini boat.