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Supporting Information

Strong, Underwater Superoleophobic PNIPAM-Clay Nanocomposite Hydrogel

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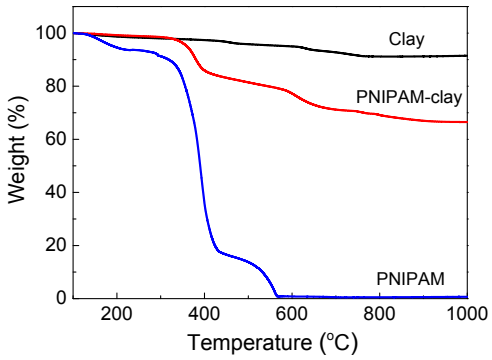

Fig. S1 TGA curves of clay, PNIPAM and dried PNIPAM-clay hydrogel, indicating that the mass ratio of clay and PNIPAM in the PNIPAM-clay gels is approximately 67:33.

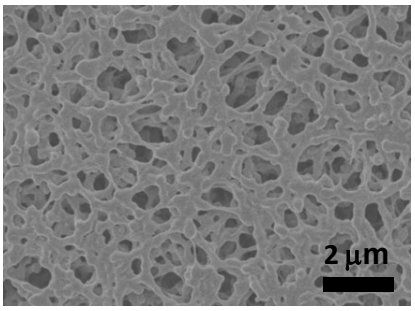

Fig. S2 SEM image of filter membrane surface, showing irregular interconnected micropores with size in the range of 100 nm to 2 μm.

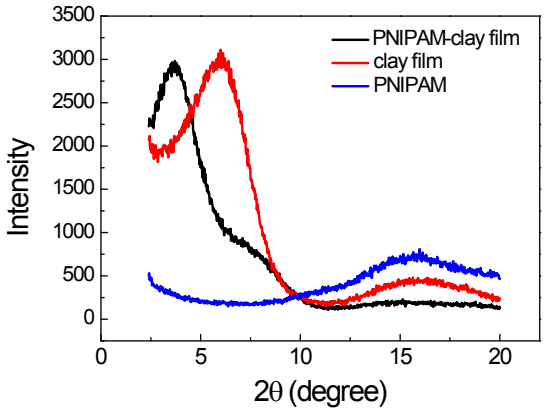

Fig. S3 Comparison of XRD curves of pure clay, PNIPAM and PNIPAM-clay nanocomposite hydrogel, revealing that the interlayer distance between clay platelets increase from 1.44 nm (2θ=6.1°) for pure clay to 2.32 nm (2θ=3.8°) for the nanocomposite hydrogel.

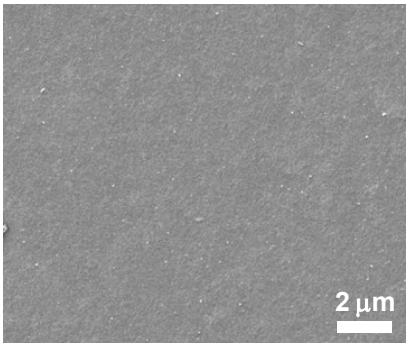

Fig. S4 The opposite surface of PNIPAM-clay hydrogel film, showing flat featureless morphology

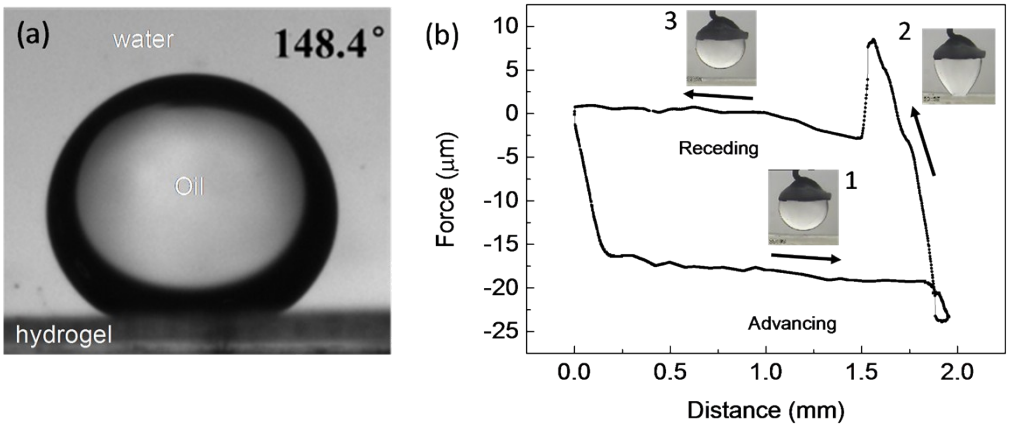

Fig. S5 (a) The shape of underwater oil droplet on the opposite surface of PNIPAM-clay hydrogel film, showing a contact angle of 148.4°. (b) Force-distance curve of underwater oil droplet on the surface. The inserted photograph 1, 2 and 3 are the shapes of oil droplets before contacted, during left and after left the hydrogel film, respectively. The detecting oil is 1, 2-dichloroethane.

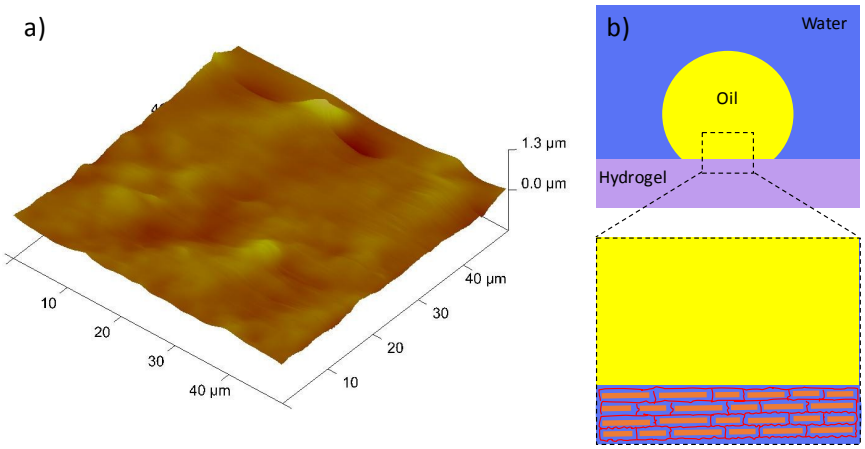

Fig. S6 (a) AFM image of the opposite surface of PNIPAM-clay nanocomposite hydrogel in water, which has an average root-mean-squared roughness of 103 nm. (b) Proposed wetting state, showing that water within the three-dimensional network of the hydrogel repels oil droplet and leads to oleophobic behavior.

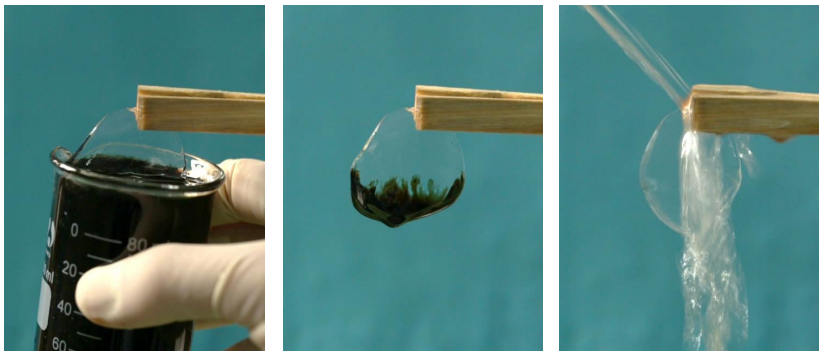

Fig. S7 Self-cleaning behavior of PNIPAM-clay nanocomposite hydrogel. The hydrogel was immersed into crude oil. The adherent crude oil was easily removed by a stream of water.

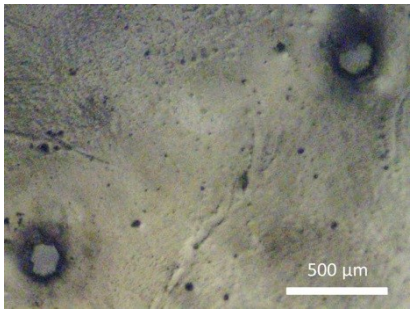

Fig. S8 Optical microscopy of the perforated hydrogel with the average pore diameter of 171 µm.