

# Preparation of Special Wettability Quartz Sand Filter Media and Its Synchronous Oil/Water Mixture Separation and Dye Adsorption

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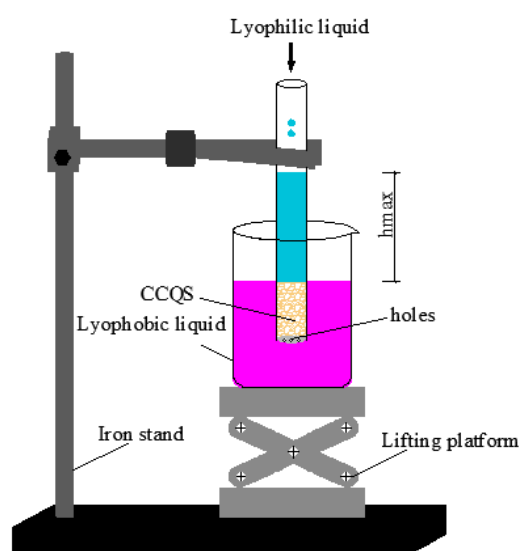
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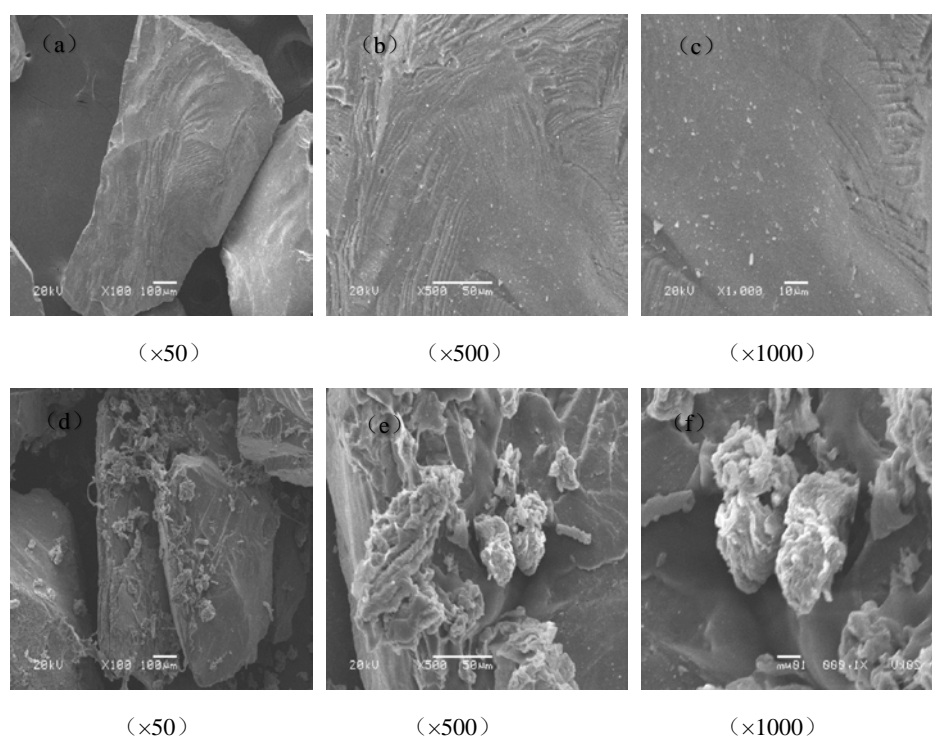
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## Supporting information

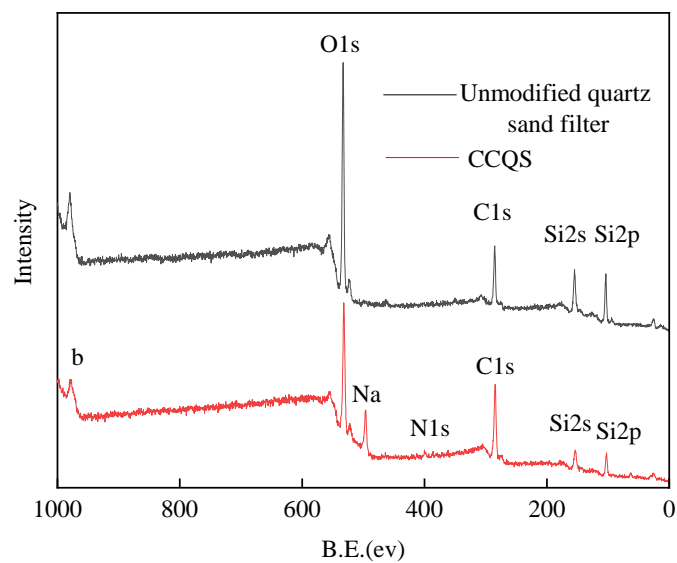
**Figure S1.** Diagram for intrusion pressure device. **Figure S2.** SEM images of (a-c) unmodified quartz sand; (d-f) CCQS. **Figure S3.** XPS spectra of Filter material. **Figure S4.** Separation device for oil and water mixture. **Figure S5.** The permeability coefficients of the water outlet and oil outlet when filtering different oils. **Figure S6.** Theoretical wetting model of superhydrophilic and underwater superoleophobic or superoleophilic and underoil superhydrophobic filter media. (a) In air, water can pass through superhydrophilic quartz sand; (b) in air, oil can pass through superoleophilic quartz sand; (c) underwater, oil cannot pass through underwater superhydrophobic quartz sand; (d) under oil, water cannot pass through underoil superhydrophobic quartz sand. **Figure S7.** Adsorption Kinetic fitting. **Figure S8.** Adsorption isotherm fitting.



**Figure S1.** Diagram for intrusion pressure device.



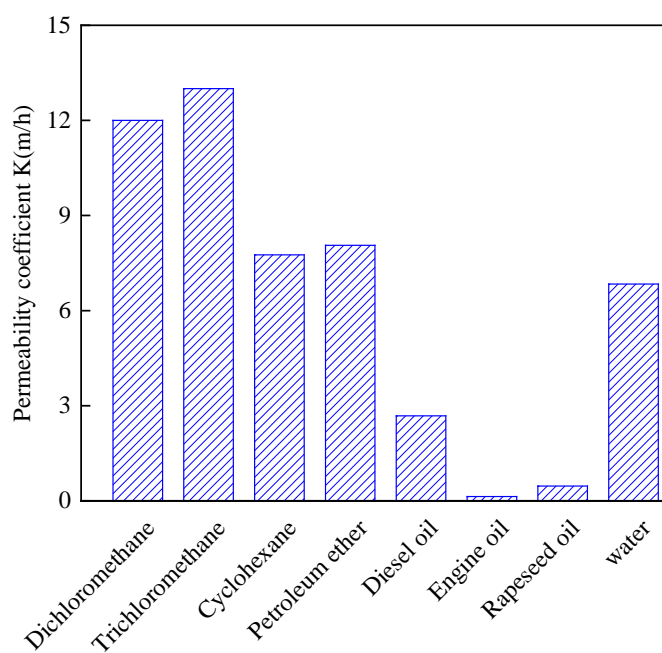
**Figure S2.** SEM images of (a-c) unmodified quartz sand; (d-f) CCQS.



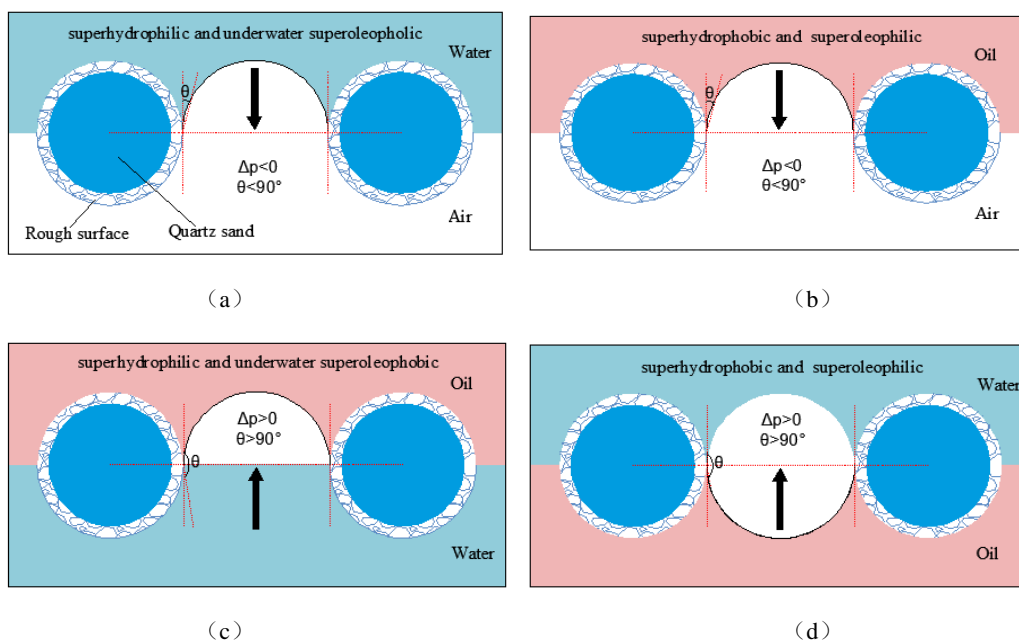
**Figure S3.** XPS spectra of Filter material.



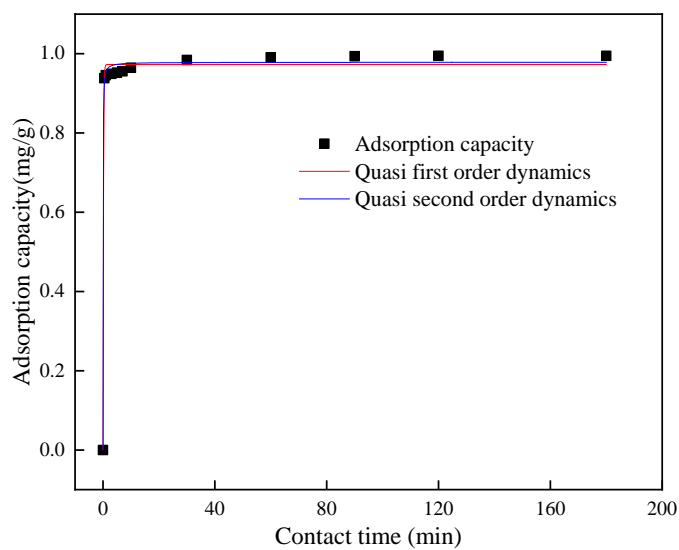
**Figure S4.** Separation device for oil and water mixture.



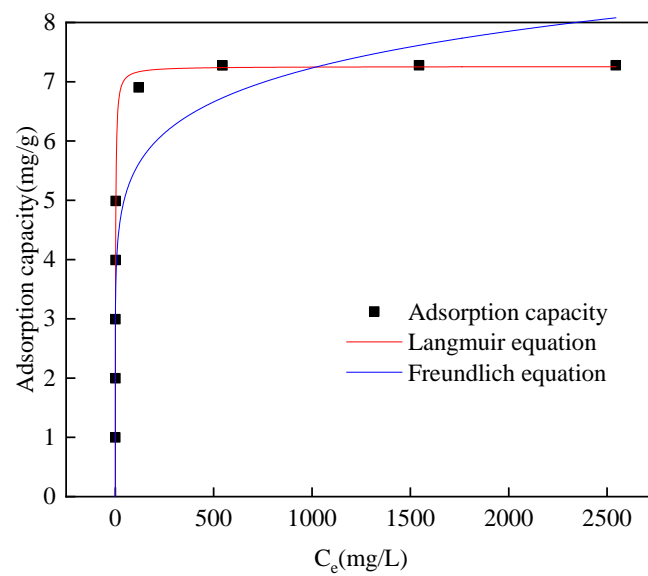
**Figure S5.** The permeability coefficients of the water outlet and oil outlet when filtering different oils.



**Figure S6.** Theoretical wetting model of superhydrophilic and underwater superoleophobic or superoleophilic and underoil superhydrophobic filter media. (a) In air, water can pass through superhydrophilic quartz sand; (b) in air, oil can pass through superoleophilic quartz sand; (c) underwater, oil cannot pass through underwater superhydrophobic quartz sand; (d) under oil, water cannot pass through underoil superhydrophobic quartz sand.



**Figure S7.** Adsorption Kinetic fitting.



**Figure S8.** Adsorption isotherm fitting.