

Article

Thermally Induced Silane Dehydrocoupling: Hydrophobic and Oleophilic Filter Paper Preparation for Water Separation and Removal from Organic Solvents

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1. Supporting Figures

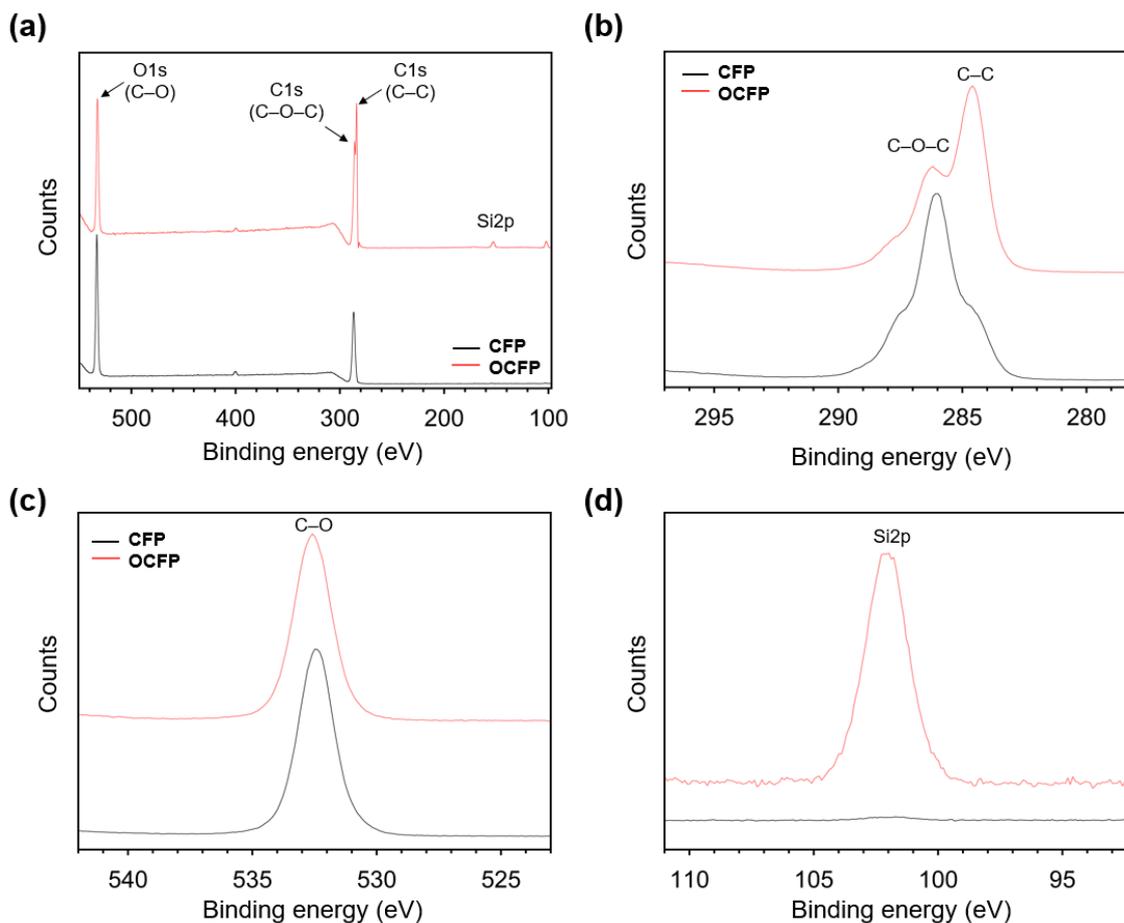


Figure S1. X-ray photoelectron spectroscopy (XPS) spectra of CFP and OCFP with the carbon, oxygen, and silicon signal. (a) Survey spectra, (b) High-resolution C1s spectra, (c) High-resolution O1s spectra, and (d) High-resolution Si2p spectra.

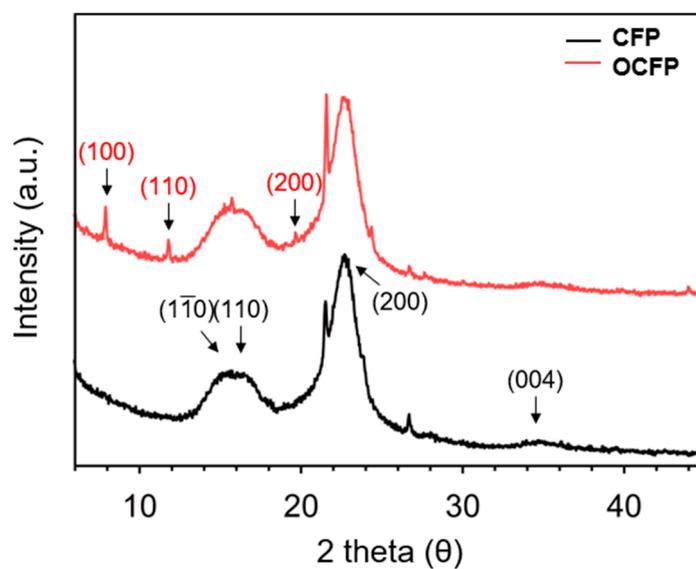


Figure S2. XRD analysis of CFP and OCFP.

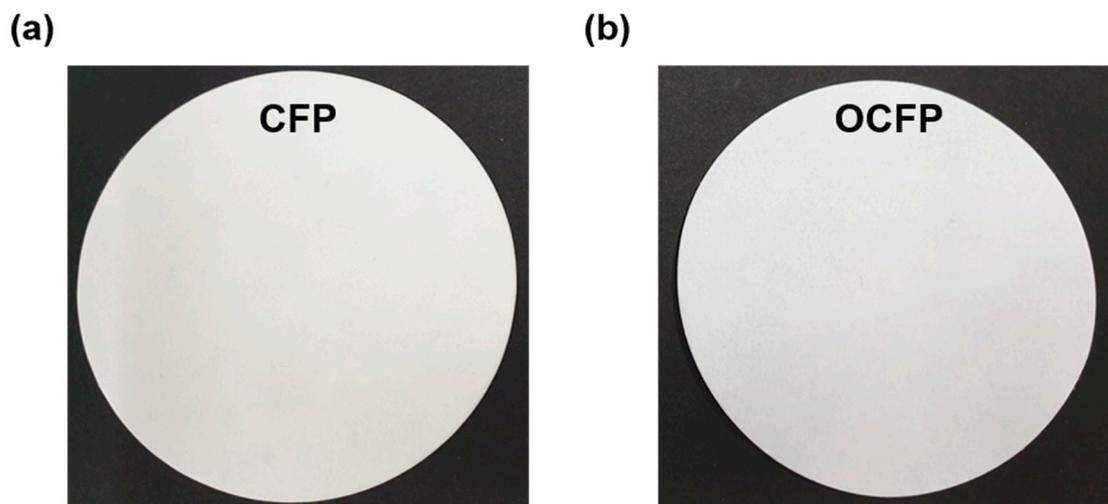


Figure S3. Representative photographs of (a) Cellulose-based filter paper (CFP) and (b) ODS-coated cellulose-based filter paper (OCFP). The diameter of filter papers is 70 mm.

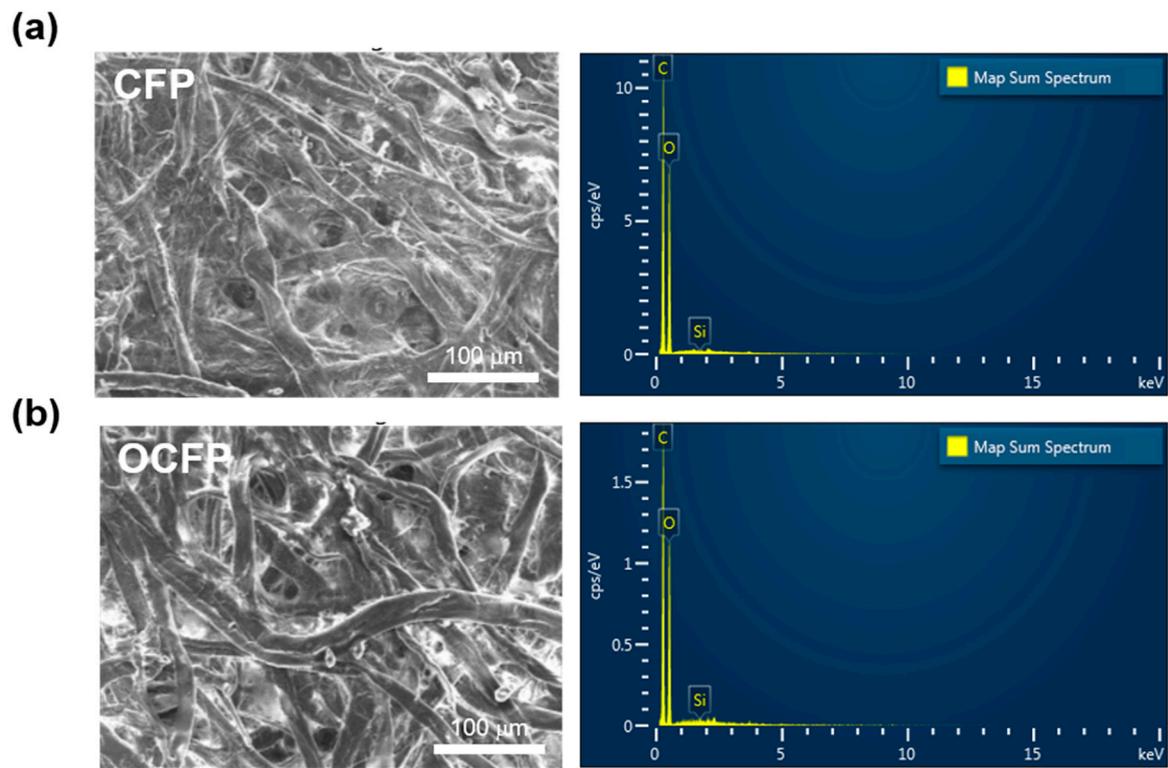


Figure S4. Scanning electron microscope (SEM) images and elemental (EDX) data of (a) CFP and (b) OCFP. The scale bar is 100 μm.

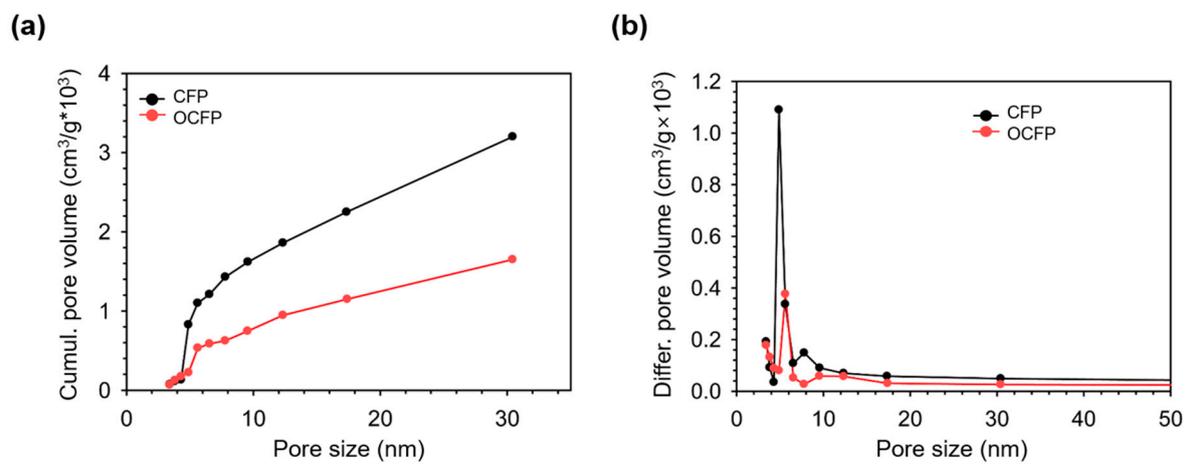


Figure S5. Porous properties of CFP and OCFP. (a) Cumulative pore volume and (b) Pore size distribution N₂ adsorption rate.

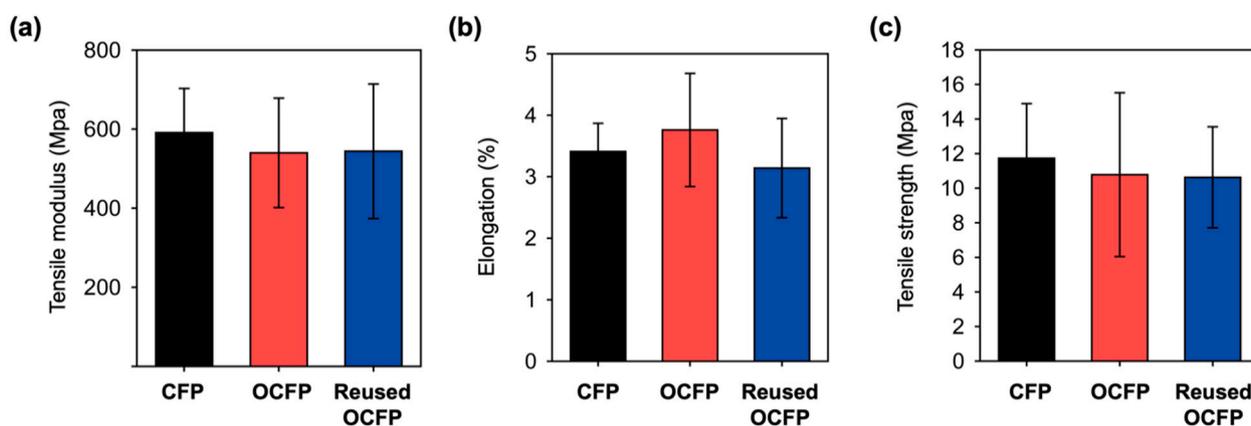


Figure S6. Universal Testing Machine (UTM) results of CFP, OCFP, and reused OCFP. (a) Tensile modulus, (b) Elongation at compliance, (c) Tensile strength.

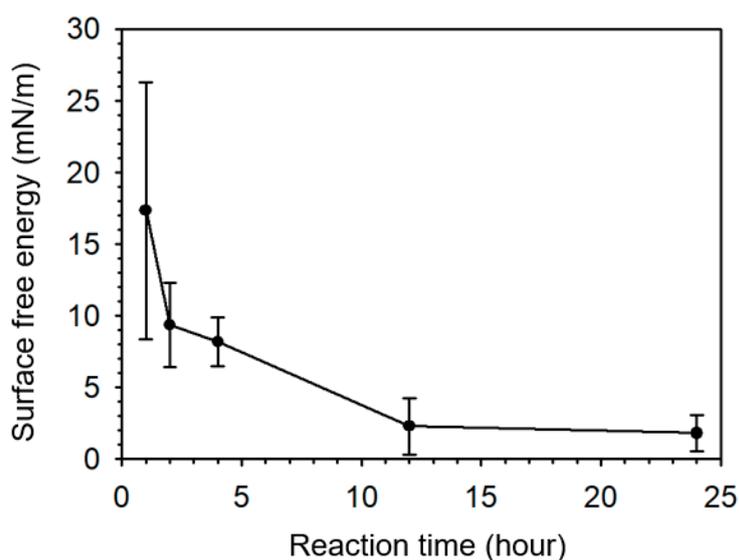


Figure S7. Variation of surface free energy of OCFP as reaction time.

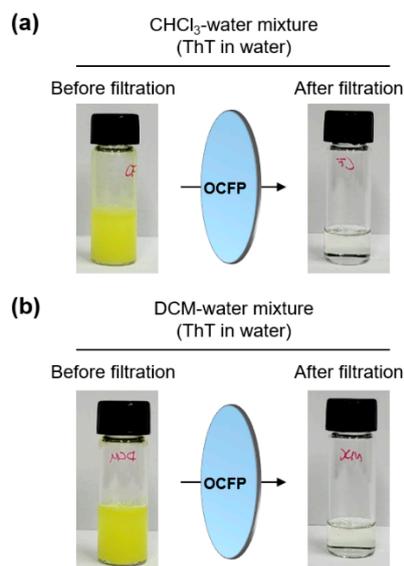


Figure 8. Separation of the oil-water mixture using OCFP. The CHCl₃ and DCM mixed with D.W. (with 0.01% ThT).

2. Supporting Tables

Table S1. The atomic ratio of C, O, and Si in CFP and OCFP obtained from EDX.

| Sample | C (%) | O (%) | Si (%) | Total (%) |
|--------|-------|-------|--------|-----------|
| CFP | 55.27 | 44.73 | 0 | 100 |
| OCFP | 56.10 | 43.80 | 0.1 | 100 |

Table S2. Mechanical properties of CFP, OCFP, and reused OCFP. All tests were conducted with the specimen size of 30 mm × 0.16 cm (area: 4.80 mm²).

| Sample | Tensile Modulus (MPa) | Elongation at Compliance (%) | Tensile Strength (MPa) |
|-------------|-----------------------|------------------------------|------------------------|
| CFP | 591 | 3.41 | 11.73 |
| OCFP | 540 | 3.76 | 10.78 |
| Reused OCFP | 544 | 3.14 | 10.63 |