

Article

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

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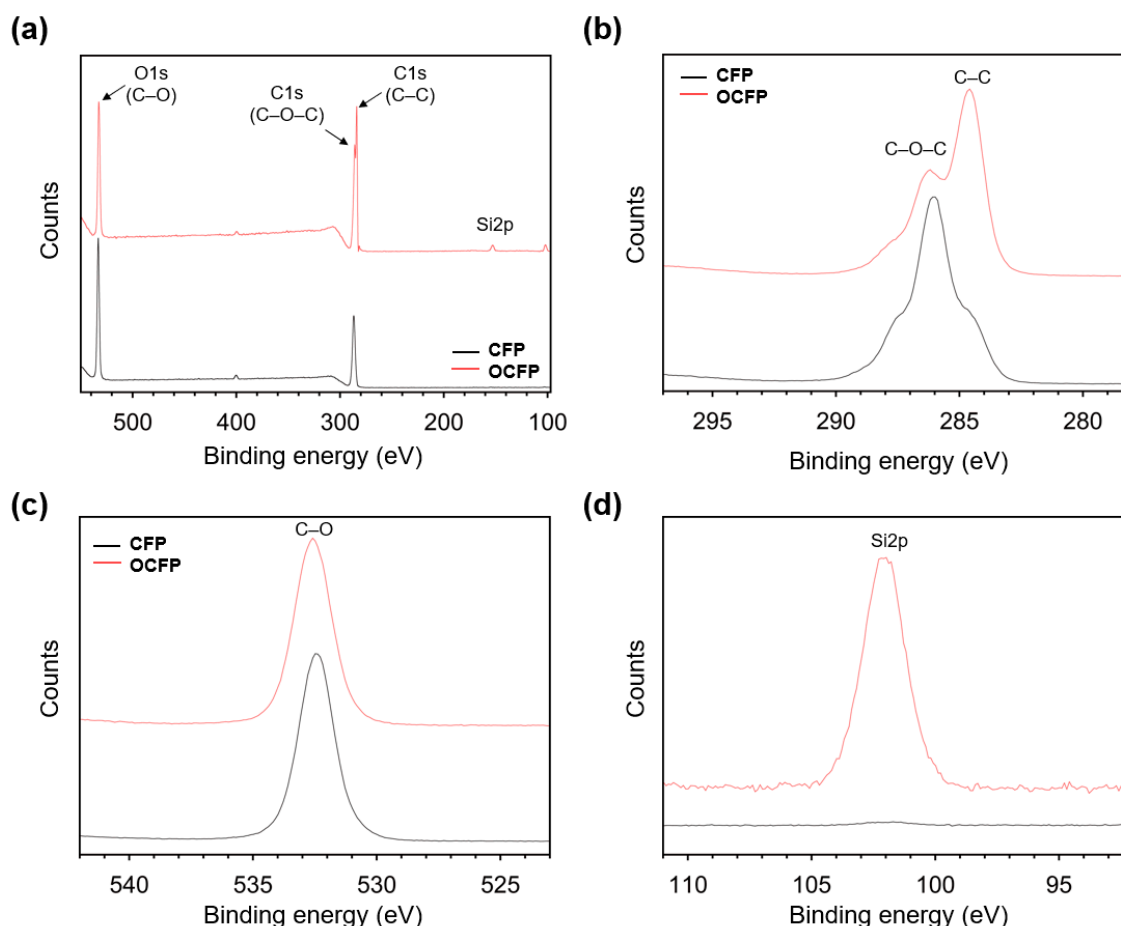
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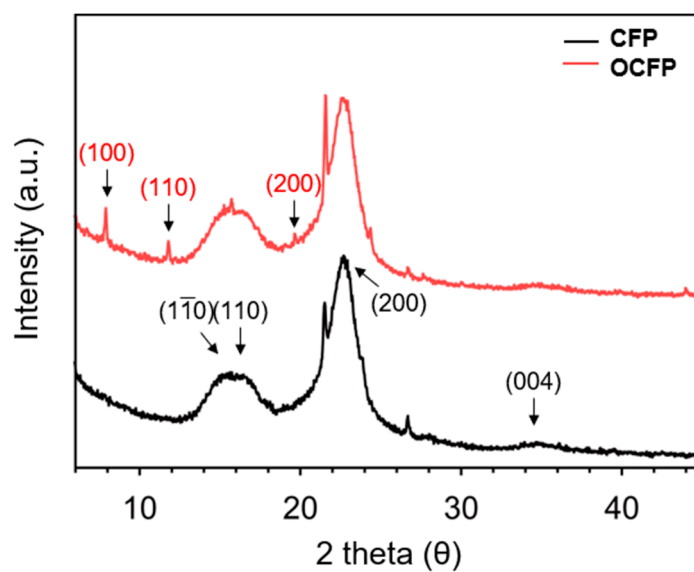
## This file includes:

1. Supporting Figures: Figure S1 to S8
2. Supporting Tables: Table S1 to S2

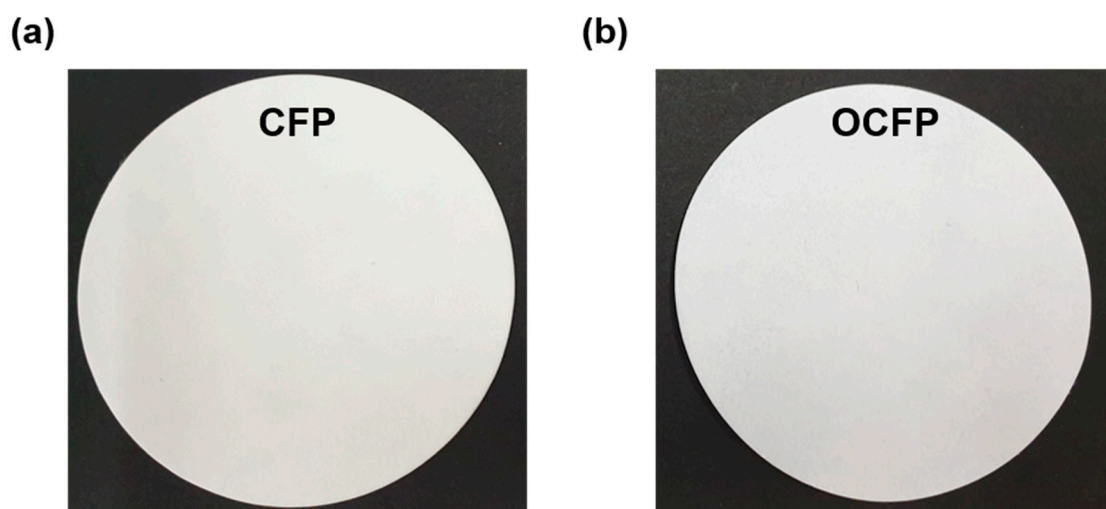
## 1. Supporting Figures



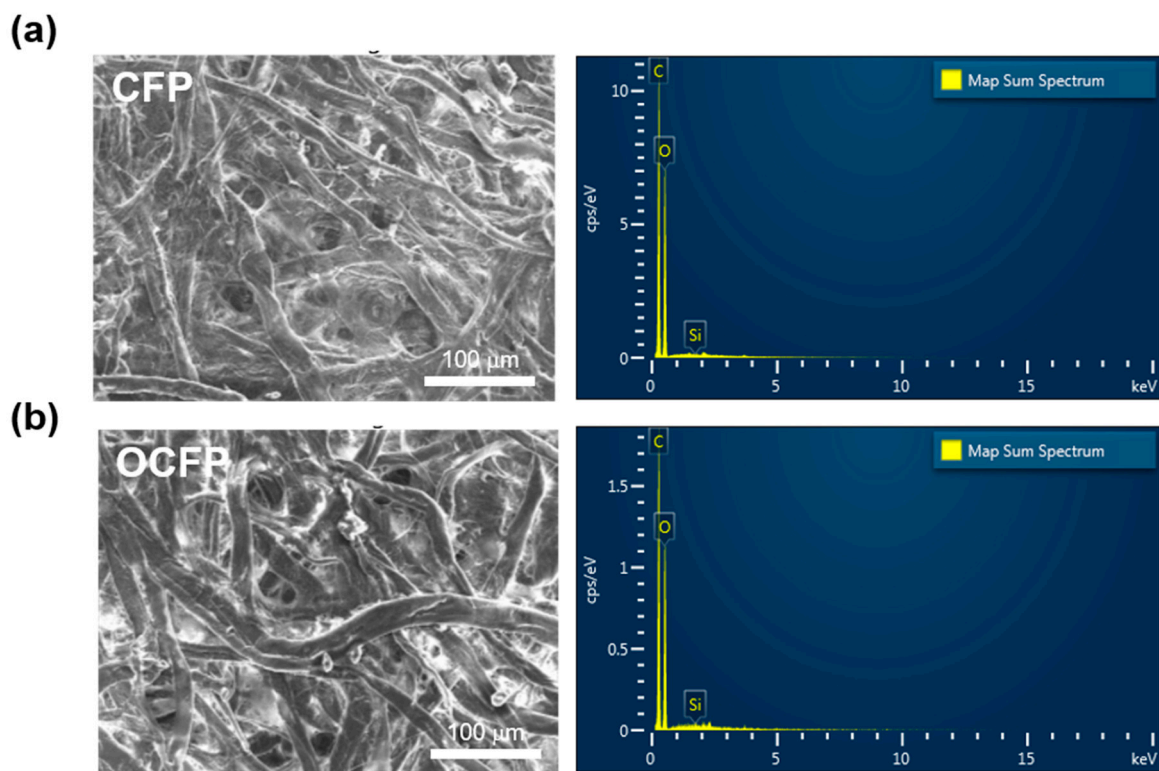
**Figure S1.** X-ray photoelectron spectroscopy (XPS) spectra of CFP and OCFP with the carbon, oxygen, and silicon signal. (a) Survey spectra, (b) High-resolution C1s spectra, (c) High-resolution O1s spectra, and (d) High-resolution Si2p spectra.



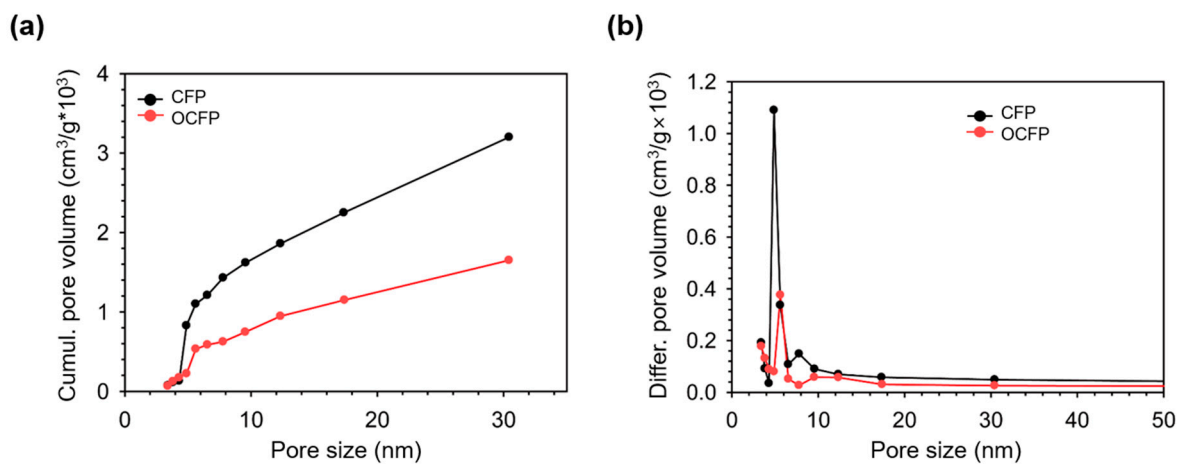
**Figure S2.** XRD analysis of CFP and OCFP.



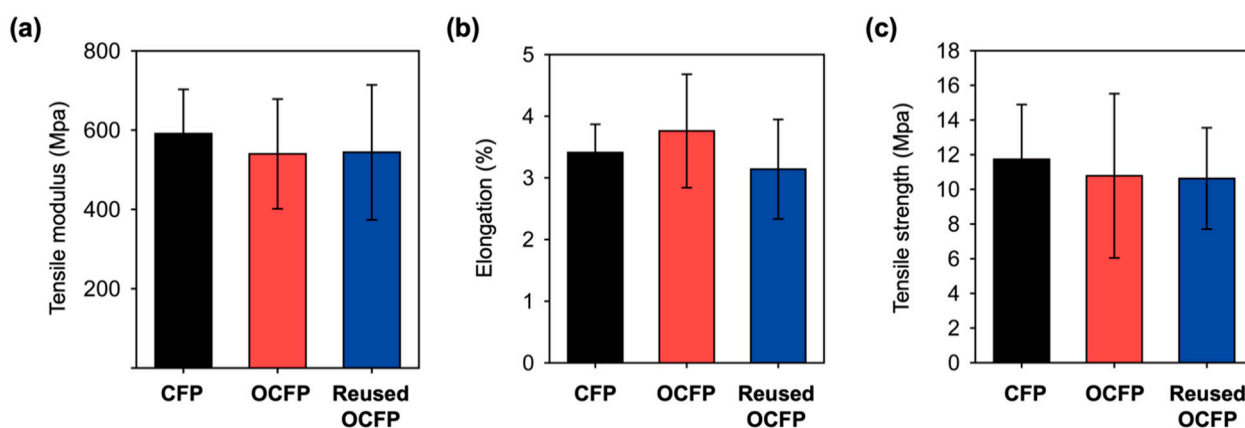
**Figure S3.** Representative photographs of (a) Cellulose-based filter paper (CFP) and (b) ODS-coated cellulose-based filter paper (OCFP). The diameter of filter papers is 70 mm.



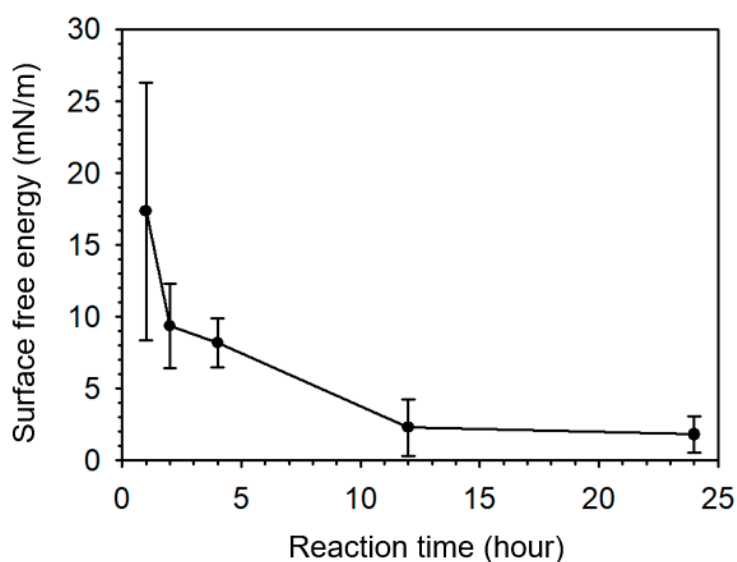
**Figure S4.** Scanning electron microscope (SEM) images and elemental (EDX) data of (a) CFP and (b) OCFP. The scale bar is 100  $\mu\text{m}$ .



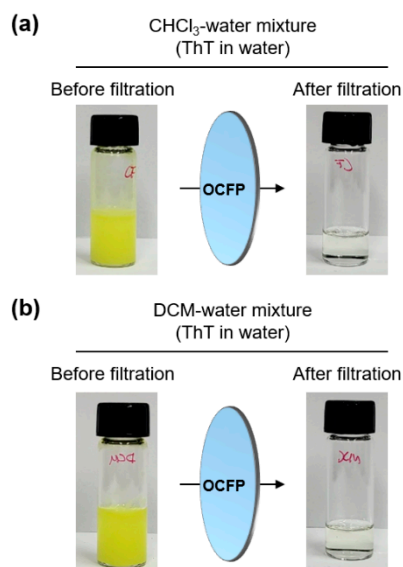
**Figure S5.** Porous properties of CFP and OCFP. (a) Cumulative pore volume and (b) Pore size distribution N<sub>2</sub> adsorption rate.



**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 CHCl<sub>3</sub> 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 mm<sup>2</sup>).

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