



Article

Sustainable Plant-Based Biopolymer Membranes for PEM Fuel Cells

Supplementary Materials

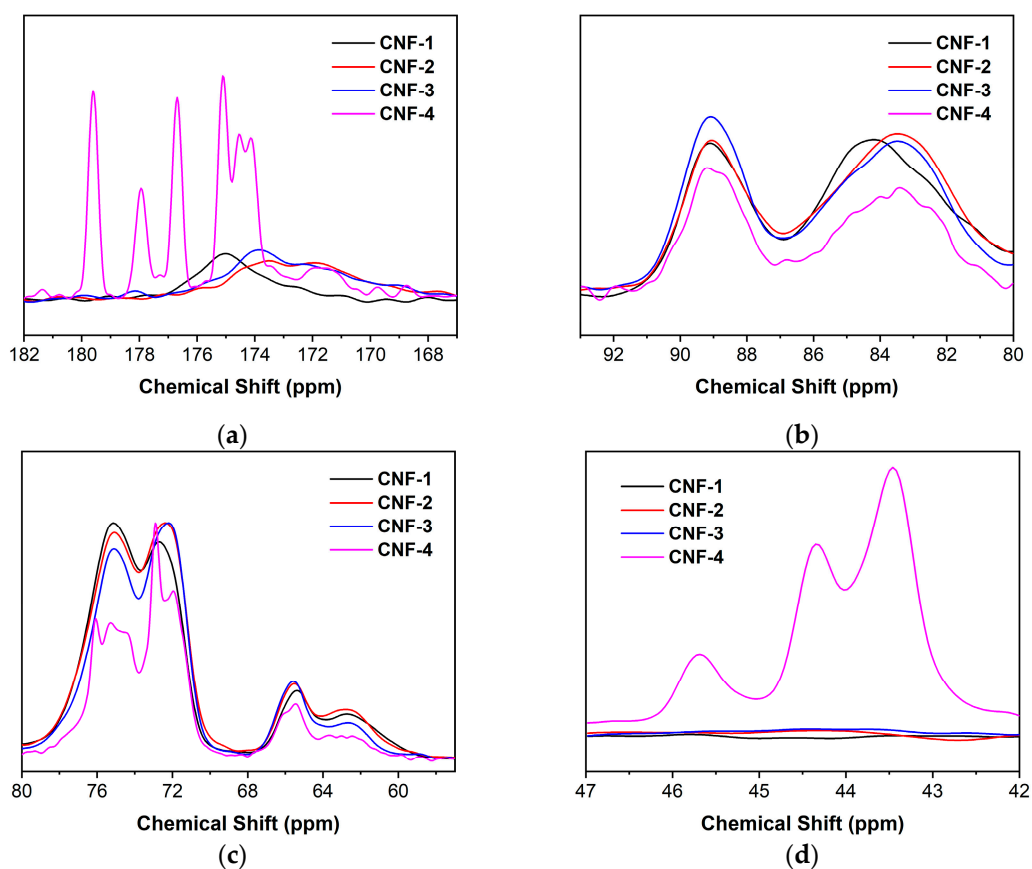


Figure S1. Zoom in of ^{13}C CPMAS NMR spectra of CNF membranes (a) 182–167 ppm, (b) 93–80 ppm, (c) 80–57 ppm, (d) 47–42 ppm.

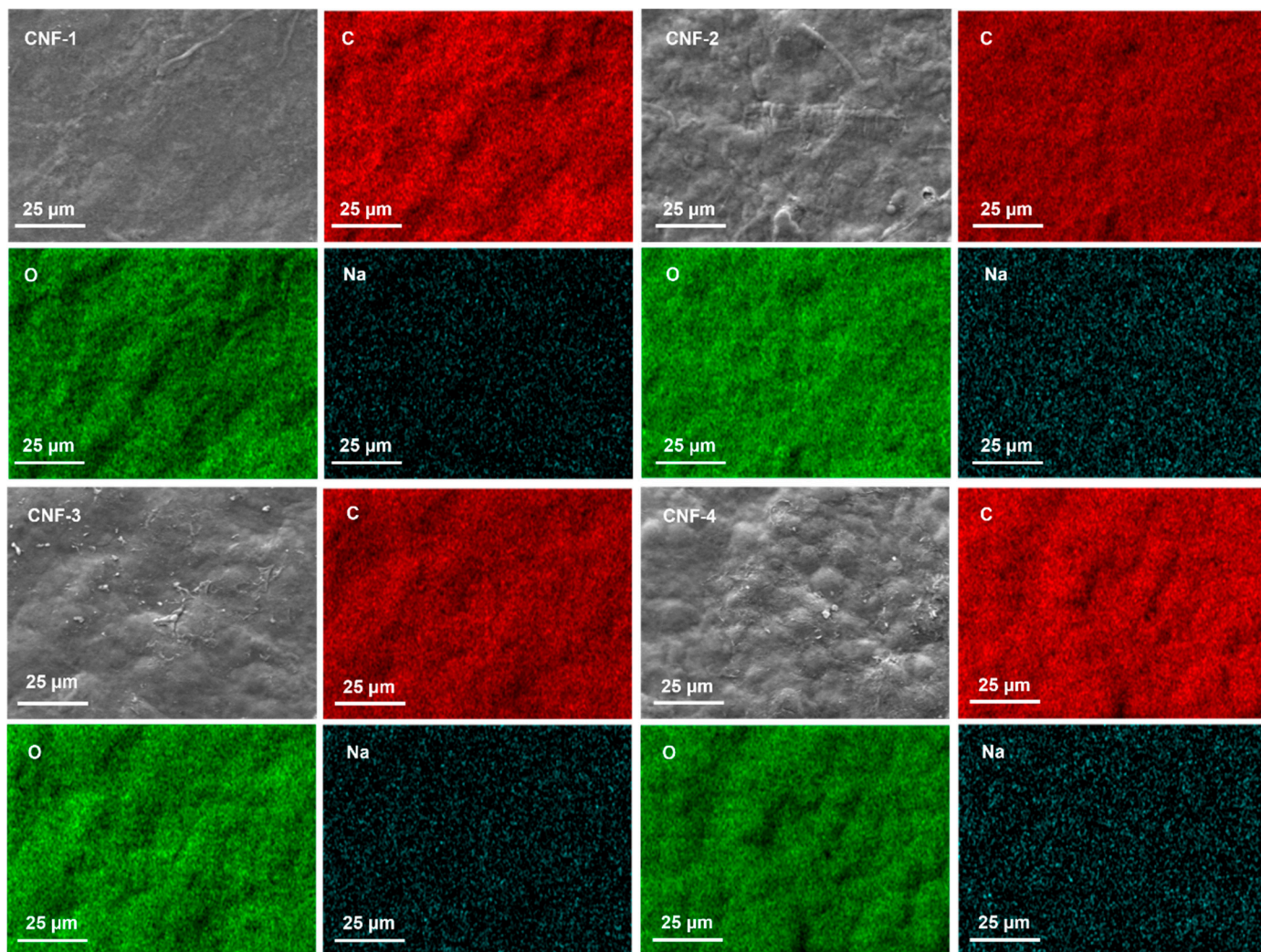
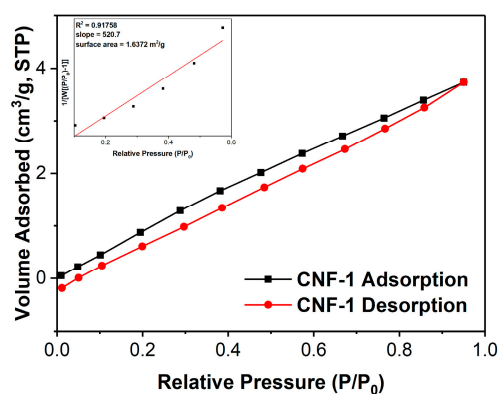
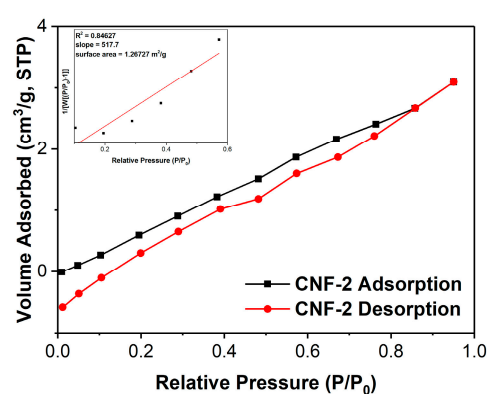


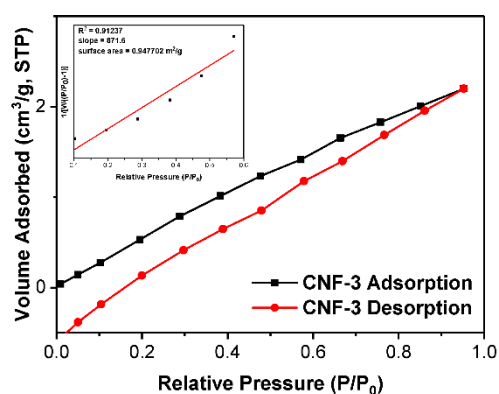
Figure S2. CNF membrane SEM and EDX images of the surface-exposed side during solvent casting.



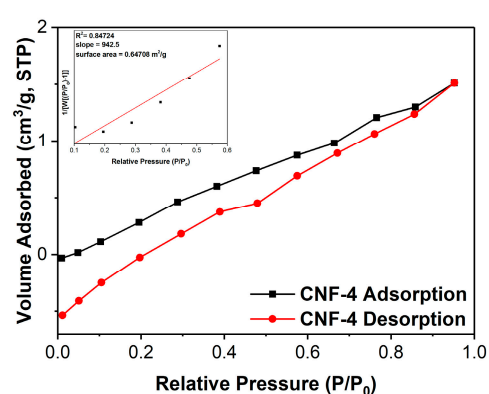
(a)



(b)



(c)



(d)

Figure S3. Individual BET isotherms with linear fit (inset) of CNF membranes, (a) CNF-1, (b) CNF-2, (c) CNF-3, (d) CNF-4.

Table S1. Crystallinity Index (CI) of CNF membranes estimated by “Segal Method”.

Crystallinity Index	
CNF-1	76%
CNF-2	74%
CNF-3	80%
CNF-4	75%