

*Supporting Information*

## **Mechanically Durable, Superhydrophobic, and Flame-Retardant Wood Fabricated via Hierarchical Hybrid Solution Impregnation**

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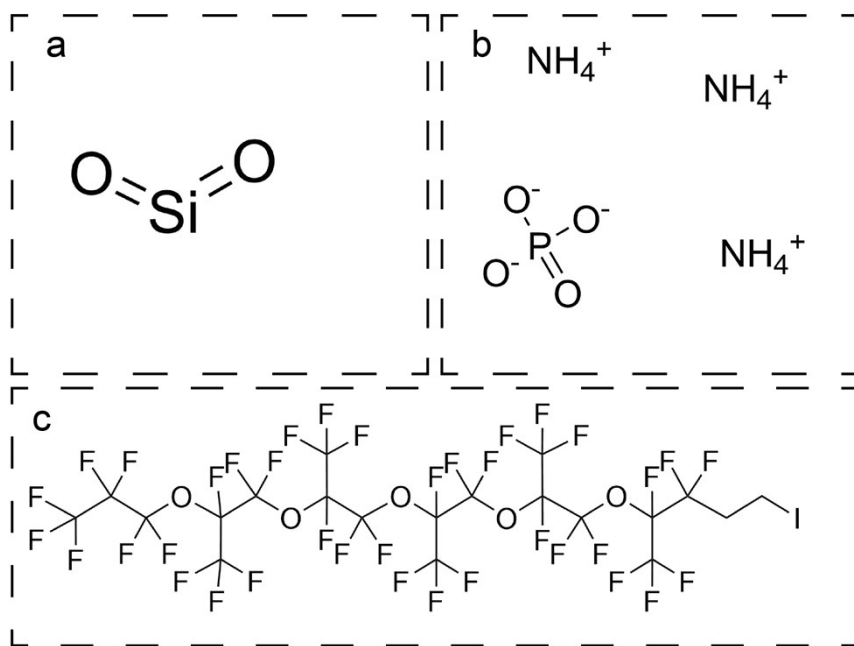


Figure S1. The chemical structural formulas of SiO<sub>2</sub> (a), APP (b) and PFDTES (c).

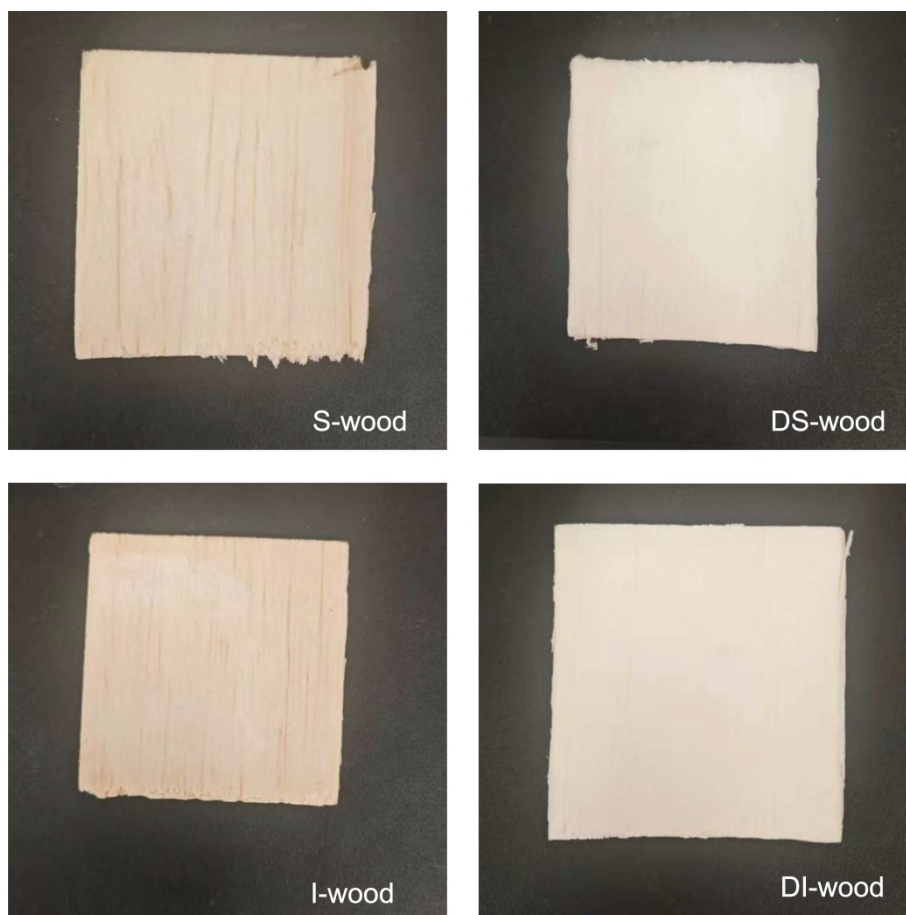


Figure S2. The optical photographs of wood sample.

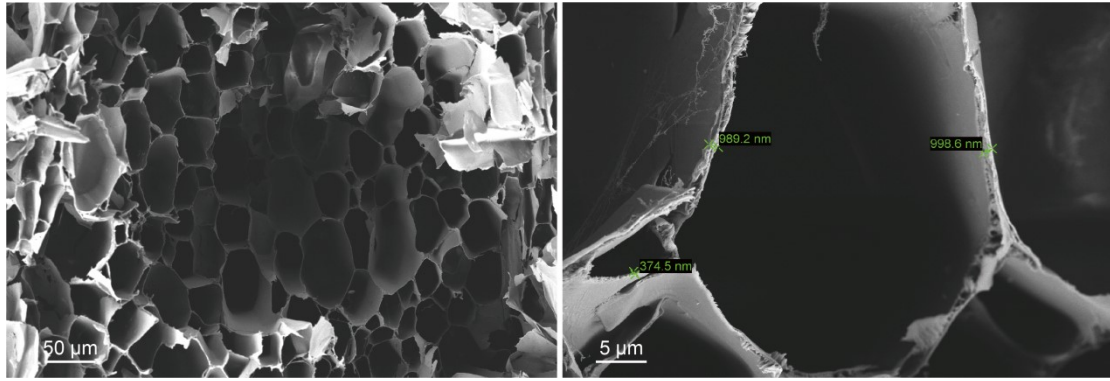


Figure S3. The SEM images of D-wood.

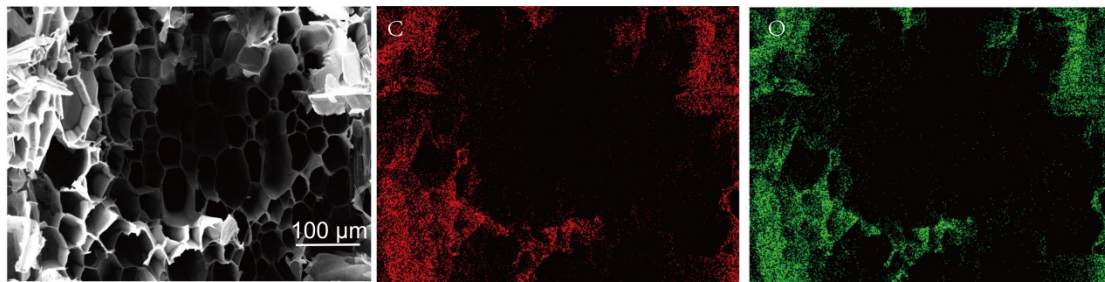


Figure S4. EDS mapping of D-wood.



Figure S5. Digital photograph demonstrating the self-floating behavior of DI-wood.

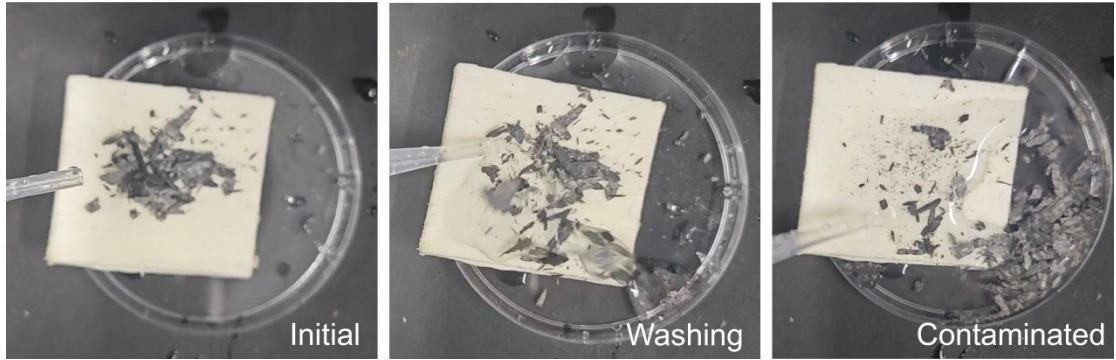


Figure S6. Self-cleaning test of DS-wood using continuous water droplets to rinse a surface contaminated with carbon particles.

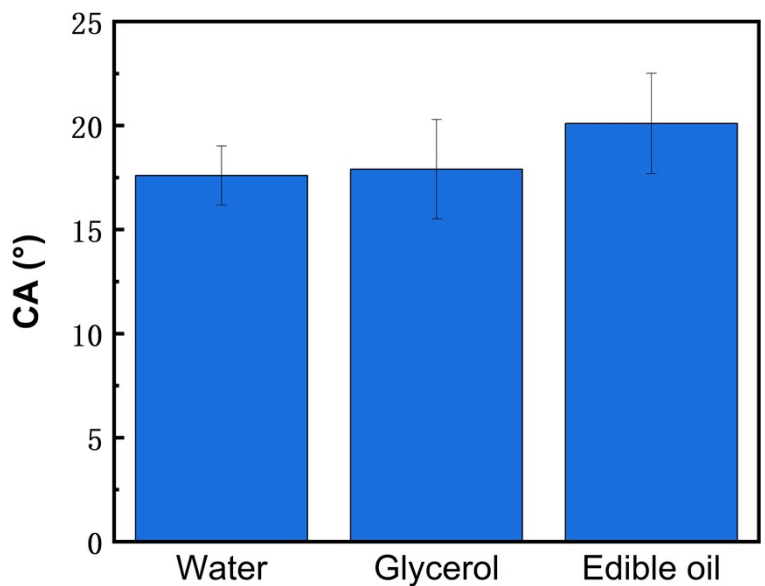


Figure S7. CA of DI-wood.

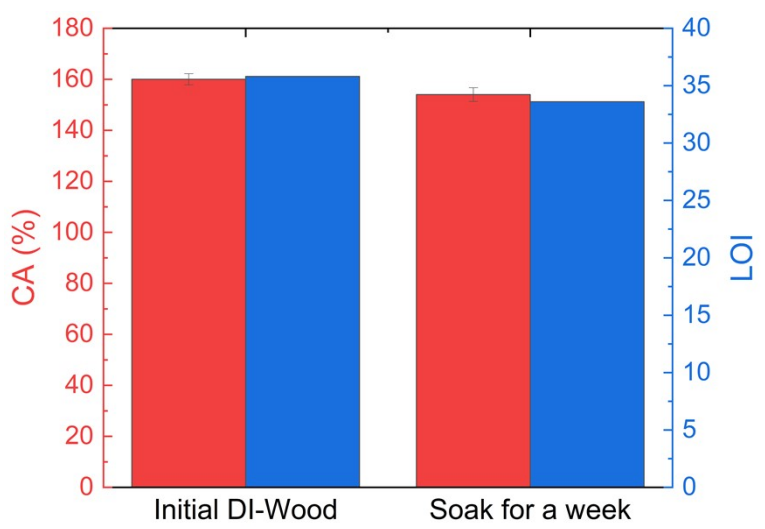


Figure S8. Immersion Resistance of DI Wood.

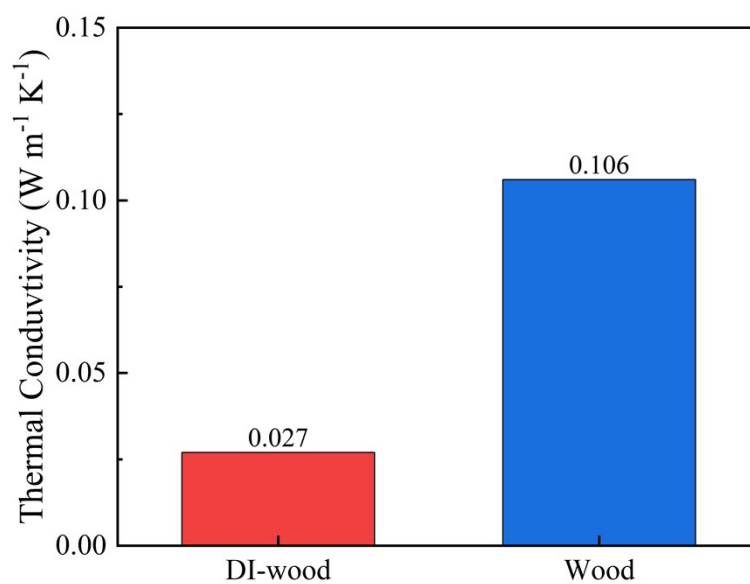


Figure S9. The thermal conductivity of DI-wood.

Table S1 the extent of the delignification of D-Wood

Moisture Content (%)	Oven-dry Density (g cm <sup>-3</sup> )	removal degree (%)
12.8±1.5	0.118±0.008	24.6±2.4

Table S2 elemental semi-quantitative results of DI-Wood

Map Sum Spectrum	Element	Line Type	Weight %	Weight % Sigma	Atomic %
	C	K series	18.63	0.26	26.68
	N	K series	3.24	0.20	3.98
	O	K series	31.44	0.17	33.81
	F	K series	24.75	0.16	22.41
	Si	K series	16.09	0.09	9.86
	P	K series	5.85	0.06	3.25
	Total		100.00		100.00