

Supporting Information

Coating of Wood with Fe₂O₃-Decorated Carbon Nanotubes by One-Step Combustion for Efficient Solar Steam Generation

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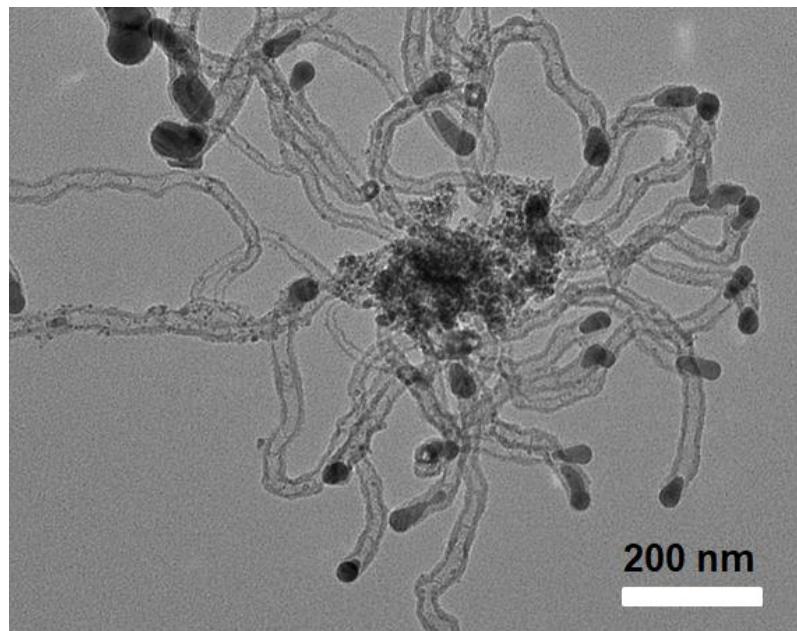


Figure S1. TEM image of the Fe₂O₃/CNT formation with a typical ‘tip-growth’ mechanism.

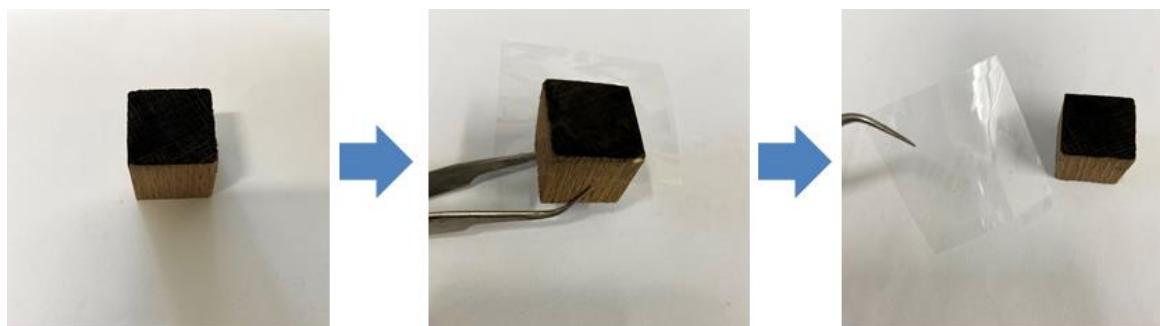


Figure S2. Fe₂O₃/CNT hybrid cannot be torn off from the wood surface by a Scotch tape.

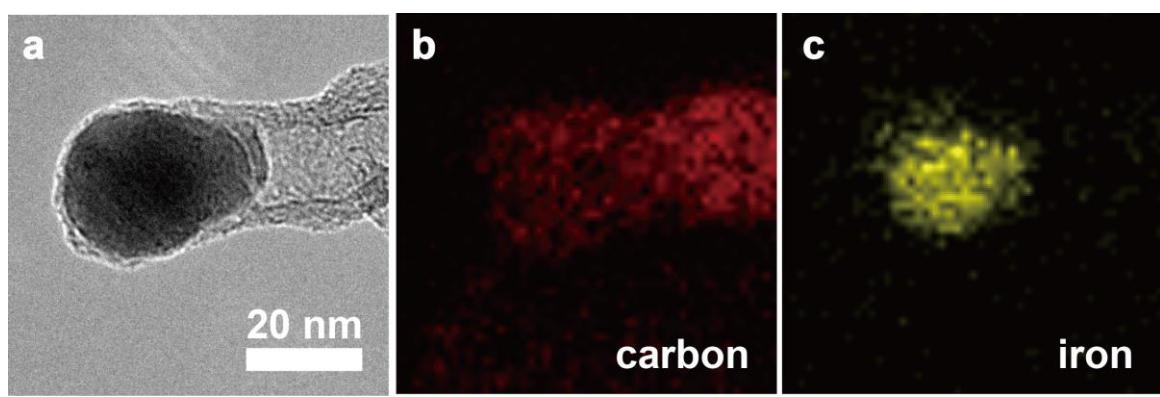


Figure S3. a) TEM image of a typical Fe₂O₃/CNT hybrid, and corresponding mappings of (b) its carbon and (c) iron elements.

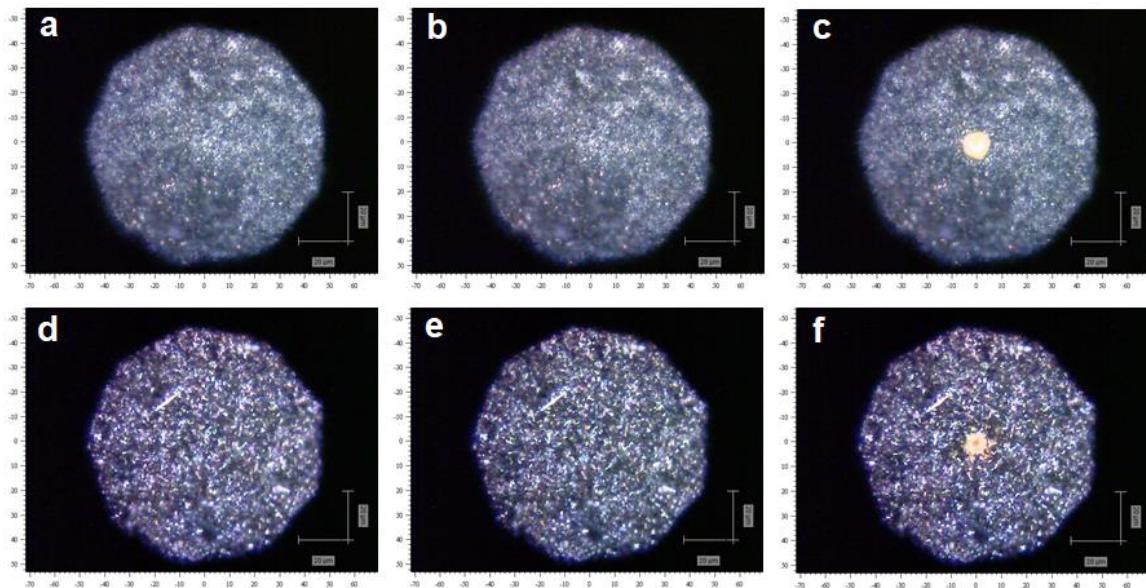


Figure S4. Micrographs of $\text{Fe}_2\text{O}_3/\text{CNT}$ hybrid at (a) 0%, (b) 10%, and (c) 50% laser power.

Micrographs of CNTs at (d) 0%, (e) 10%, and (f) 50% laser power. The bright spots in **Figures S4c** and **S4f** are caused by burnt carbon materials due to the high-power laser irradiation.

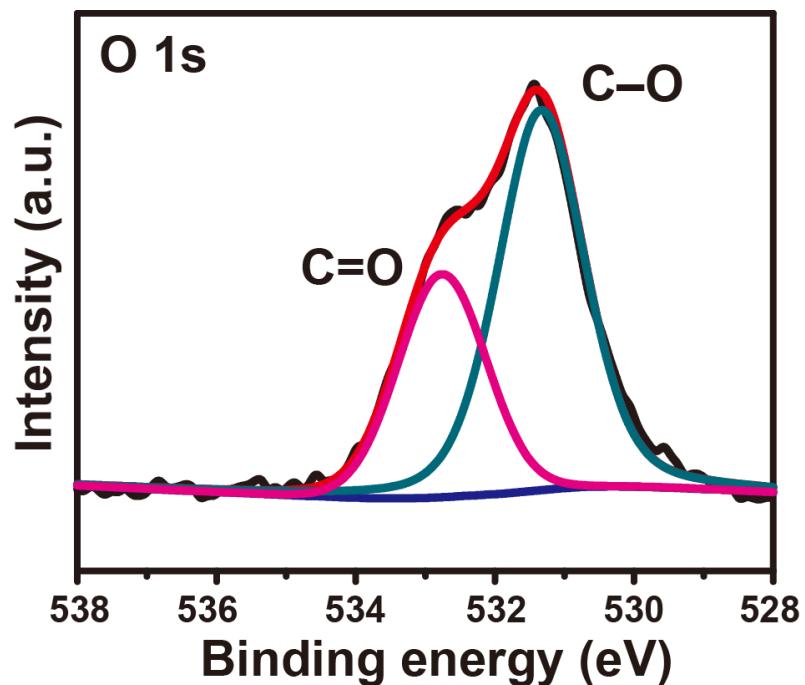


Figure S5. O 1s XPS spectrum of CNTs.

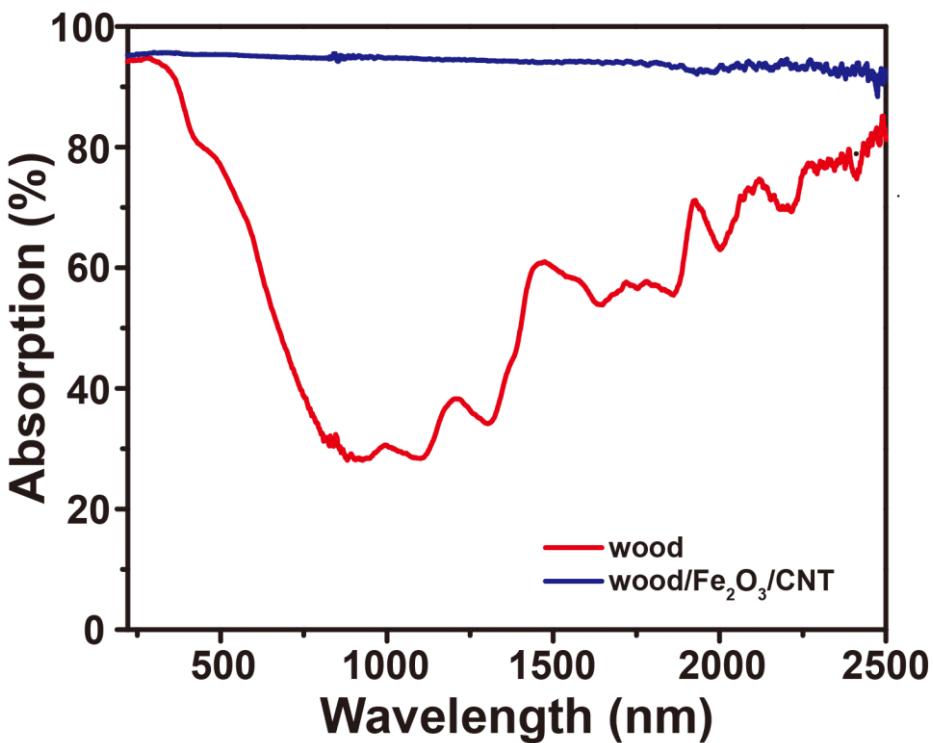


Figure S6. Solar light absorbance spectra of wood and wood/Fe₂O₃/CNT composite.

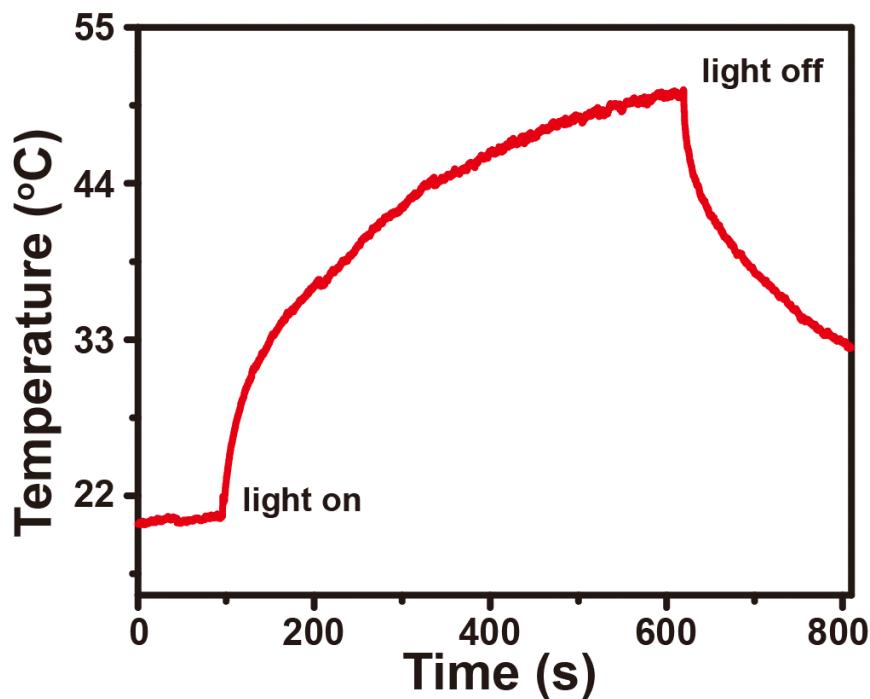


Figure S7. Time trace of the temperature curve in response to simulated solar light irradiation for wood/Fe₂O₃/CNT composite under 1 sun irradiation.

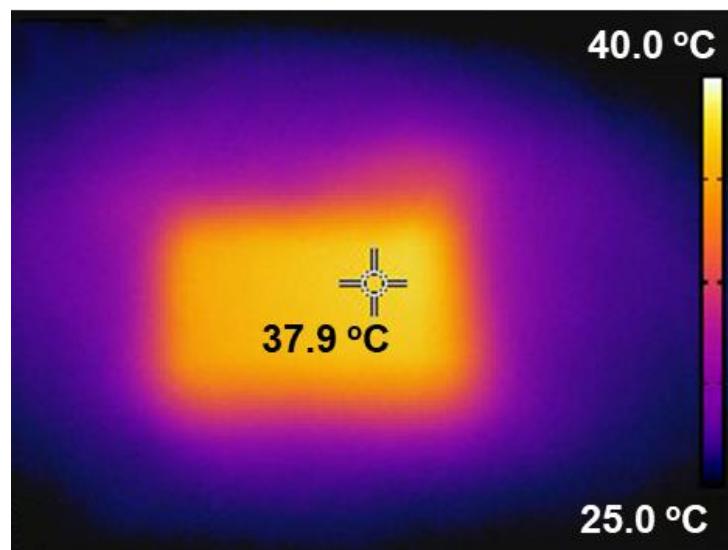


Figure S8. Surface temperature of the wood/CNT composite under 1 sun irradiation.

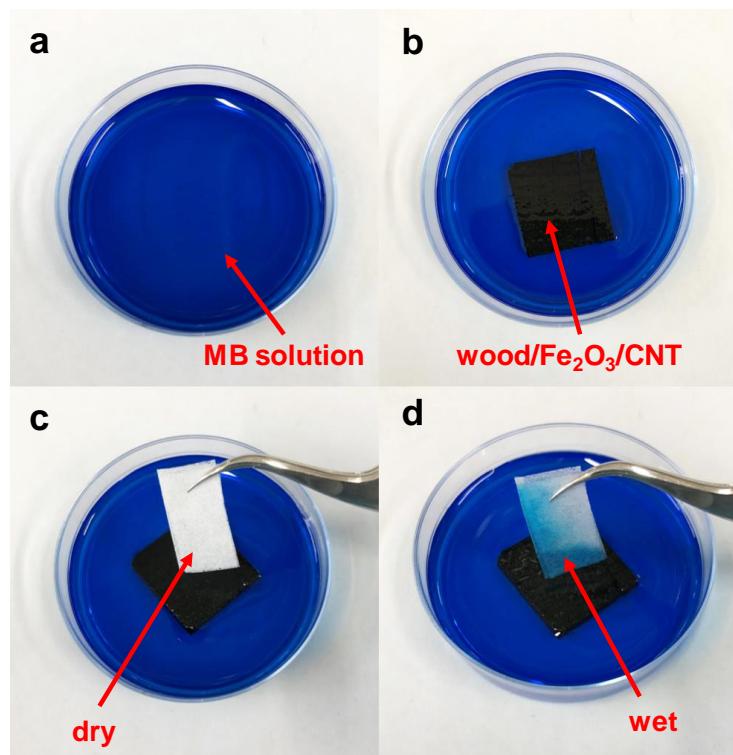


Figure S9. (a, b) Water wettability of wood/Fe₂O₃/CNT. Wood/Fe₂O₃/CNT composite can be rapidly wetted by methylene blue (MB) solution (100 ppm). (c, d) When a dry paper contacts the wood (one side is in air and the other side is in the MB solution), it could be quickly wetted, indicating that the wood/Fe₂O₃/CNT composite could upward transport of water rapidly.

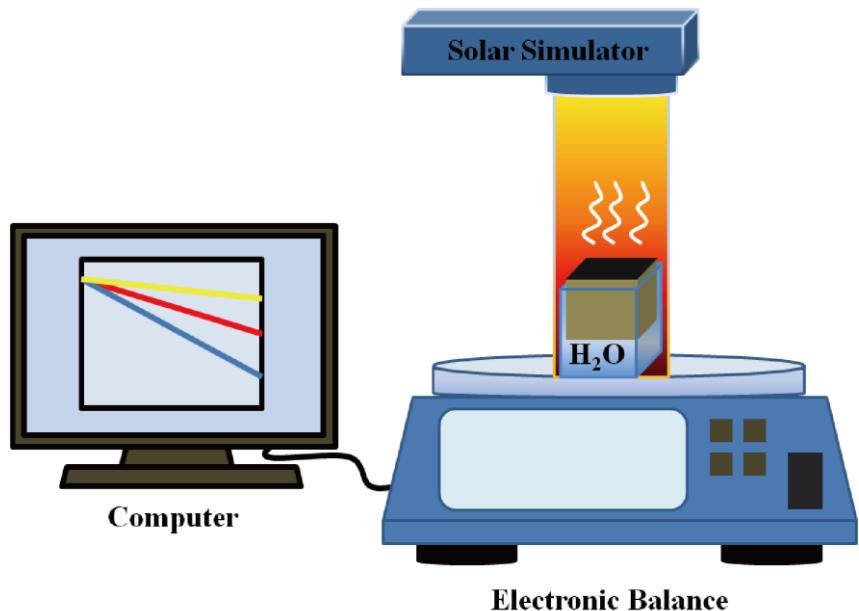


Figure S10. Schematic illustration of a real-time solar steam generation measurement system with the wood/ $\text{Fe}_2\text{O}_3/\text{CNT}$ composite floating on water.

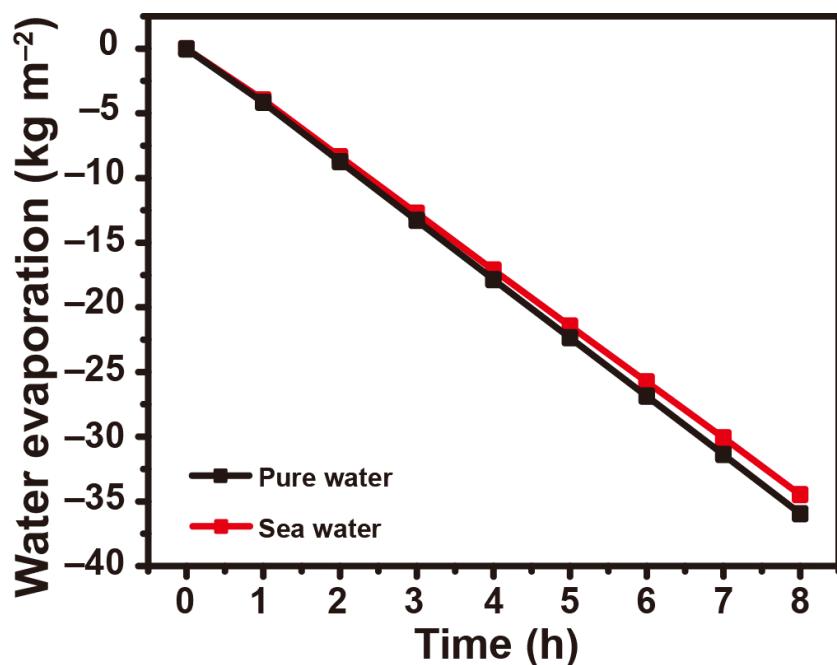


Figure S11. Plots of water mass change versus time for the wood/ $\text{Fe}_2\text{O}_3/\text{CNT}$ device for continuous evaporating pure water and seawater for 8 h under 3 sun irradiations.

Table S1. Comparison of the solar steam generation performances of the wood/Fe₂O₃/CNT device with other wood-based devices reported in the literature.

Materials	Water evaporation rate (kg m ⁻² h ⁻¹)							Ref.
	1-sun	2-sun	3-sun	5-sun	6-sun	7-sun	10-sun	
CNTs/wood	0.95	-	2.88	5.14	-	7.65	11.22	[1]
Plasmonic wood	~1	~2.3	~3.3	~6	-	8.75	11.9	[2]
Carbonized Wood	1.3	-	-	-	-	-	-	[3]
HT-Au-wood	-	-	4	-	-	-	-	[4]
Woods-TA-Fe ³⁺	1.34	-	-	-	-	-	-	[5]
WO _{3-x} decorated wood	1.28	2.59	-	-	7.98	9.12	-	[6]
Delignified wood with carbon quantum dots	1.09	-	-	-	-	-	~11	[7]
Porous wood membrane	0.8	1.7	-	-	6.4	-	-	[8]
Candle soot/wood	0.95	-	-	-	-	-	-	[9]
Wood/Fe₂O₃/CNT	1.42	2.77	4.22	7.08	-	9.84	14.01	This work

References

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