Supporting Information

Cuttlefish Ink Nanoparticles-Integrated Aerogel Membranes for Efficient Solar Steam Generation

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Supplementary figures and tables

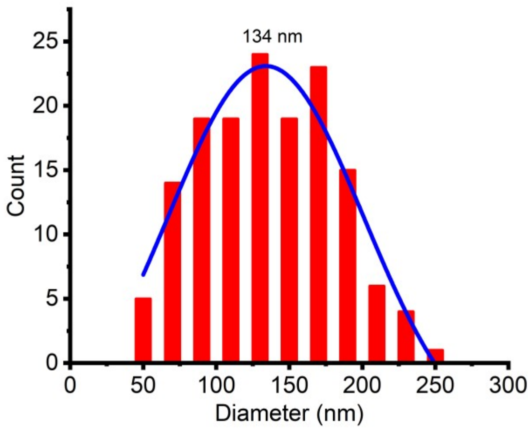

Figure S1. Size distribution of CFNPs measured by SEM.

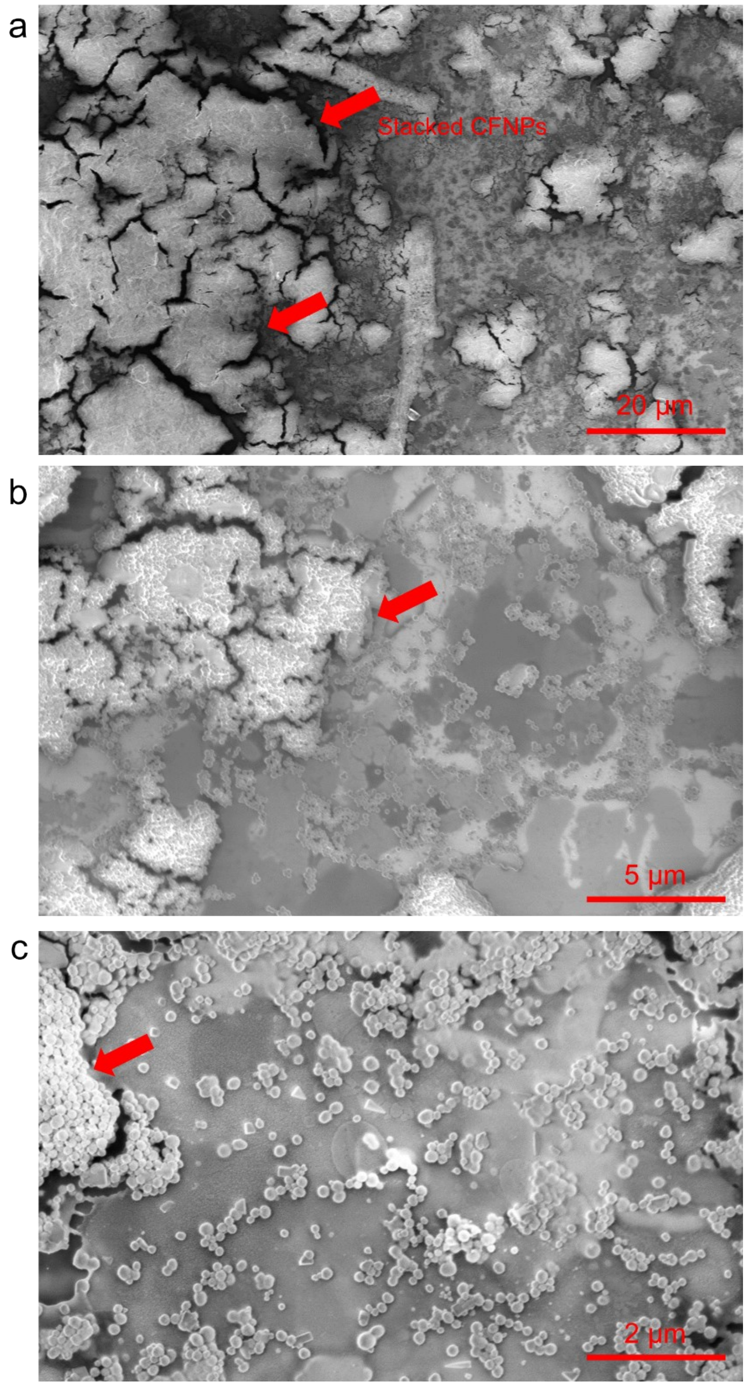

Figure S2. SEM images of unpurified cuttlefish ink under different magnifications. The red arrows indicate closely stacked CFNPs.

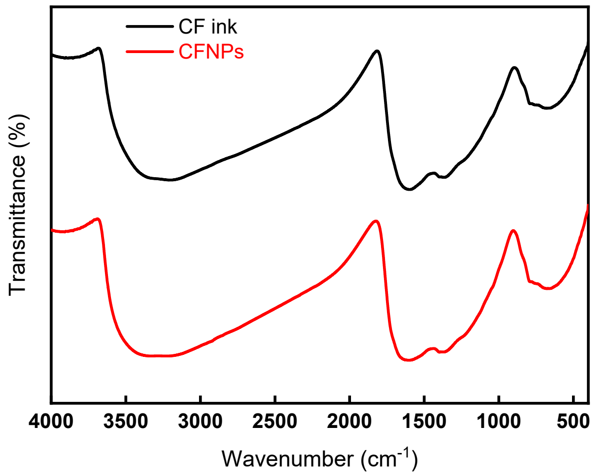

Figure S3. FTIR spectra of CF ink and CFNPs.

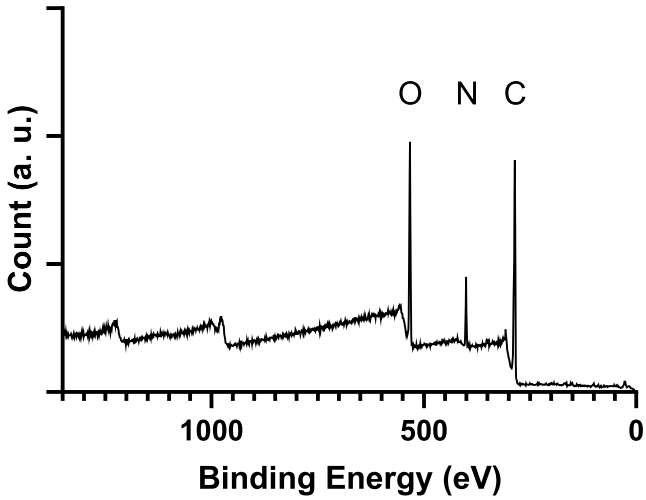

Figure S4. The XPS spectrum of CFNPs.

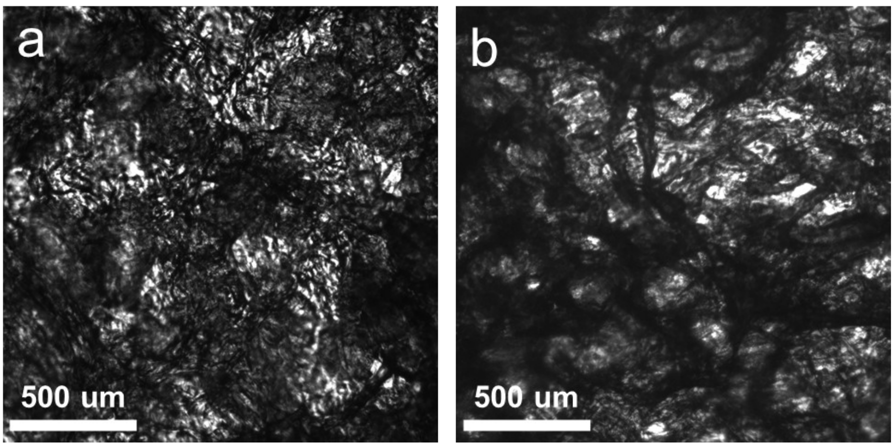

Figure S5. Optical images of aga (a) and CFNPs@Aga (b) aerogel membranes.

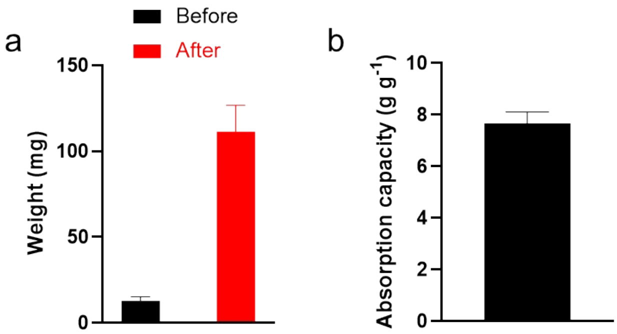

Figure S6. Water absorption capacity of the CFNPs@Aga aerogel. (a) The weight change before/after water absorption. (b) The calculated absorption capacity.

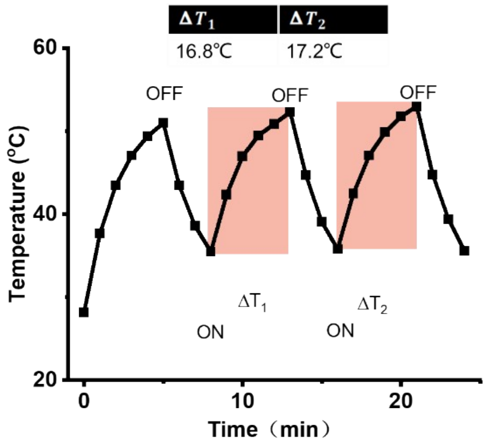

Figure S7. Photothermal stability of CFNPs during three on-off cycles.

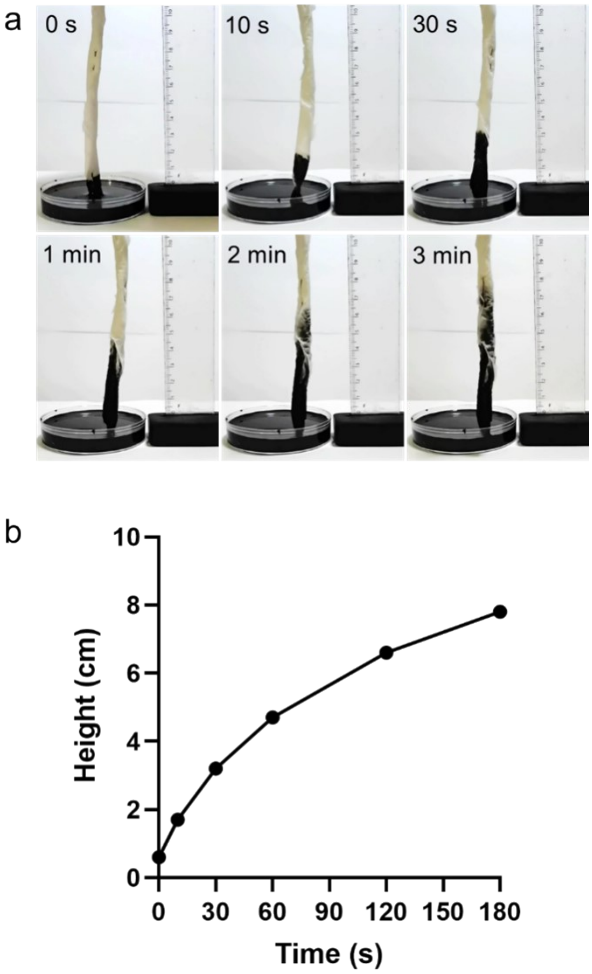

Figure S8. (a) Images of the paper string that can deliver water. (b) The height that water transports alongside the paper string in 3 min.

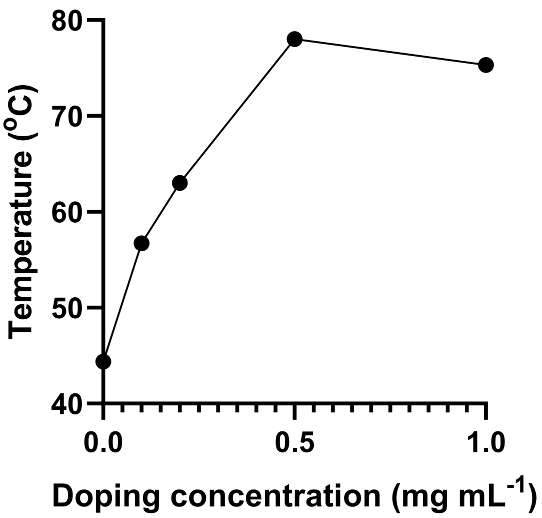

Figure S9. Surface temperature of the CFNPs@Aga membranes with different doping concentrations.

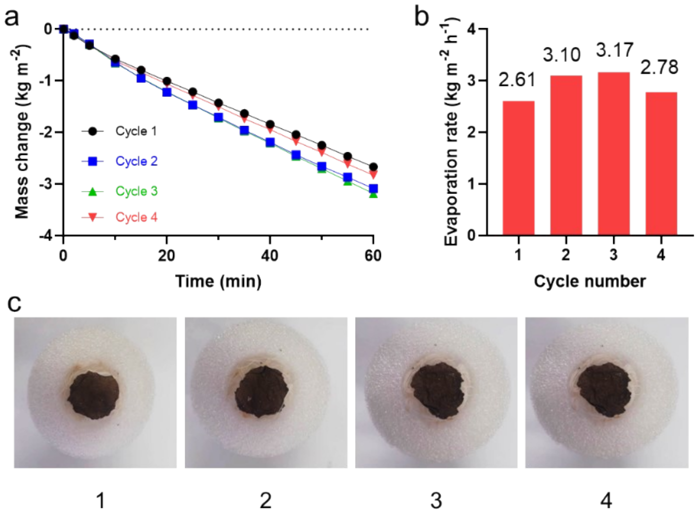

Figure S10. Durability of the CFNPs@Aga membrane in repeated use. (a-b) Evaporation rate of 5.0 wt% NaCl solution in four independent experiments using the same membrane. (c) Photographs of the aerogel membrane during repeated use.

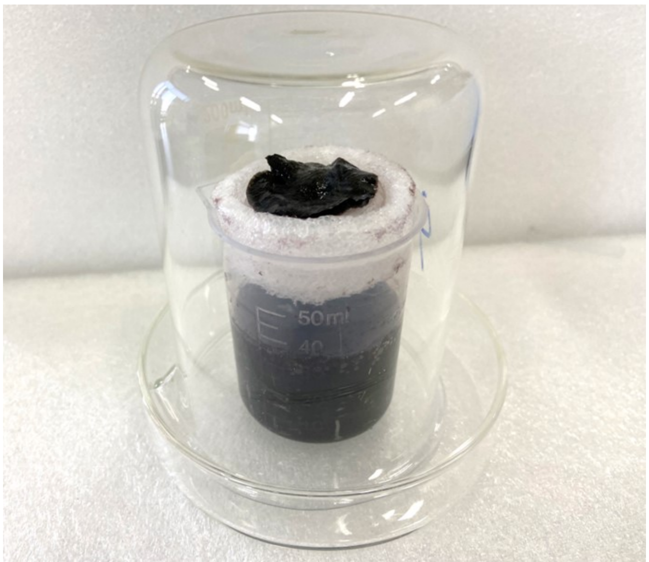

Figure S11. The experimental setup for freshwater obtainment.

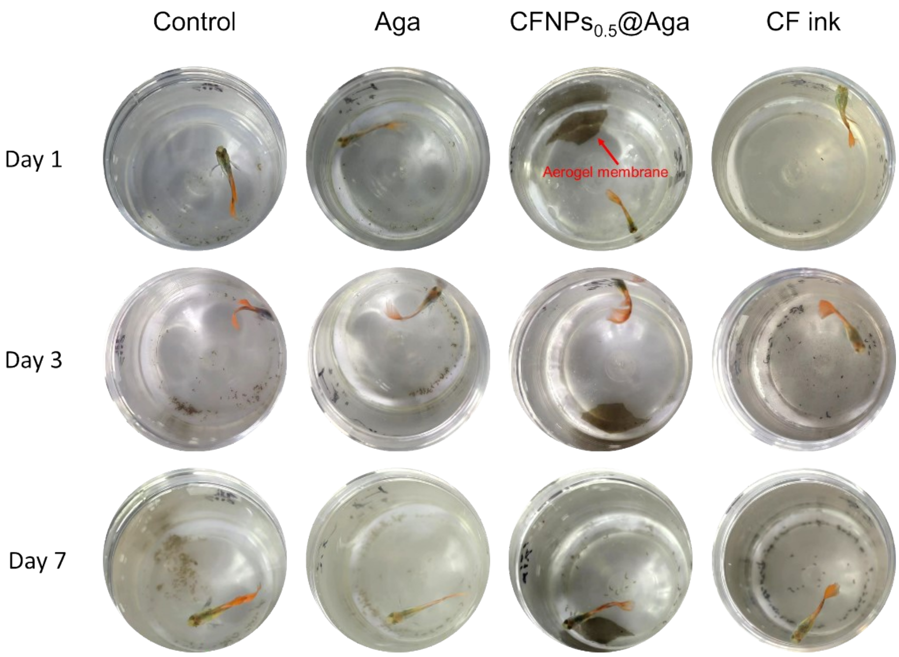

Figure S12. Aquatic toxicity of the aerogels and CFNPs to *poecillia reticulata*.

Table S1. Cost of the CFNPs@Aga aerogel

Materials	Price	Amount/m^2	Total Cost
Aga powder	300 ¥/kg	85.7 g/m^2	94.7 ¥/m^2 ~ 13.5 $/$m^2$
Cuttlefish ink[a]	140 ¥/kg	2.86 g/m^2	
Ethanol	24 ¥/L	1.43 L/m^2	

[a]The cuttlefish ink used in the experiment was collected from the market for free. The price here refers to an average price of commercial products.

Table S2. Comparison of cost-effectiveness over previous reported solar evaporators

Reference	Estimated Total cost ($\$/m^2$)	Evaporation Rate (kg m^{-2} h^{-1})	Cost-effectiveness (Rate/Price, g h^{-1} $\$^{-1}$)
Energy Environ. Sci. **2018**, 11, 1510.	3	0.6	200
Joule **2018**, 2, 1331	106.3	1.62	15.2
ACS Nano **2019**, 13, 7913	293.21	3.6	12.3
Joule **2018**, 2, 1171.	442.39	2.04	4.6
Mater. Horiz. **2018**, 5, 1143	41.50	1.657	40
ACS Nano **2017**, 11, 5087	16.70	1.62	97
Proc. Natl. Acad. Sci. U. S. A. **2016**, 113, 13953	20.0	1.45	72.5
Adv. Mater. **2017**, 29, 1704107	100	1.12	11.2
Nat. Commun. **2014**, 5, 4449	205.07	1.2	5.9
Adv. Mater. **2017**, 29, 1702590	124.07	1.6	12.9
Nat. Commun. **2015**, 6, 10103	6637	0.67	0.1

Nat. Nanotechnol. **2018**, 13, 489	98.83	3.2	32.4
Nat. Photonics **2016**, 10, 393	6600	1.43	0.2
Nat. Energy **2016**, 1, 16126	54	0.5	9.3
Adv. Mater. **2019**, 31, 1807716	20	1.35	67.5
Adv. Mater. **2019**, 31, 1808249	190	1.5	7.9
Adv. Mater. **2015**, 27, 4889	55	0.92	16.7
Adv. Mater. **2020**, 32, 1907061	14.9	3.2	215
Our work	13.5	2.59	192

The cost of reported works was summarized based on the reference Chem. Eng. J. 2022, 427, 130905.

Table S3. Degradability of the CFNPs@Aga aerogel in soil

Sample	1	2	3
Weight on Day 0/g	0.0276	0.0315	0.0251
Weight on Day 14/g	0.0237	0.0279	0.0208
Degradation efficiency (DE)	14.1%	11.4%	17.1%
Average DE		14.2%	