Electronic Supplementary Material (ESI) for Environmental Science: Water Research & Technology.

Mass production of superhydrophilic sponge for efficient and stable solar-driven highly corrosive water evaporation

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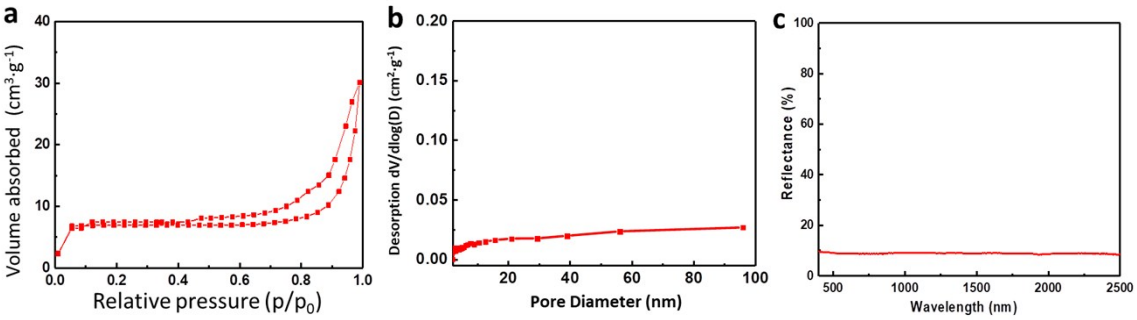

Figure S1. The nitrogen adsorption and desorption isotherm (a), derived pore size distribution (b) and diffuse reflectance spectrum (c) of NBS in the wavelength range of 250–2500 nm.

Figure S2. Photograph of NBS in solar-vapor desalination unit.

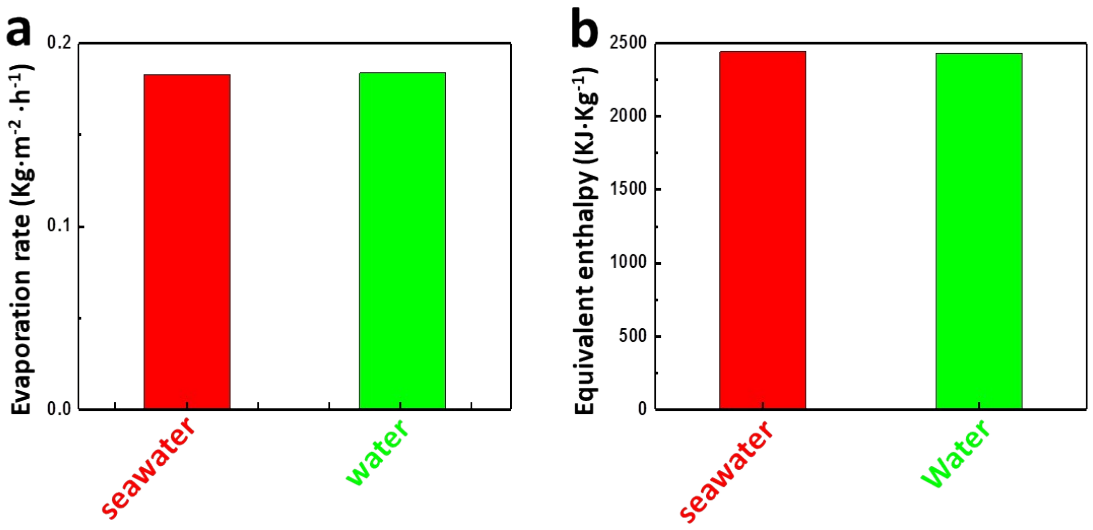

Figure S3. (a) Seawater and water evaporation rates under dark circumstances and (b) the corresponding calculated equivalent enthalpy change. The ambient temperature is 30 °C and the humidity is 42.

The evaporation rates are 0.182, 0.184 $kg \cdot m^{-2} \cdot h^{-1}$ from seawater and pure water respectively. Since the latent heat of pure water evaporation was 2430 $KJ \cdot kg^{-1}$ at 30 °C, the latent heat of seawater evaporation was 2444 $KJ \cdot kg^{-1}$.

The thermal efficiency (η) was calculated in term of the equation below:[1,2]

$$\eta = Qe/Qs$$

where Qs is the total solar irradiation energy in 1 hour, and Qe is power consumed for seawater vapor generation in 1 hour, which can be estimated by the following equation,

$$Qe = m\lambda + m\,C\Delta T$$

where m is the mass of seawater vapor, λ is the latent heat of the phase change recorded in Fig. 3b, C is the specific heat capacity of water (4.2 J·g-1·K-1) and ΔT is the temperature increase of the water.

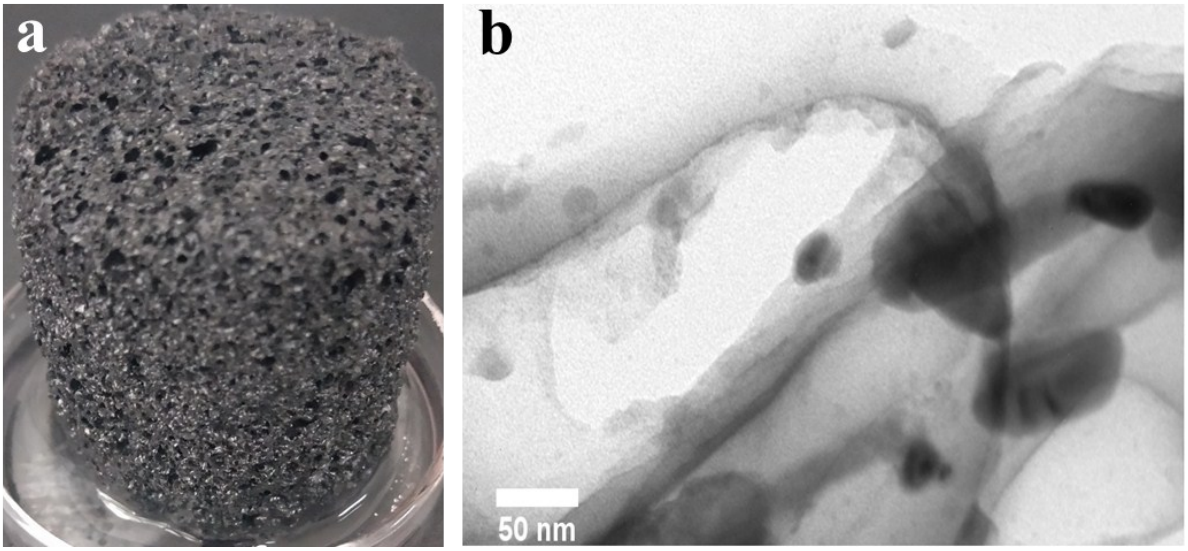

Figure S4. (a) The photographs of BS during soalr-driven water evaporation. (b) The coresponding HRTEM images of KCl in the top surfaces of BS after soalr-driven water evaporation.

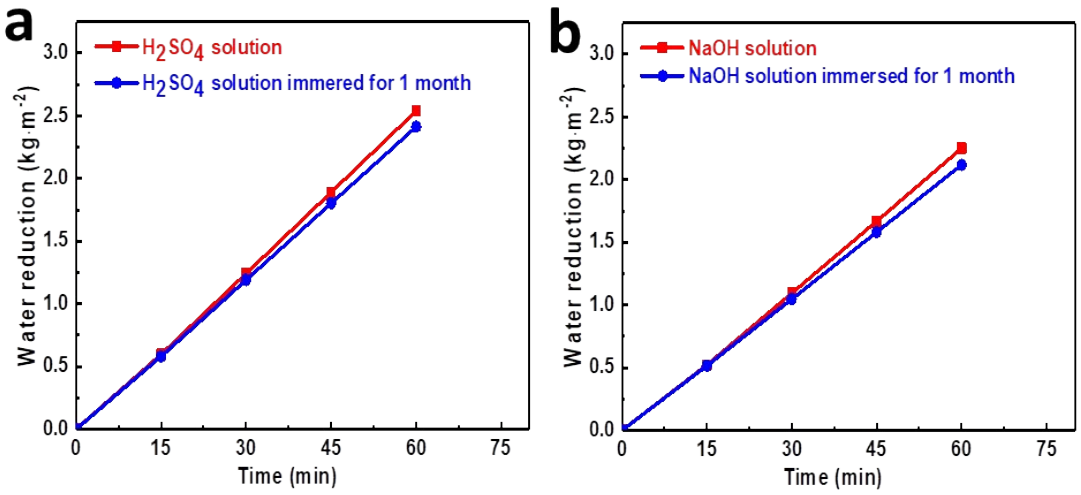

Figure S5. (a) The water evaporation performances of NBS from 0.5 M H_2SO_4 solution before and after 1 month immersion in 0.5 M H_2SO_4. (b) The water evaporation performances of NBS from 1 M NaOH solution before and after 1 month immersion in 1 M NaOH. The circumstance temperature is 30 °C.

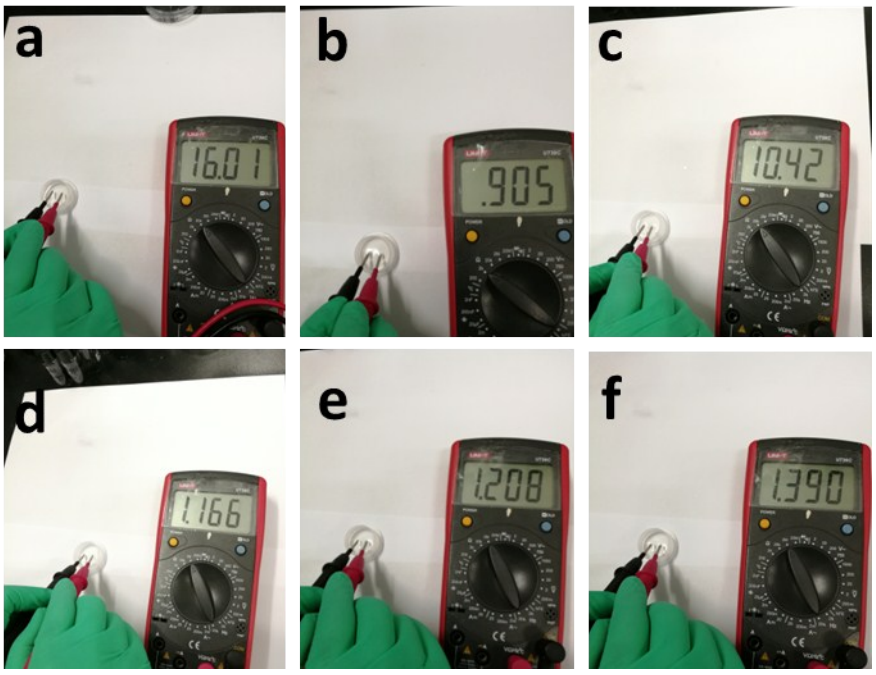

Figure S6. (a, d) The resistances of seawater and water evaporated from seawater by NBS. (b, e) The resistances of 0.5 M H_2SO_4 and water evaporated from 0.5 M H_2SO_4 by 5NBS. (c, f) The resistances of 1 M NaOH and water evaporated from 1 M NaOH by NBS.

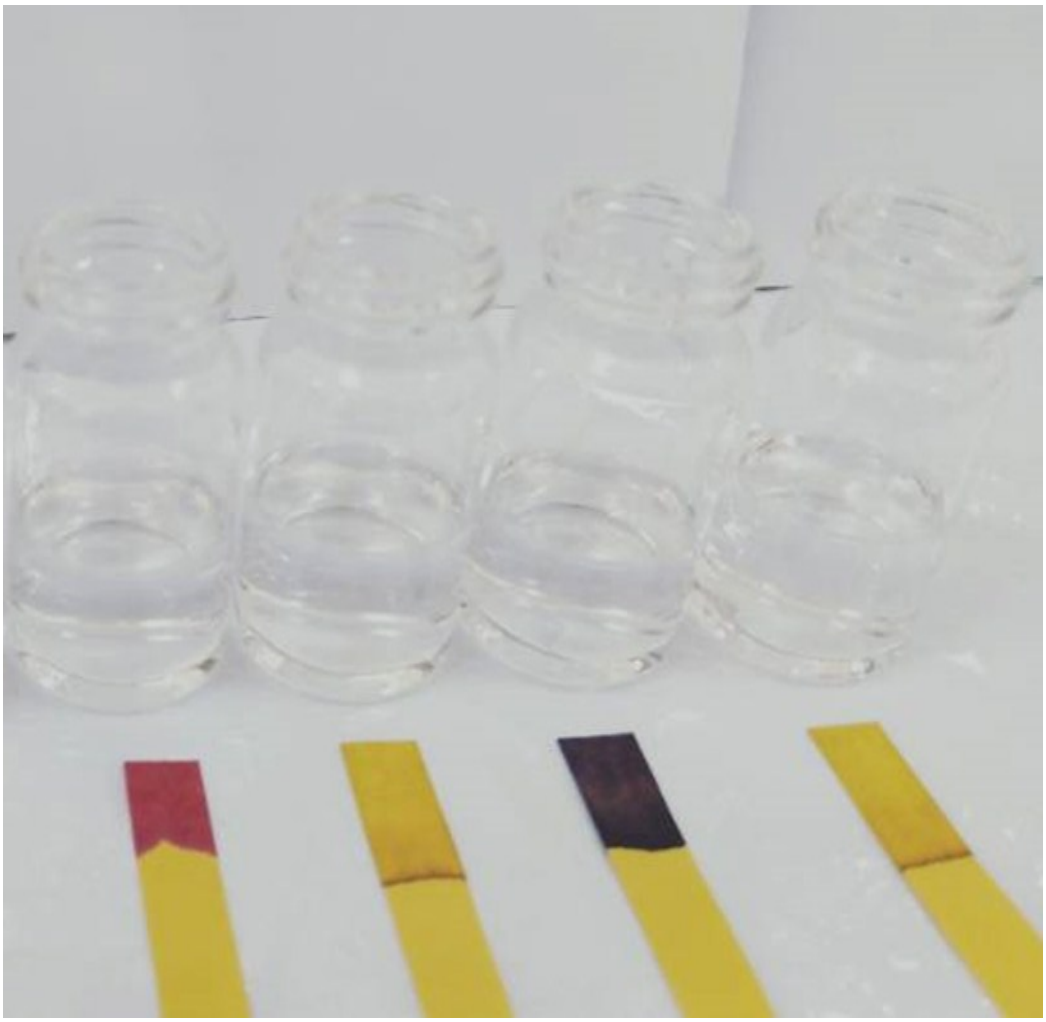

Figure S7. The pH values of 0.5 M H_2SO_4, water evaporated from 0.5 M H_2SO_4, 1 M NaOH, water evaporated from 1 M NaOH (from left to right).

References

1 F. Zhao, X. Zhou, Y. Shi, X. Qian, M. Alexander, X. Zhao, S. Mendez, R. Yang, L. Qu and G. Yu, *Nat. Nanotechnol.*, 2018, **13,** 489–495.

2 G. Xue, K. Liu, Q. Chen, P. Yang, J. Li, T. Ding, J. Duan, B. Qi and J. Zhou, *ACS. Appl. Mater. Inter.*, 2017, **9**, 15052-15057.