Supporting Information for Publication

Formation of S defects in MoS_2-coated Wood for High-Efficiency Seawater Desalination

Authors

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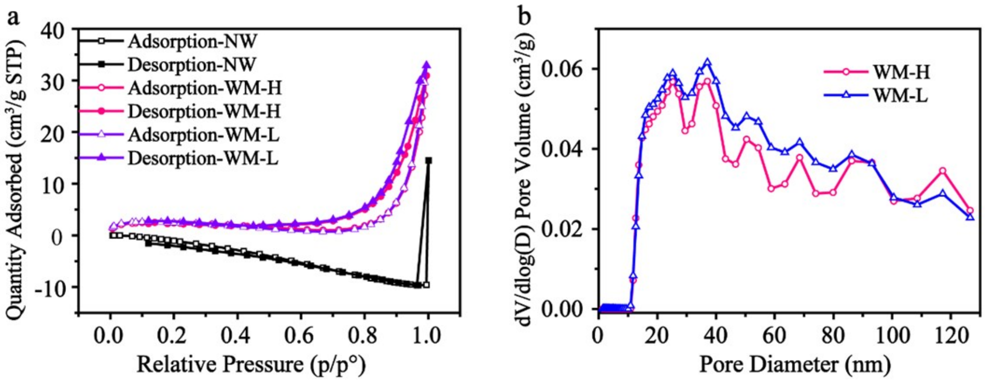

Fig. S1 Nitrogen adsorption-desorption curves (a) and pore diameter distribution curves (b) of NW, WM-H and WM-L.

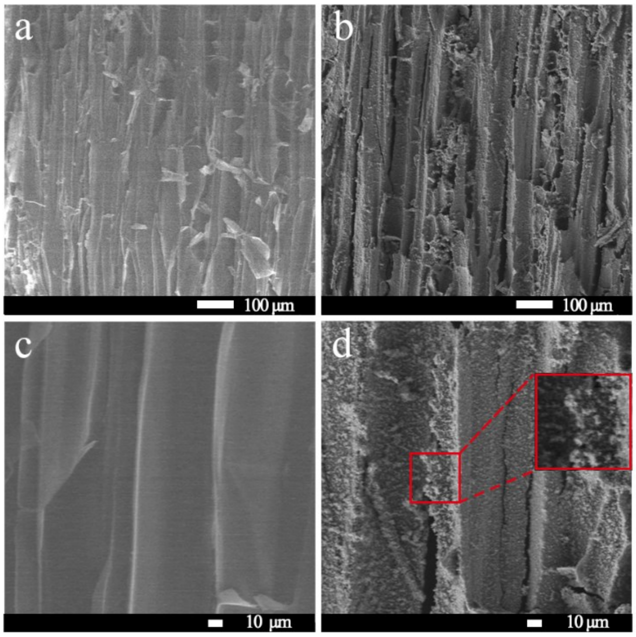

Fig. S2 SEM images of radial sections of natural wood (NW) (a and c) and MoS_2-coated wood (WM-H) (b and d).

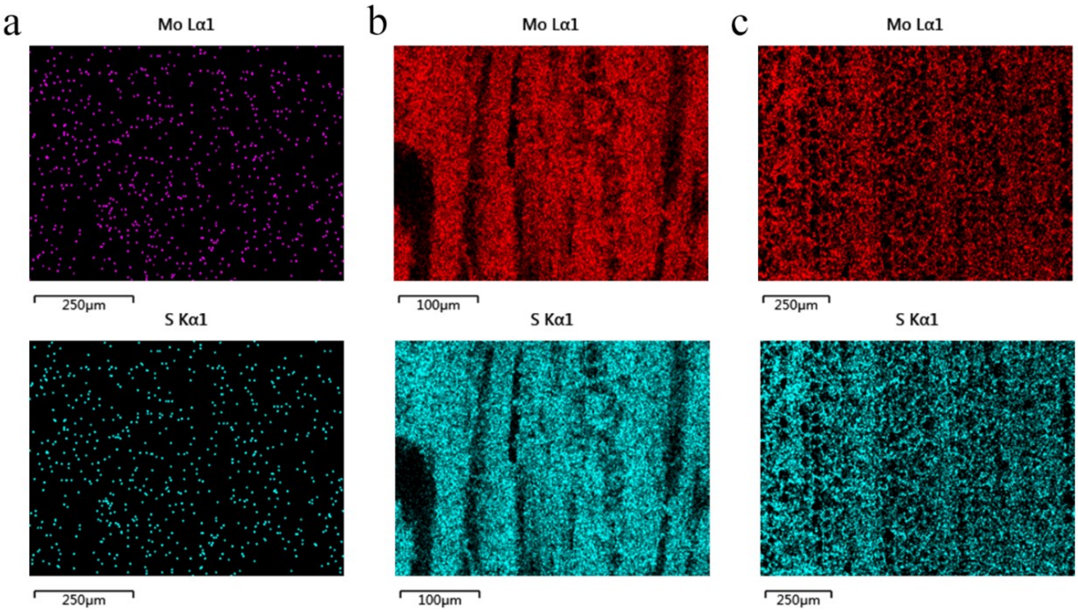

Fig. S3 Energy dispersive X-ray spectroscopy (EDX) images of NW (a), WM-H (b) and WM-L (c).

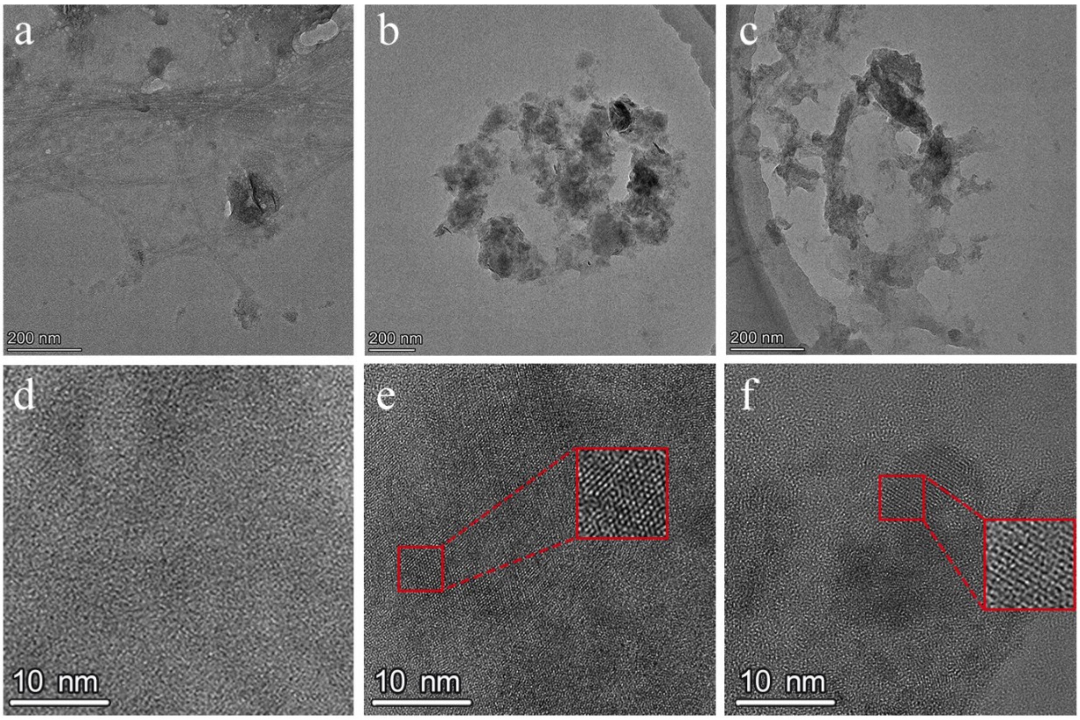

Fig. S4 Typical TEM and HRTEM images of NW (a and d), WM-H (b and e) and WM-L (c and f).

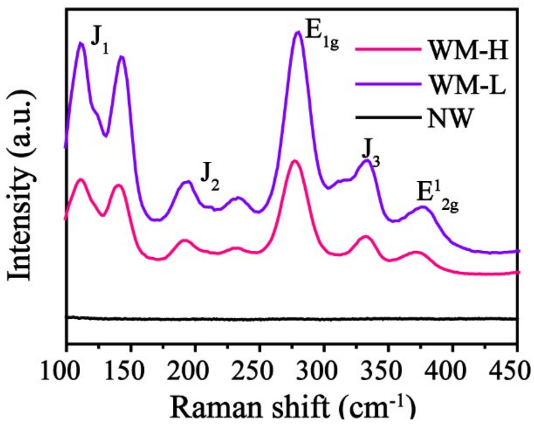

Fig. S5 Raman spectra of NW, WM-H and WM-L.

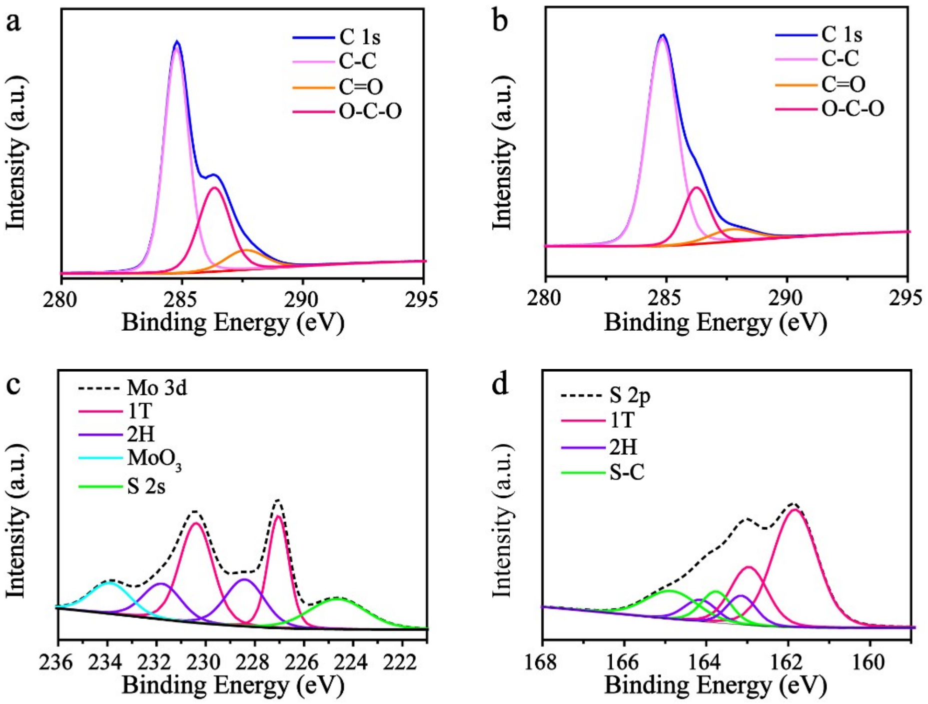

Fig. S6 (a and b) C 1s spectra of NW and WM-L. (c and d) Mo 3d and S 2s XPS spectra of WM-L.

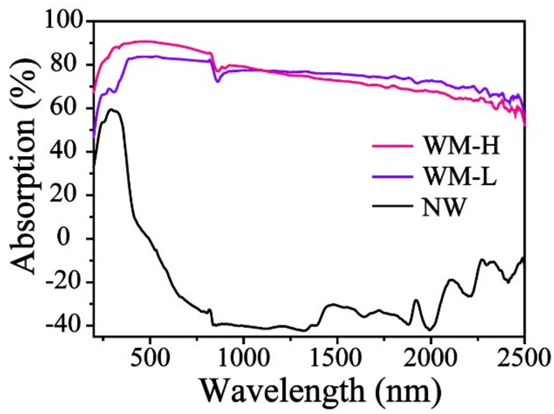

Fig. S7 Absorption spectra of NW, WM-H and WM-L in the wavelength range of 200 nm to 2,500 nm.

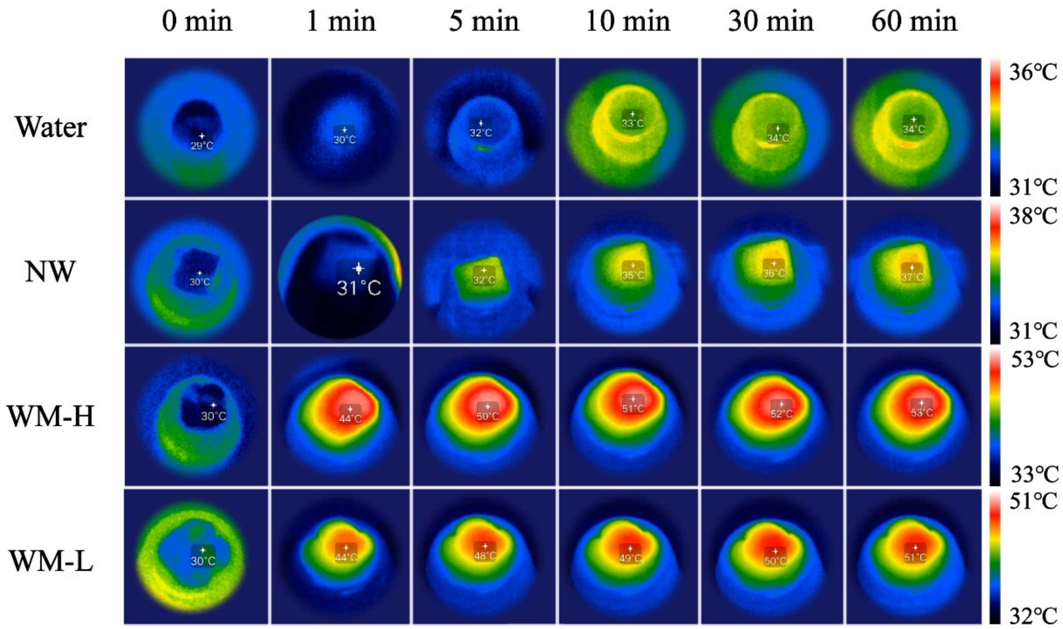

Fig. S8 Comparison of the surface temperatures of water, NW, WM-H and WM-L floating on water under 1 sun illumination.

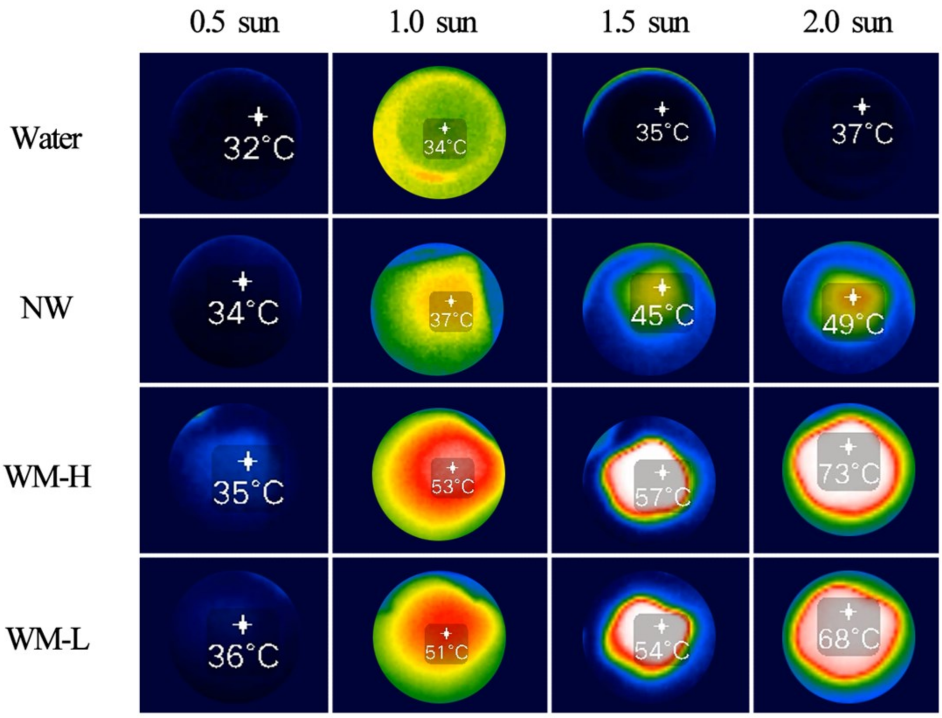

Fig. S9 Surface temperatures of natural wood, WM-H and WM-L floating on water after 60 min of solar illumination (0.5-2 sun).

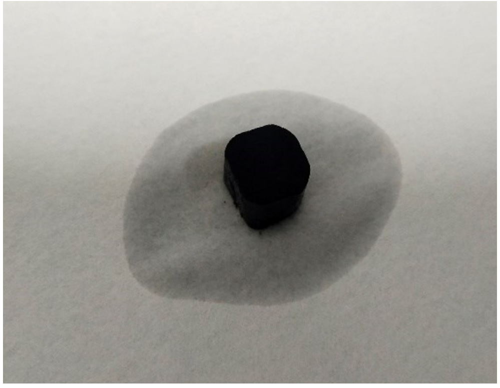

Fig. S10 Drops of water on the MoS_2-coated wood can be quickly absorbed.

Calculation details of the photothermal conversion efficiency

The photothermal conversion efficiency was obtained according to Eq. 1, where the net evaporation rate (m) is the evaporation rate of water under light conditions minus the evaporation rate of water under dark conditions. h_{LV} is calculated according to the following equations[1, 2]:

$$h_{LV,Ts} = \int_{Ts}^{100℃} C_{p,l}\, dT + h_{LV,100℃} + \int_{100℃}^{Ts} C_{p,v}\, dT$$

$h_{LV,100\,°C}$ =2257 J·g^{-1} (S2)

$C_{p,l}$ = 4.1813 J·K^{-1}·g^{-1} (S3)

$C_{p,v}$= (3.470+1.45×10^{-3}×T+0.121×10^{5}×T^{-2})·R (J·K^{-1}·mol) (S4)

R=8.314 J·K^{-1}·mol (S5)

T is the temperature in Kelvin.

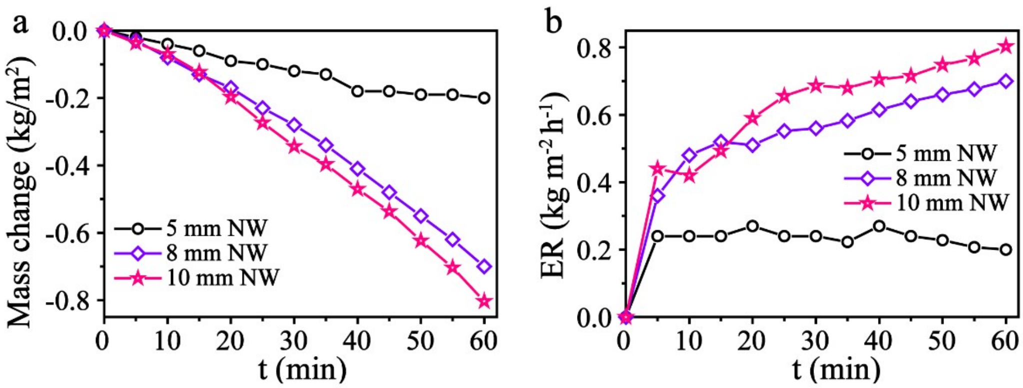

Fig. S11 Mass changes and water evaporation rates of wood with different thicknesses.

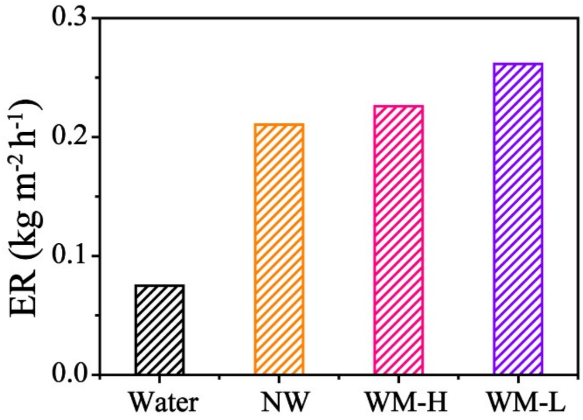

Fig. S12 Evaporation rates of water, NW, WM-H and WM-L under dark conditions.

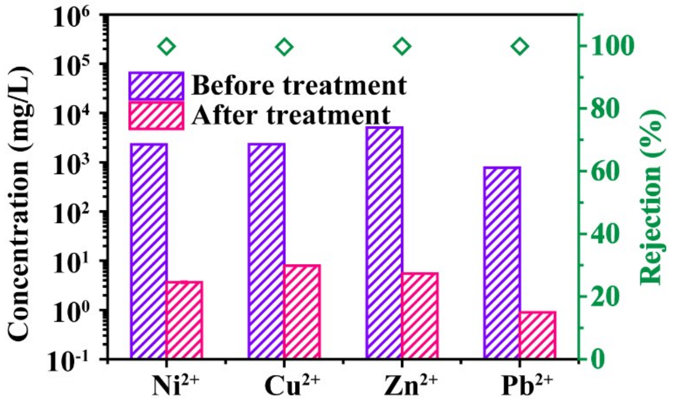

Fig. S13 Solar thermal purification of Ni^{2+}, Cu^{2+}, Zn^{2+} and Pb^{2+} with WM-H in an actual seawater sample under one sun illumination. The actual seawater samples were taken from the Bohai Sea, Tianjin, China.

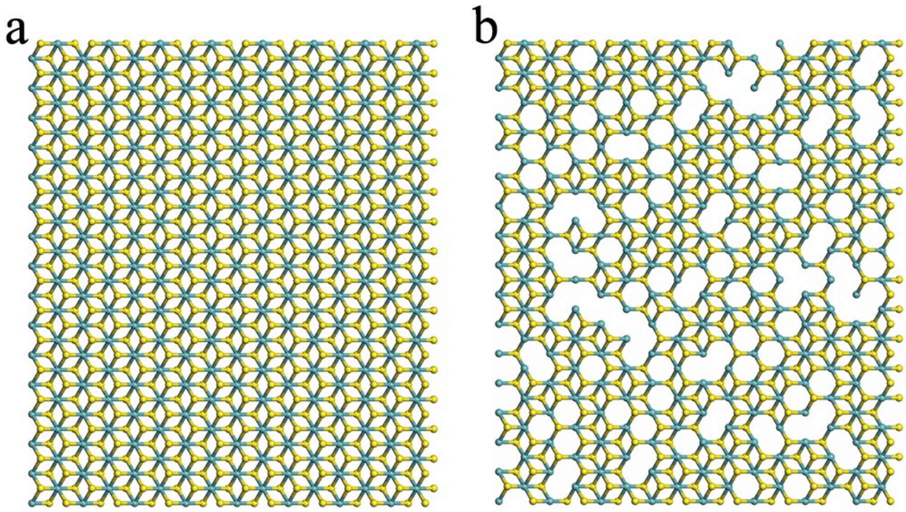

Fig. S14 Atomic structures of MoS_2 without (a) and with (b) defects.

References:

1. W. Li, Z. Li, K. Bertelsmann and D. E. Fan, Portable low-pressure solar steaming-collection unisystem with polypyrrole origamis, *Adv. Mater.*, 2019, **31**, e1900720.
2. M. D. Koretsky, *Engineering and chemical thermodynamics*, Wiley New York, 2004.