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Supporting information

Self-Floating Monodisperse Microparticles with Nano-Engineered Surface Composition and Structure for Highly Efficient Solar-Driven Water Evaporation

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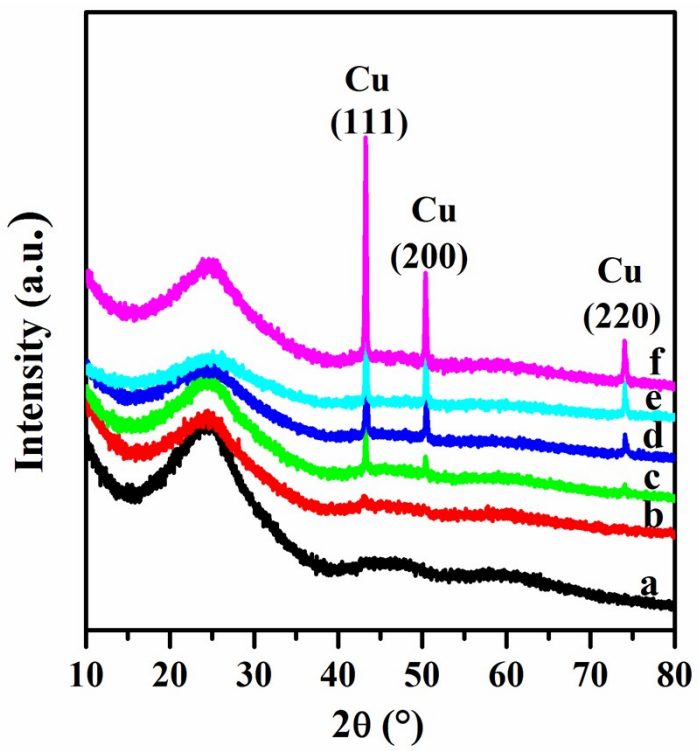

Figure S1. Wide-angle XRD patterns of the MPE-x%Cu/CST microparticles with a Cu/TiO_2 mass ratio of 0 (a), 0.5 (b), 1.0 (c), 3.0 (d), 5.0 (e) and 10.0 wt% (f), respectively.

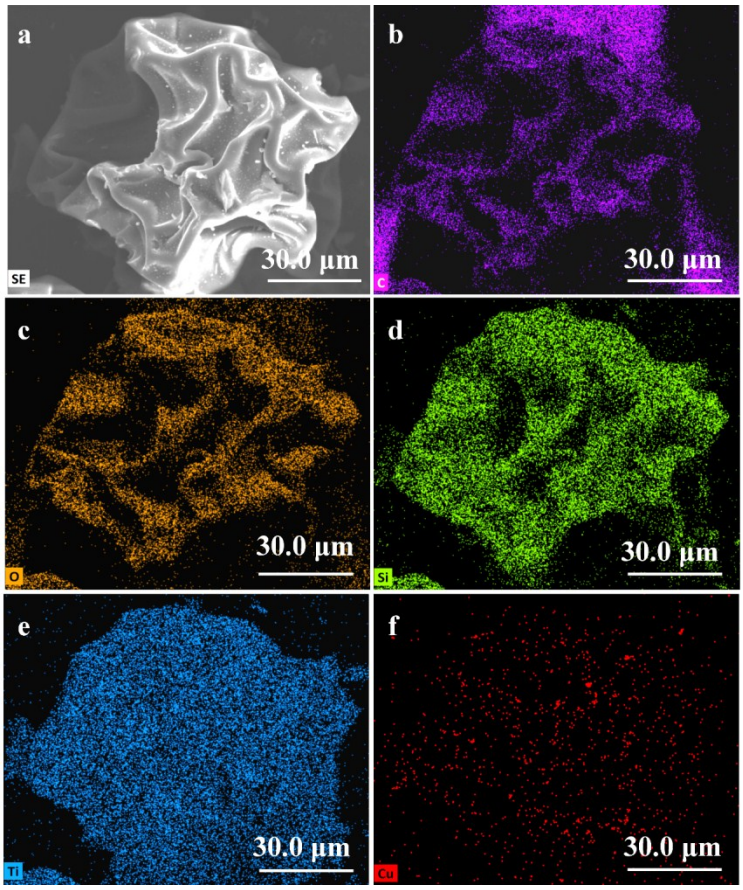

Figure S2. SEM image (a) and the corresponding C (b), O (c), Si (d), Ti (e) and Cu (f) elemental maps of the MPE-5%Cu/CST microparticles, respectively.

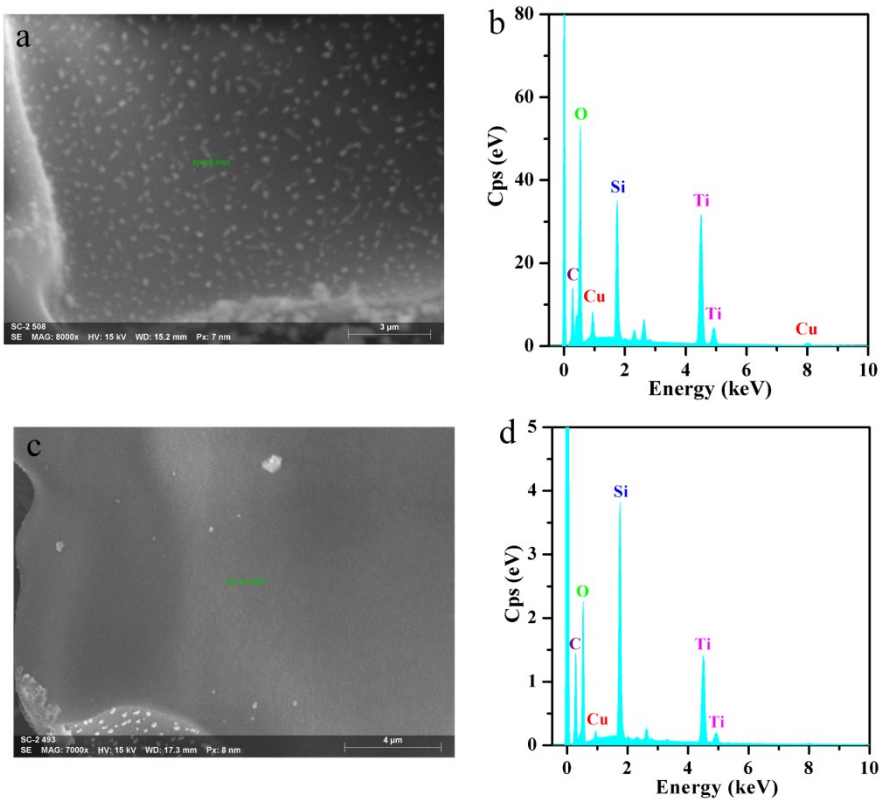

Figure S3. SEM images (a, c) of the external surface (a) and cross section (c) of the MPE-5%Cu/CST microparticles, and the EDX spectra (b, d) corresponding to the spots shown in image a (b) and image c (d), respectively.

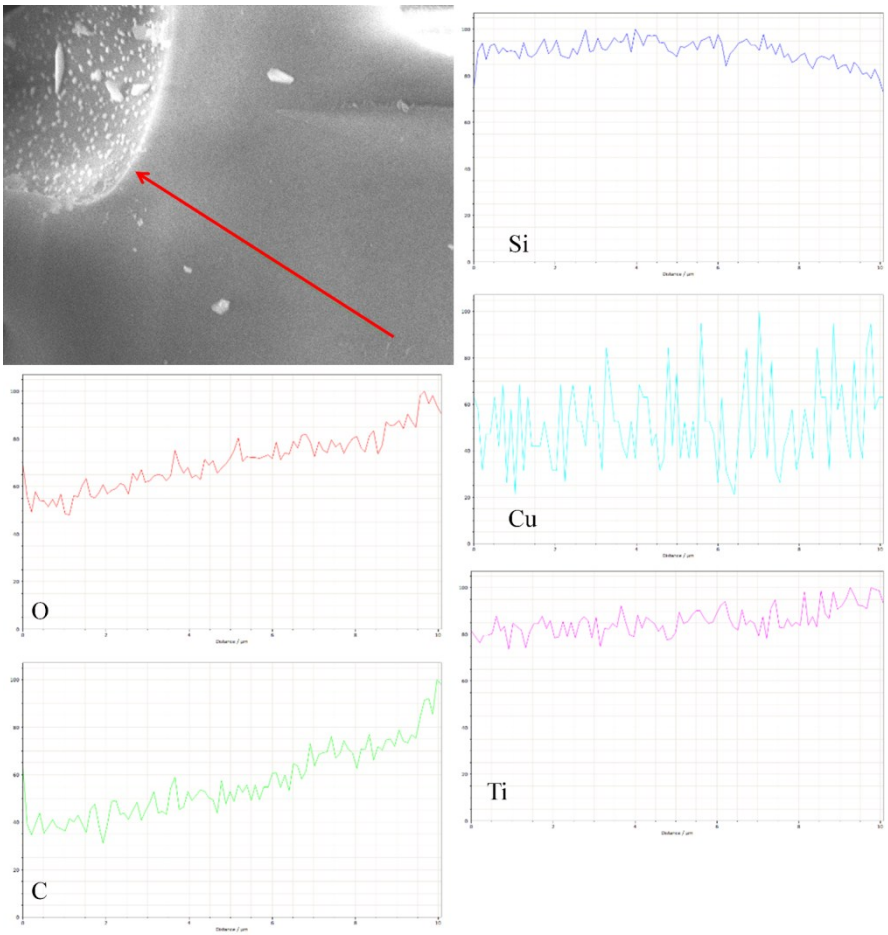

Figure S4. SEM image of the cross section of the MPE-5%Cu/CST microparticles, and the corresponding EDX element line scanning profiles along the red arrows shown in the SEM image, respectively.

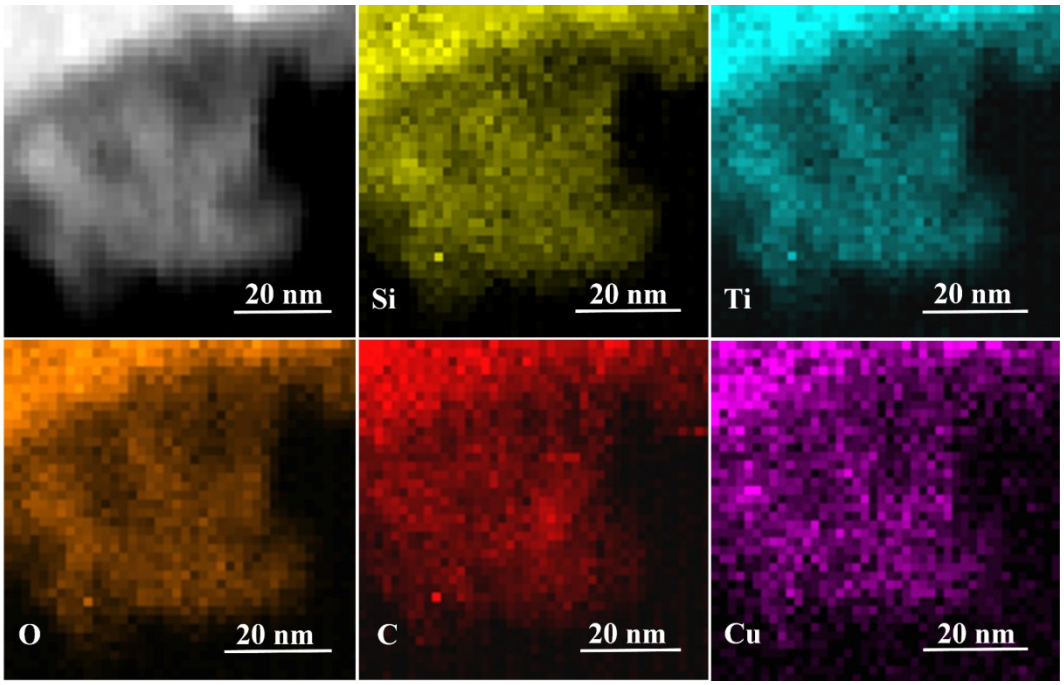

Figure S5. Dark-field STEM image of the MPE-5%Cu/CST microparticles and the corresponding high-resolution element maps, respectively.

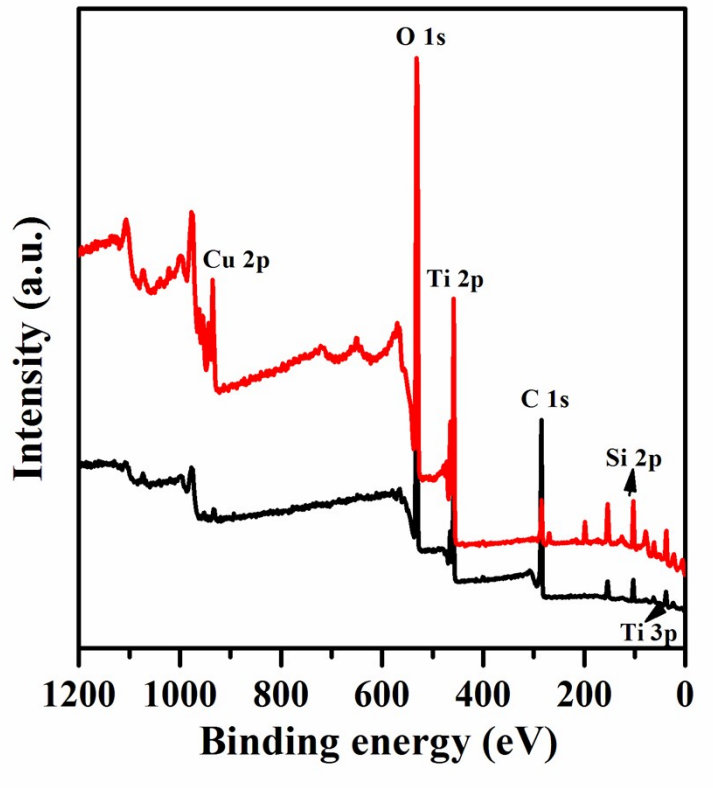

Figure S6. XPS survey spectrum of the MPE-5%Cu/CST microparticles.

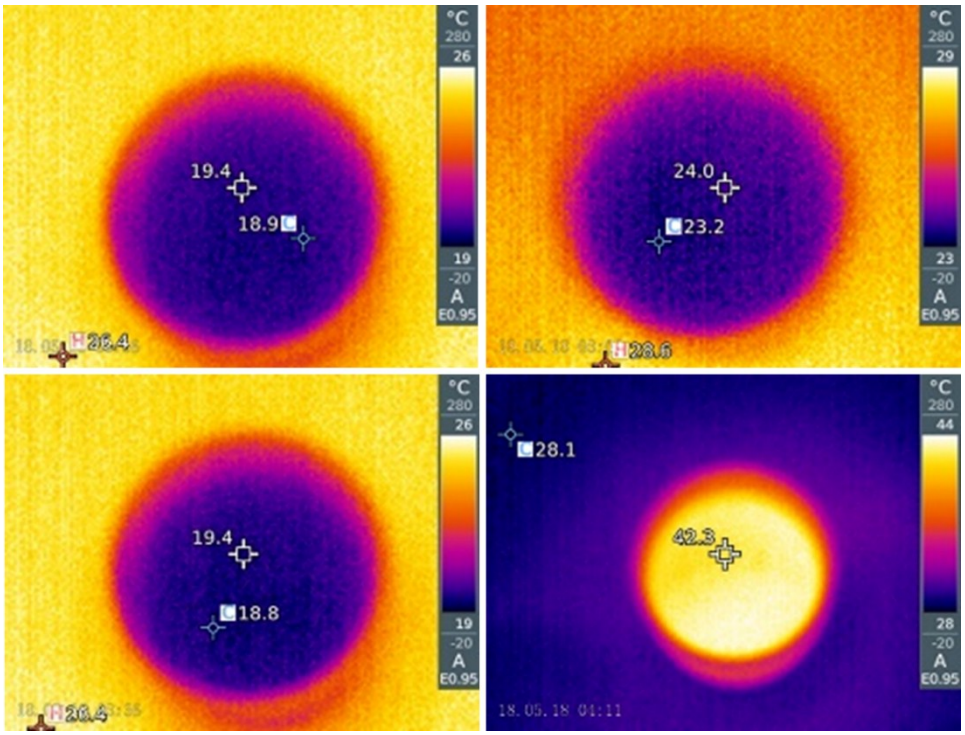

Figure S7. Infrared thermo-images of the 3.5 wt% NaCl saline water alone (top row) and the solution with monolayer MPE-5%Cu/CST microparticles floating on the water surface (bottom row) before light irradiation (left column) and after one-sun irradiation for 30 min (right column), respectively.

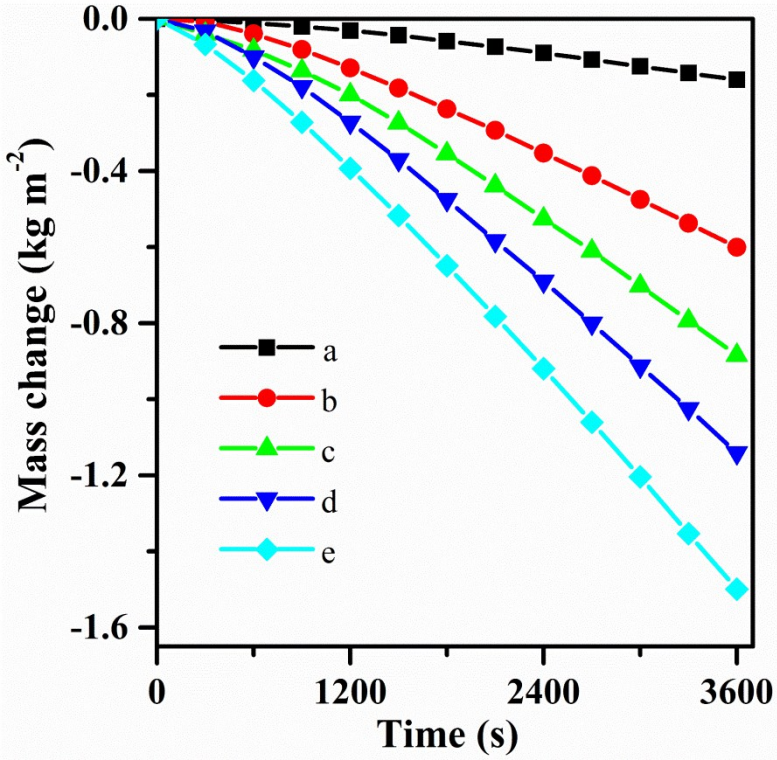

Figure S8. Mass changes during water evaporation of the 3.5 wt% NaCl saline water alone (a), and with the aid of MPE-CS (b), MPE-CT (c), MPE-CST (d) and MPE-5%Cu/CST (e), respectively, under the irradiation of one sun.

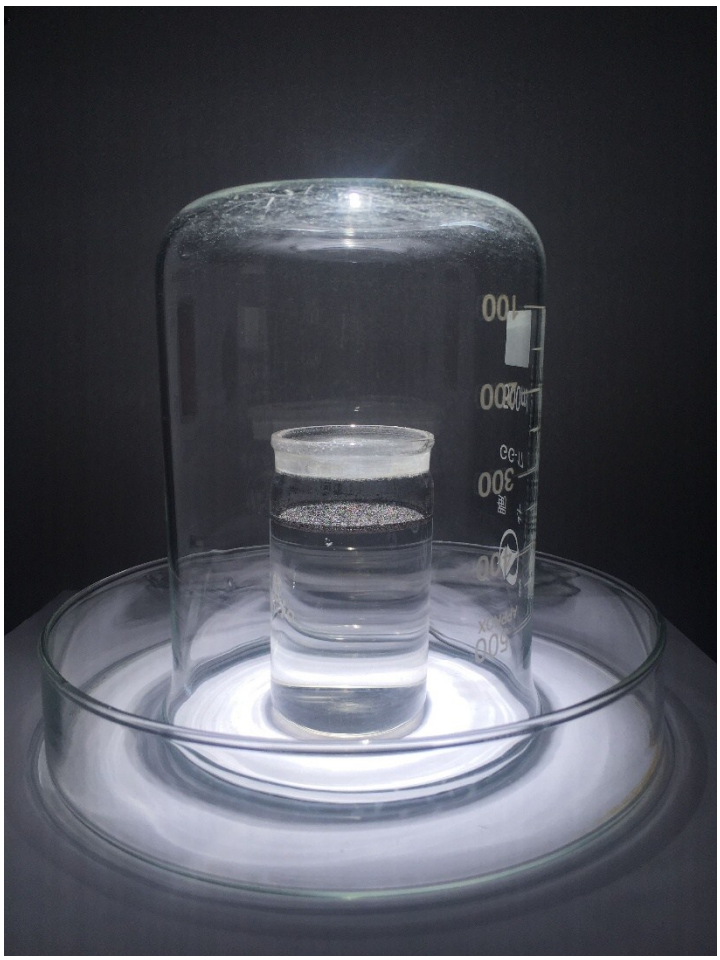

Figure S9. Optical image of the solar-driven water evaporation set-up and the liquid water collection accessory with the monolayer of MPE-5%Cu/CST microparticles floating on water surface.

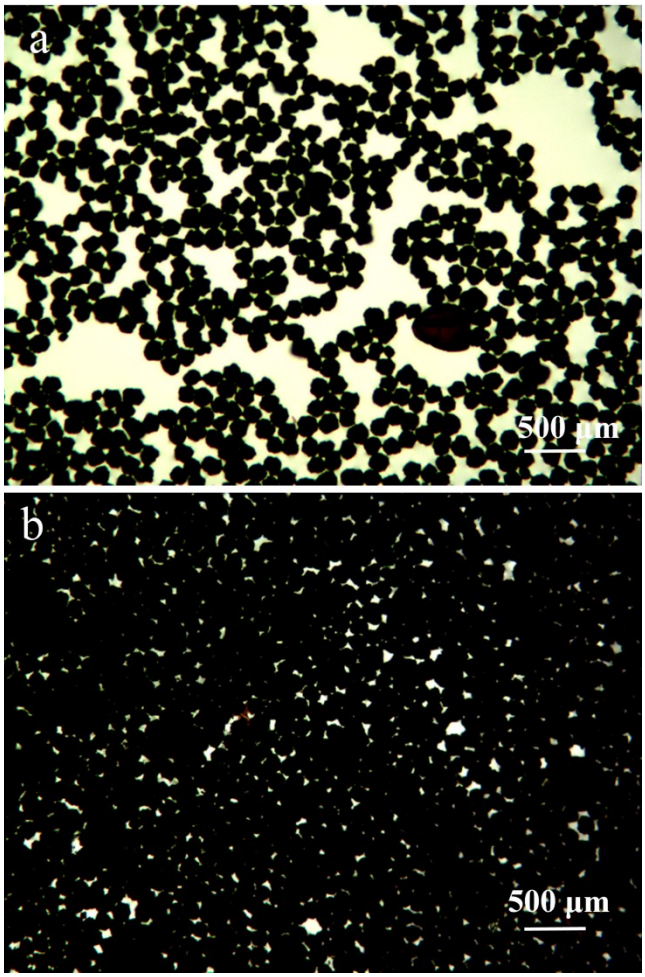

Figure S10. Optical microscope images of the MPE-5%Cu/CST microparticles floating on water surface with a loading amount of ~ 3.0 (a) and 10.0 (b) mg cm^{-2}, respectively.

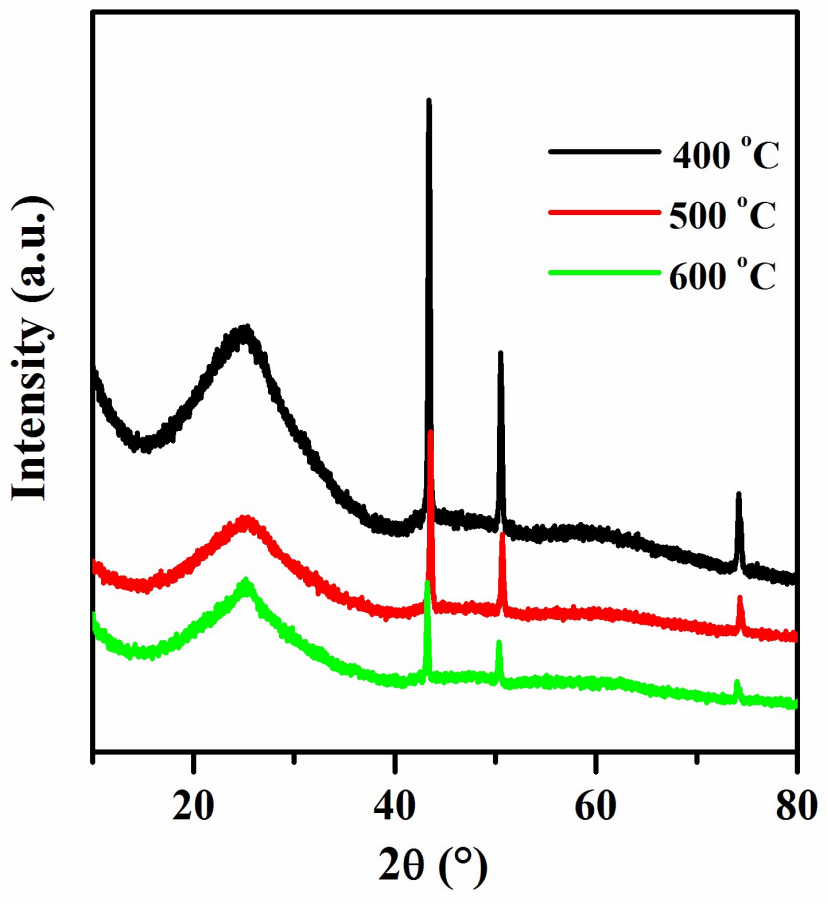

Figure S11. Wide-angle XRD patterns of the MPE-5%Cu/CST microparticles obtained at a calcination temperature of 400, 500 and 600 ºC in N_2, respectively.

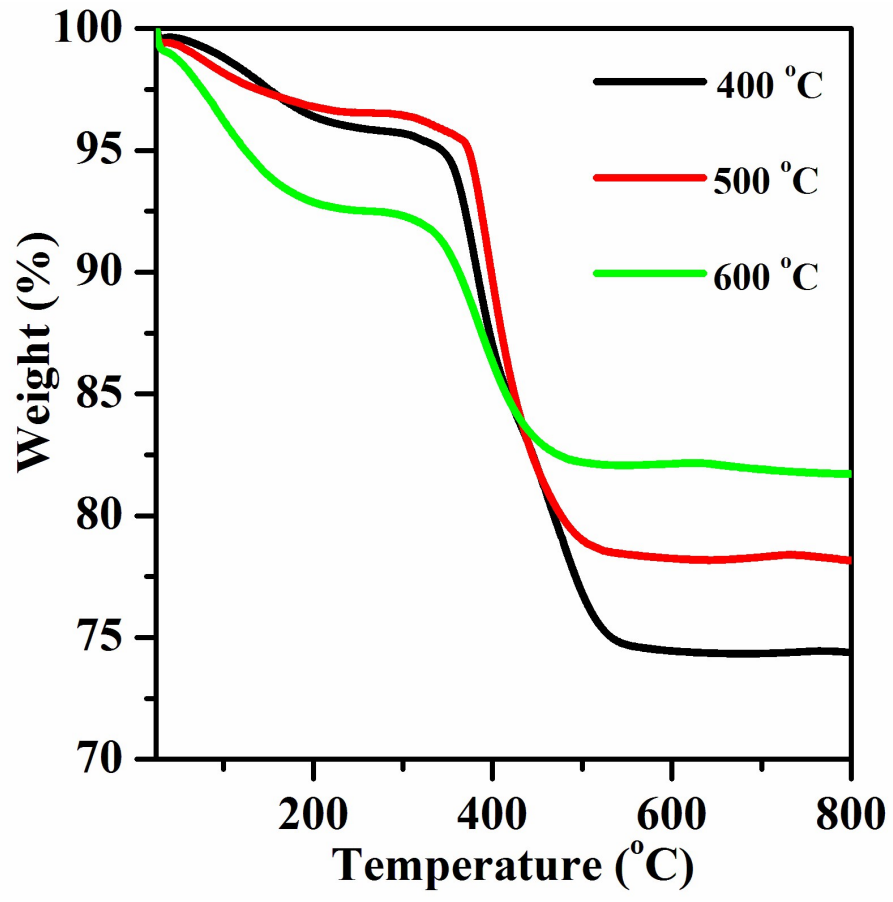

Figure S12. TG curves in air of the MPE-5%Cu/CST microparticles obtained at a calcination temperature of 400, 500 and 600 ºC in N_2, respectively.

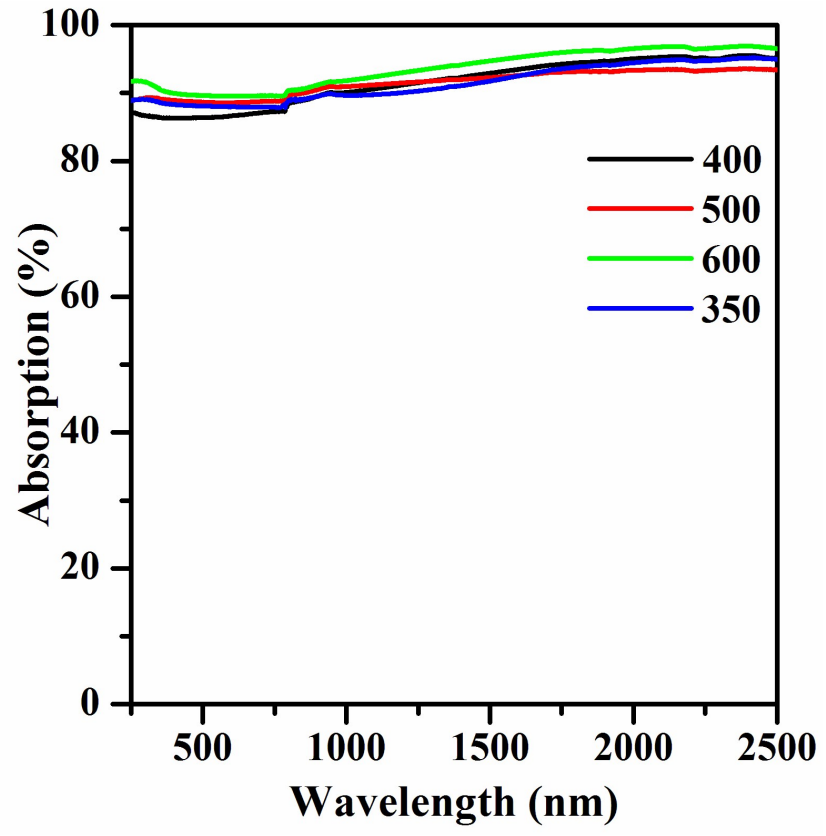

Figure S13. Uv-vis-NIR spectra of the MPE-5%Cu/CST microparticles obtained at a calcination temperature of 350, 400, 500 and 600 ºC in N_2, respectively.

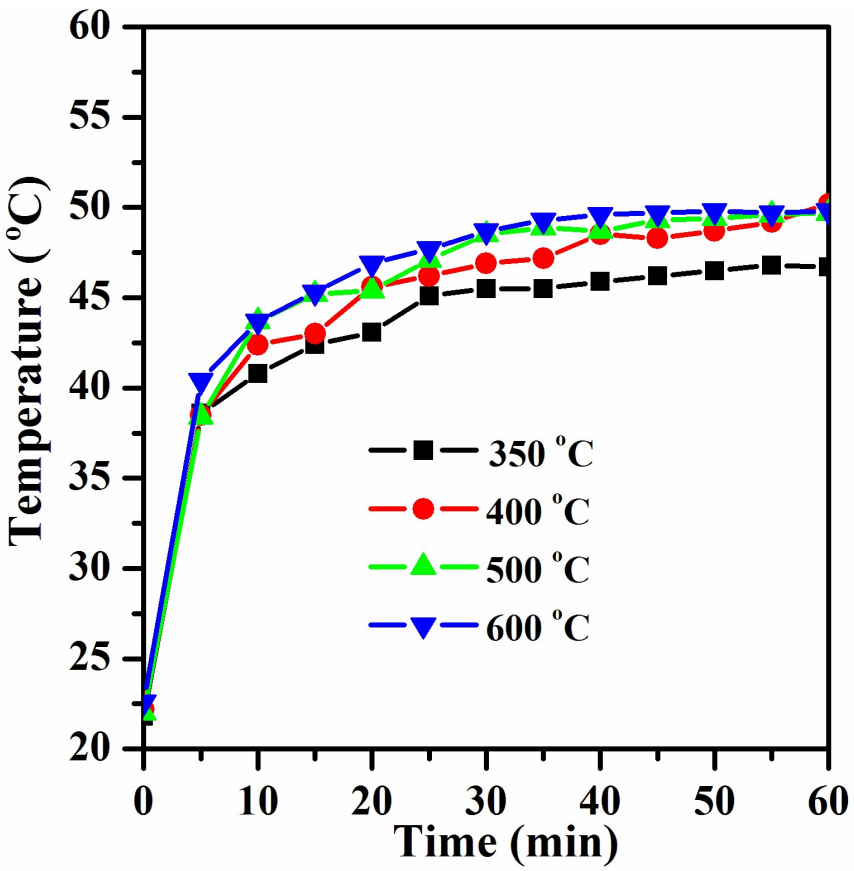

Figure S14. Surface temperature changes during evaporating the 3.5 wt% NaCl saline water with the MPE-5%Cu/CST microparticles obtained at a calcination temperature of 350 ~ 600 ºC in N_2 floating on water surface under the irradiation of one sun.

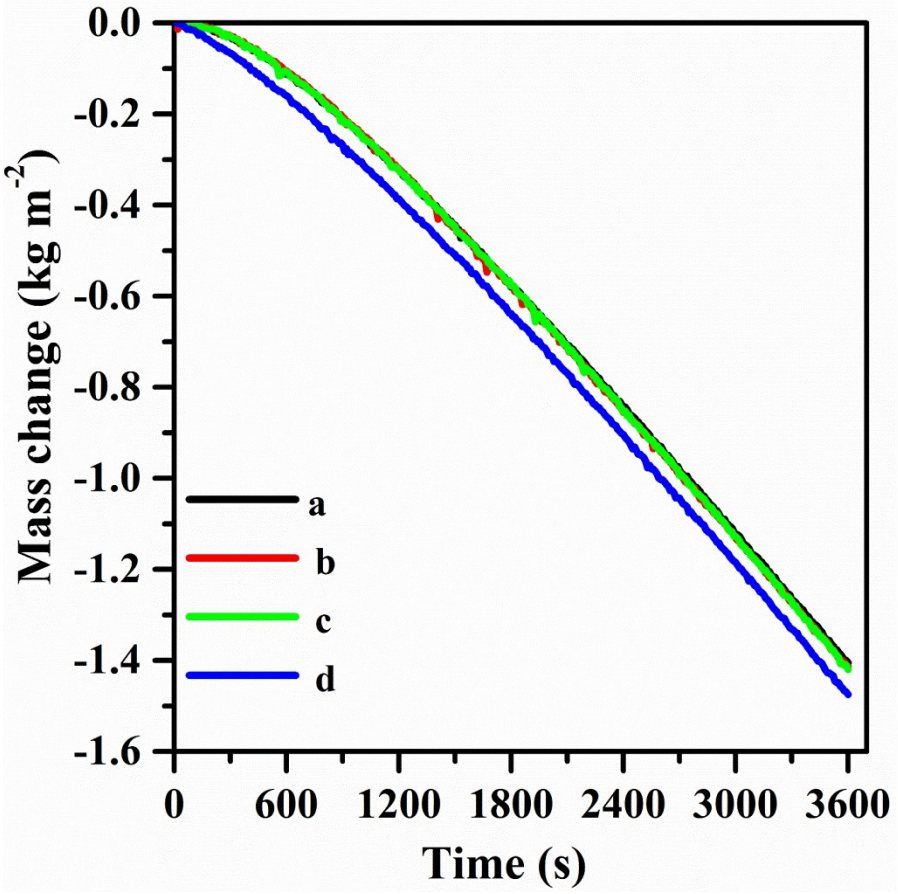

Figure S15. Mass changes during water evaporation of the 3.5 wt% NaCl saline water with the MPE-5%Cu/CST microparticles obtained at a calcination temperature of 350 (a), 400 (b), 500 (c) and 600 ºC (d) in N_2 floating on water surface under the irradiation of one sun.

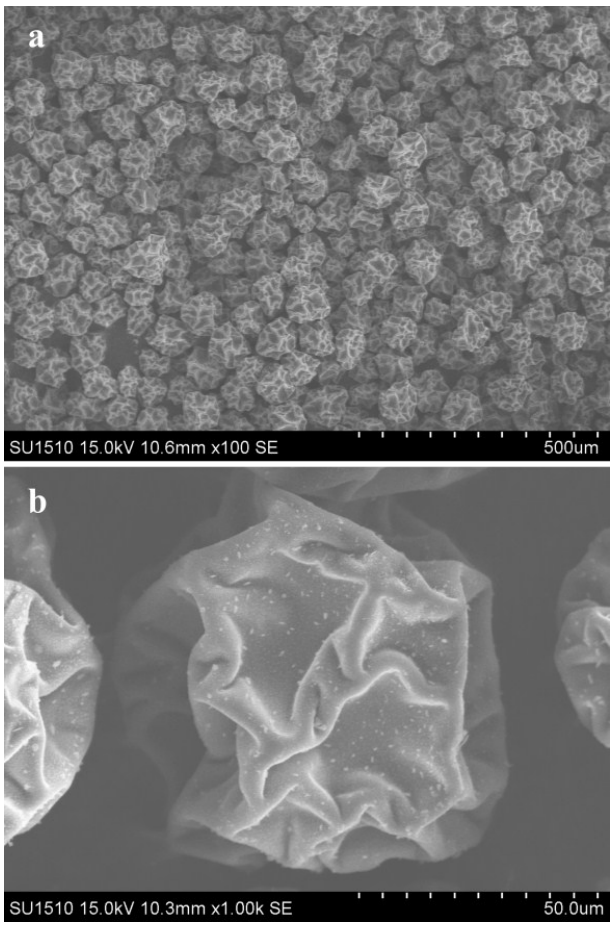

Figure S16. SEM images (a, b) of MPE-5%Cu/CST microparticles after 10 cycles of solar-driven water evaporation under the irradiation of one sun.

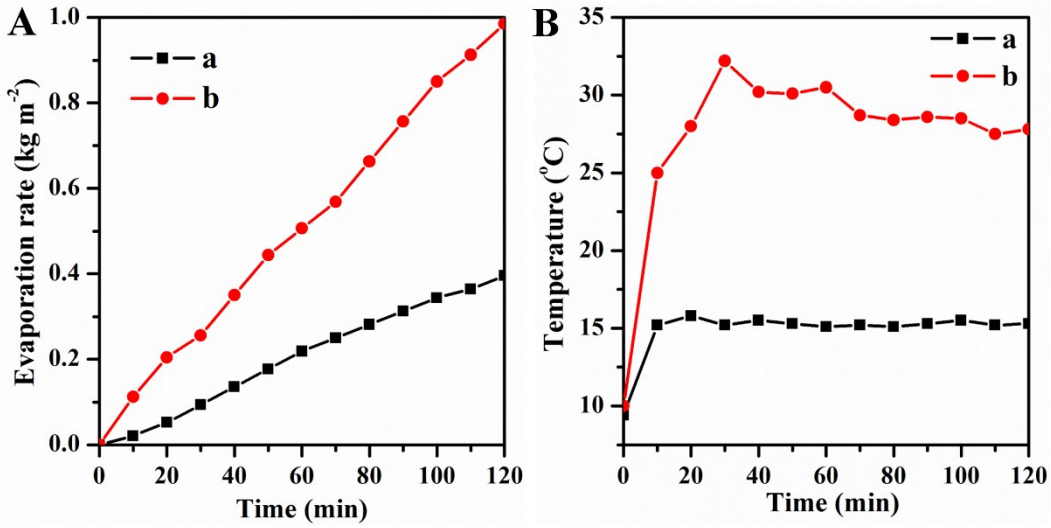

Figure S17. The water evaporation rates (A) and the temperature changes (B) of the 3.5 wt% NaCl solution alone (a) and the same solution with the MPE-5Cu%/CST microparticles floating on surface (b) under the irradiation of natural sunlight at ambient temperature and humidity.