

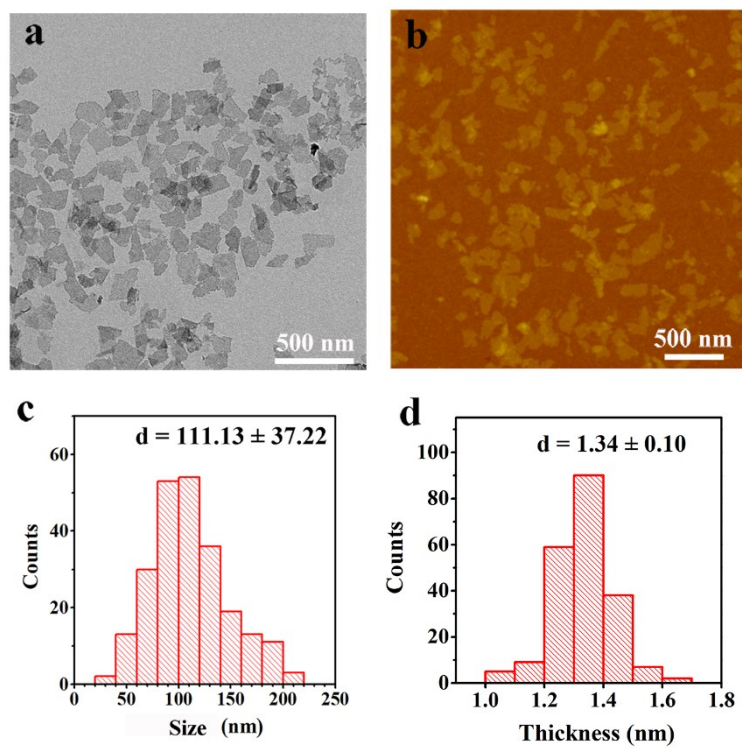
## Electronic Supplementary Information

### **Hyaluronidase-responsive phototheranostic nanoagents for fluorescence imaging and photothermal/photodynamic therapy of methicillin-resistant *Staphylococcus aureus* infections**

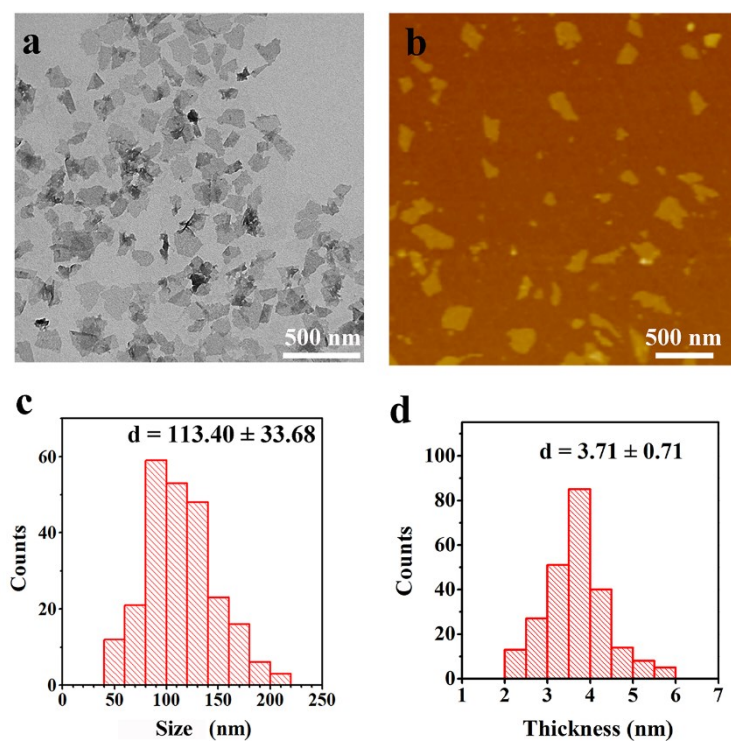
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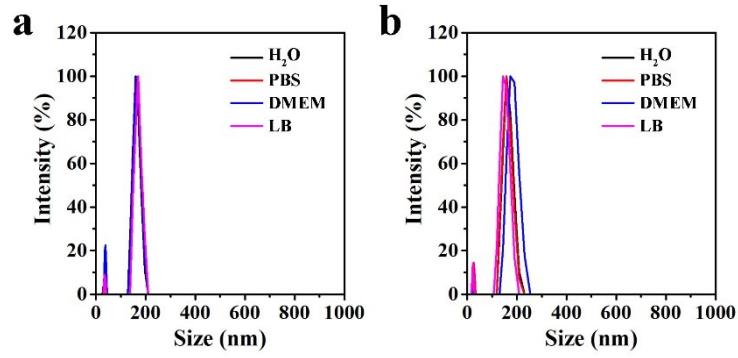
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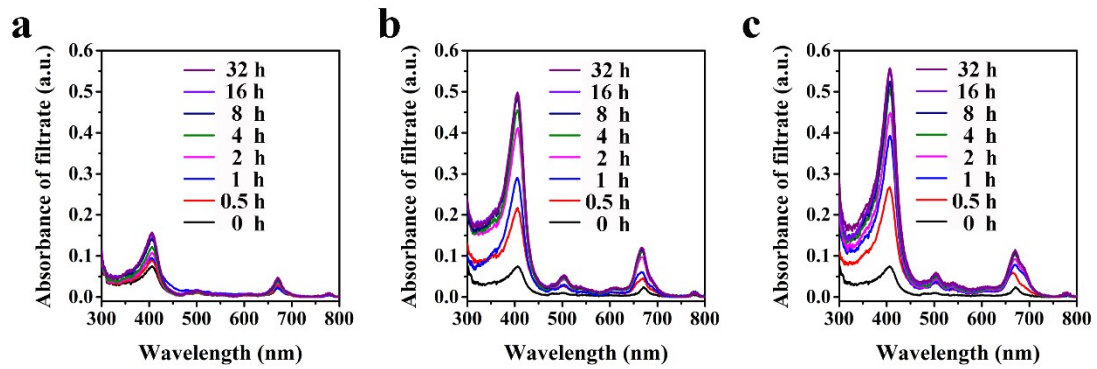
**Figure S1.** (a) TEM image, (b) AFM image, (c) size statistics, and (d) thickness statistics of MoS<sub>2</sub> NSs. Data are presented as mean  $\pm$  s.d., based on more than 200 nanosheets.



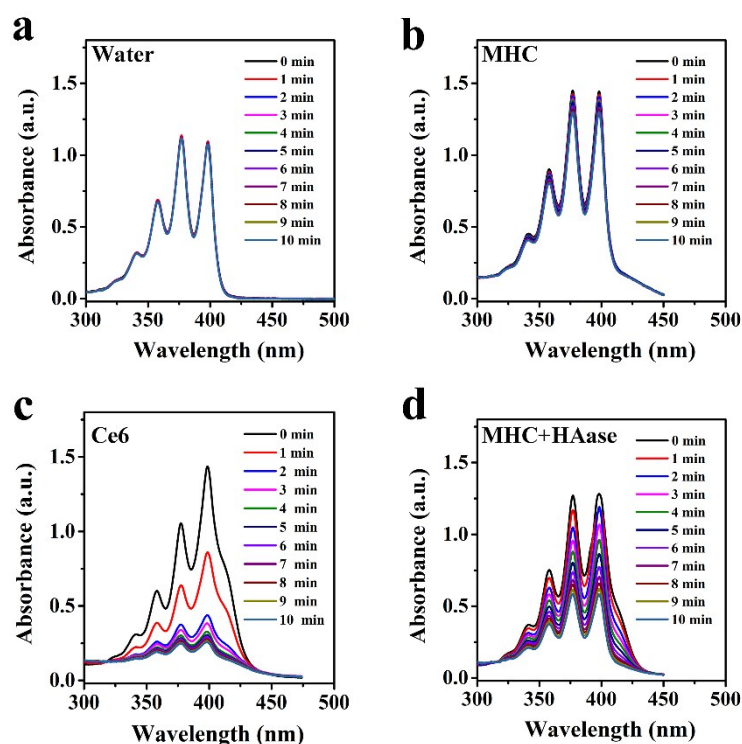
**Figure S2.** (a) TEM image, (b) AFM image, (c) size statistics, and (d) thickness statistics of MHC NSs. Data are presented as mean  $\pm$  s.d., based on more than 200 nanosheets.



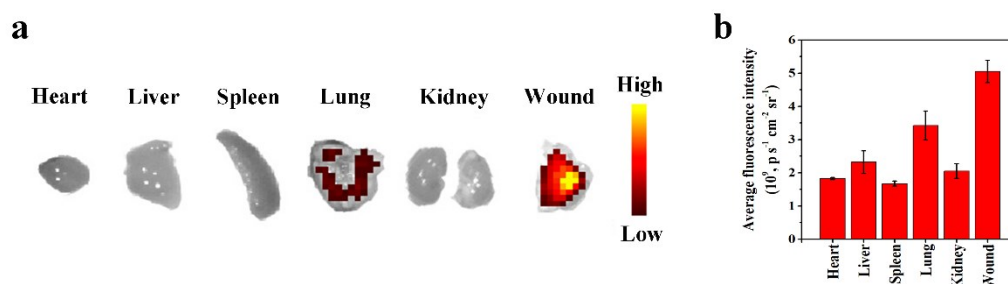
**Figure S3.** Hydrodynamic sizes of MHC NSs dispersed in H<sub>2</sub>O, PBS, DMEM, and LB for (a) 0 h and (b) 48 h.



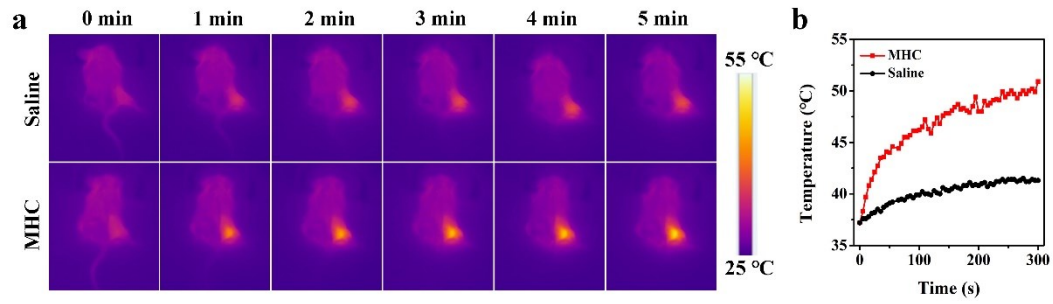
**Figure S4.** UV-Vis-NIR absorption spectra of the filtrates from the MHC NSs solutions after incubated with (a) PBS, (b) MRSA, and (c) HAase.



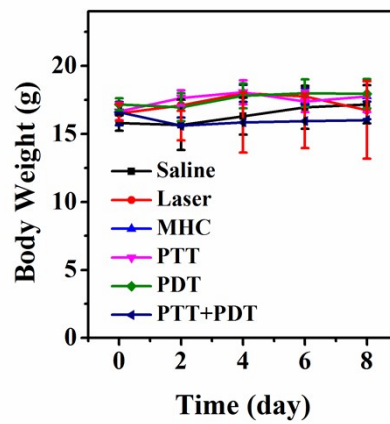
**Figure S5.** UV-Vis absorption spectra of the ABDA in different solutions after laser irradiation: (a) water, (b) MHC NSs, (c) Ce6, and (d) MHC NSs + HAase. The 635 nm laser irradiation was set at the power density of  $20 \text{ mW/cm}^2$  for all these samples.



**Figure S6.** (a) *Ex vivo* fluorescence images of the major organs (heart, liver, spleen, lung and kidney) and the MRSA infected tissues from the mice i.v. injected with MHC NSs ( $\text{MoS}_2$ :  $5 \text{ mg/kg}$ ; Ce6:  $5 \text{ mg/kg}$ ) for 24 h and (b) the corresponding average fluorescence intensity. Data are presented as means  $\pm$  s.d. ( $n = 3$ ).



**Figure S7.** (a) Infrared thermal images of the MRSA infected wounds in mice treated with saline ( $50 \mu\text{L}$ ), MHC NSs ( $\text{MoS}_2$ :  $200 \mu\text{g/mL}$ , Ce6:  $200 \mu\text{g/mL}$ ;  $50 \mu\text{L}$ ) under  $785 \text{ nm}$  laser irradiation ( $0.60 \text{ W/cm}^2$ ) at different times, and (b) the corresponding temperature evolution curves.



**Figure S8.** Body weight curves of the mice after different treatments.