

## Supporting Information

### **Alleviating hypoxia by integrating MnO<sub>2</sub> with metal-organic frameworks coated upconversion nanocomposites for enhanced photodynamic therapy *in vitro***

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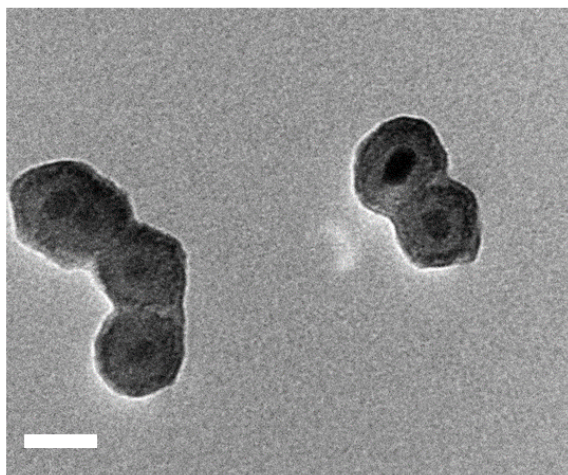
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**Fig. S1** TEM image of UMMn. Scale bar: 50 nm.

**Fig. S2** Energy dispersive X-ray spectroscopy (EDS) spectrum of UMMnP.

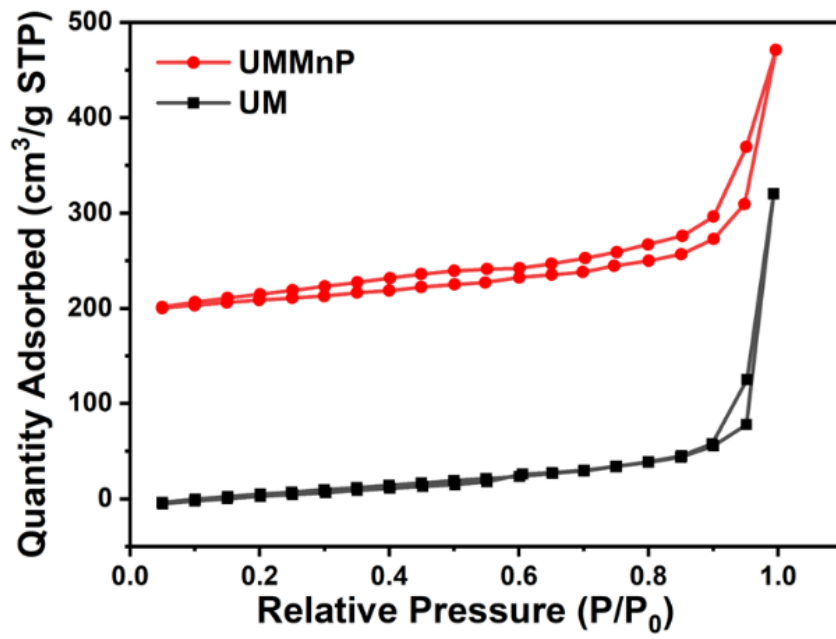
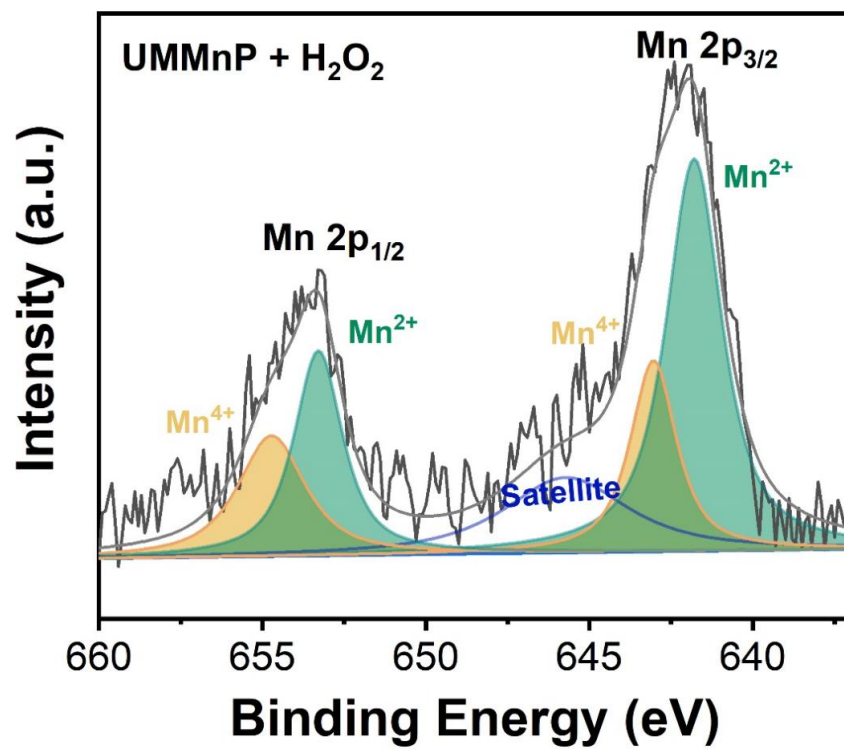
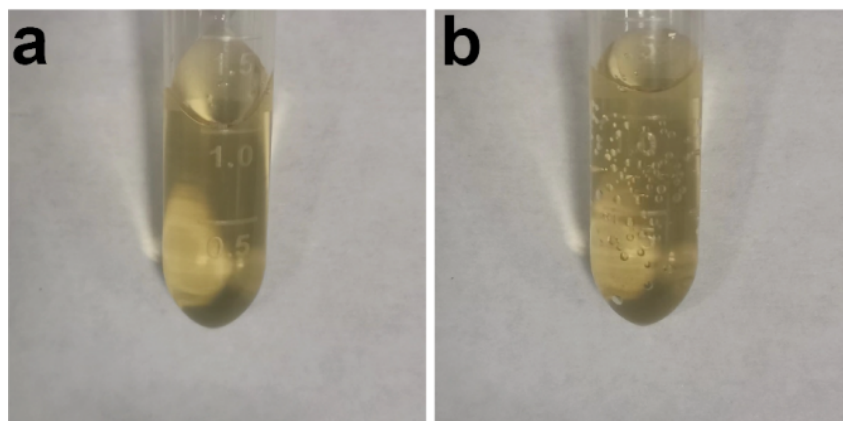


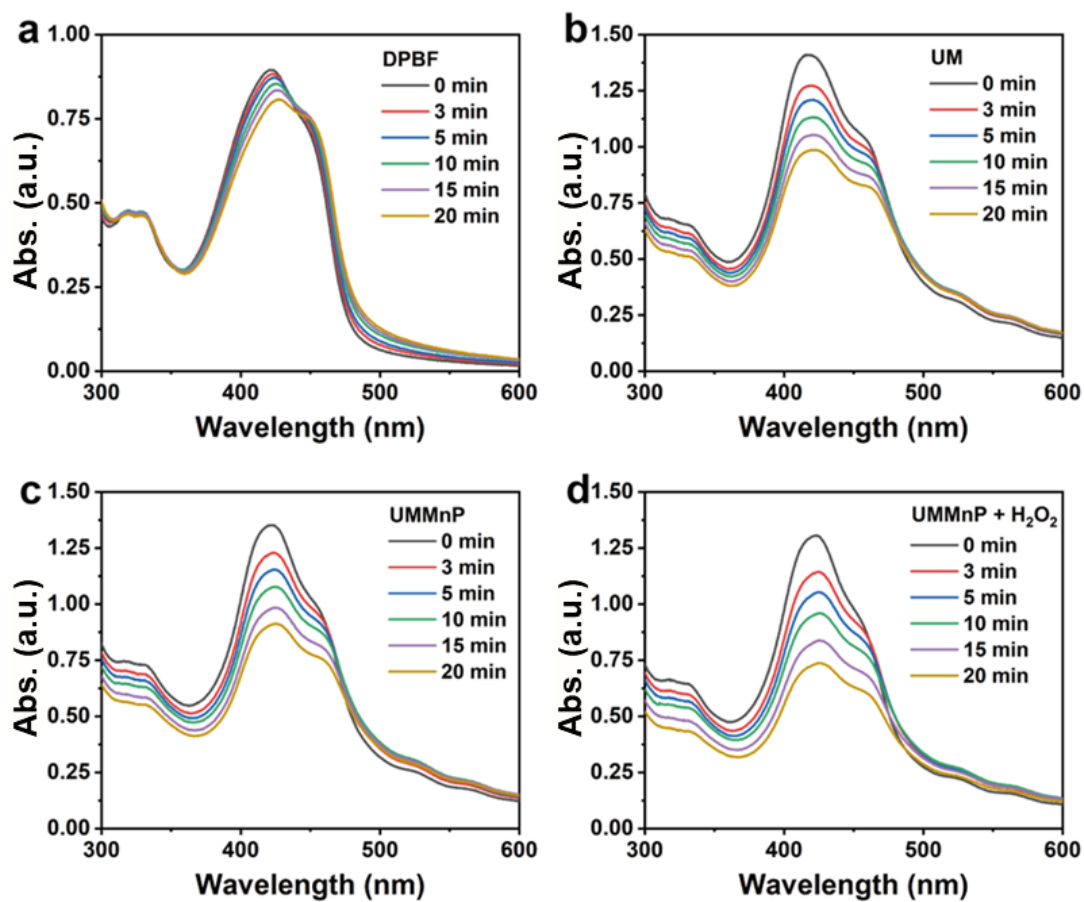
Fig. S3 N<sub>2</sub> adsorption-desorption isotherms of UM and UMMnP.



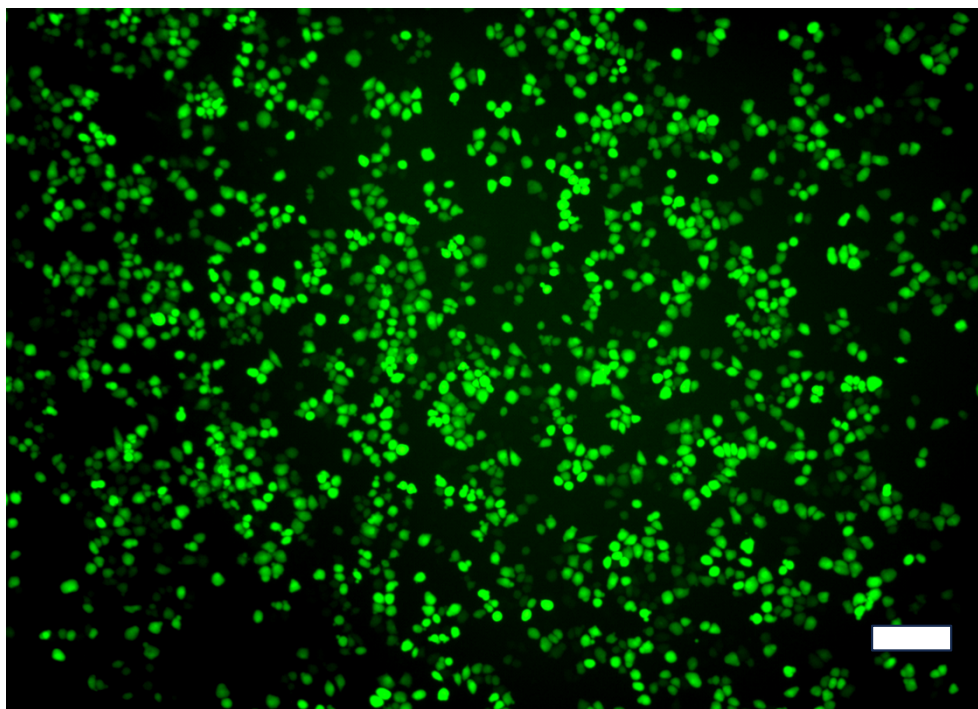
**Fig. S4** High-resolution X-ray photoelectron spectroscopy (XPS) spectrum of Mn 2p of UMMnP with H<sub>2</sub>O<sub>2</sub> treatment.



**Fig. S5** Pictures of UMMnP (200  $\mu\text{g}/\text{mL}$ ) mixed with  $\text{H}_2\text{O}_2$  solution (1 mM) for 0 min (a) and 5 min (b).



**Fig. S6** Time-dependent UV-Vis absorption spectra of DPBF (a), and DPBF in UM (b), in UMMnP (c), and in UMMnP mixed with H<sub>2</sub>O<sub>2</sub> solution (1 mM) (d) under 980 nm laser irradiation (1.2 W/cm<sup>2</sup>).



**Fig. S7** Fluorescence image of intracellular reactive oxygen species (ROS) production with the existence of DCFH-DA in HeLa cells treated with 0.15%  $\text{H}_2\text{O}_2$ . Scale bar: 100  $\mu\text{m}$ .