Supporting Information

Functionalized nanozyme with drug loading for enhanced tumor combination treatment of catalytic therapy and chemotherapy

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Chemodynamic performance

To clarify the catalytic activity of Zr/Ce-MOFs and Zr/Ce-MOFs/DOX/MnO_2, MB was applied as an indicator to monitor ·OH production. MB can be degraded by ·OH produced from the disproportionation reaction between H_2O_2 and Zr/Ce-MOFs and Zr/Ce-MOFs/DOX/MnO_2, then assayed at 665 nm on a UV spectrometer. According to the time-dependent absorbance curve, all the corresponding average initial velocities of absorbance were calculated. Next, these average initial velocities were transformed to initial velocities (V_0) of ·OH production via the Beer-Lambert law (eqn (1)), and then plotted as curves against the corresponding concentrations and fitted by the Michaelis-Menten equation (eqn (3)) to obtain the Michaelis-Menten constant (K_M) and the maximum velocity (Vmax).

$$A=kbc \quad (1)$$

$$V_0=(V_{max}\times[S])/(K_M+[S]) \quad (2)$$

$$1/V_0=(K_M/V_{max})\times(1/[S])+(1/V_{max}) \quad (3)$$

[S]-the concentration of H_2O_2

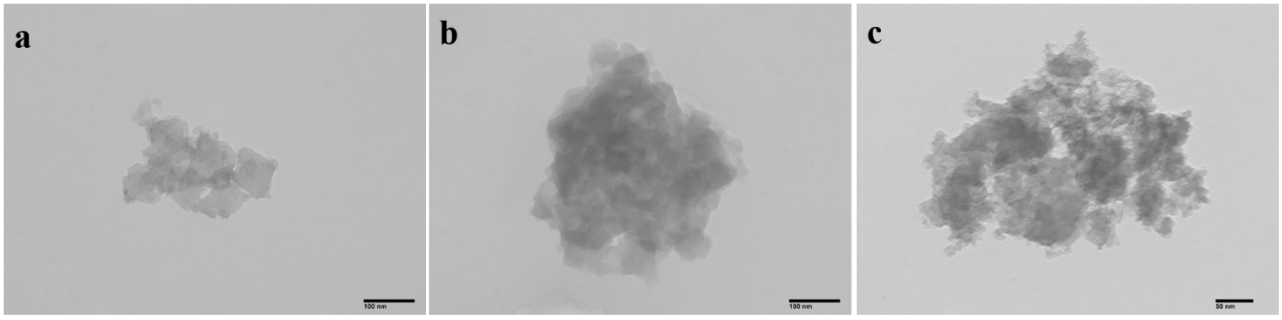

Fig. S1. TEM images of (a)Zr/Ce-MOFs, (b) Zr/Ce-MOFs/DOX and (c) Zr/Ce-MOFs/DOX/MnO_2.

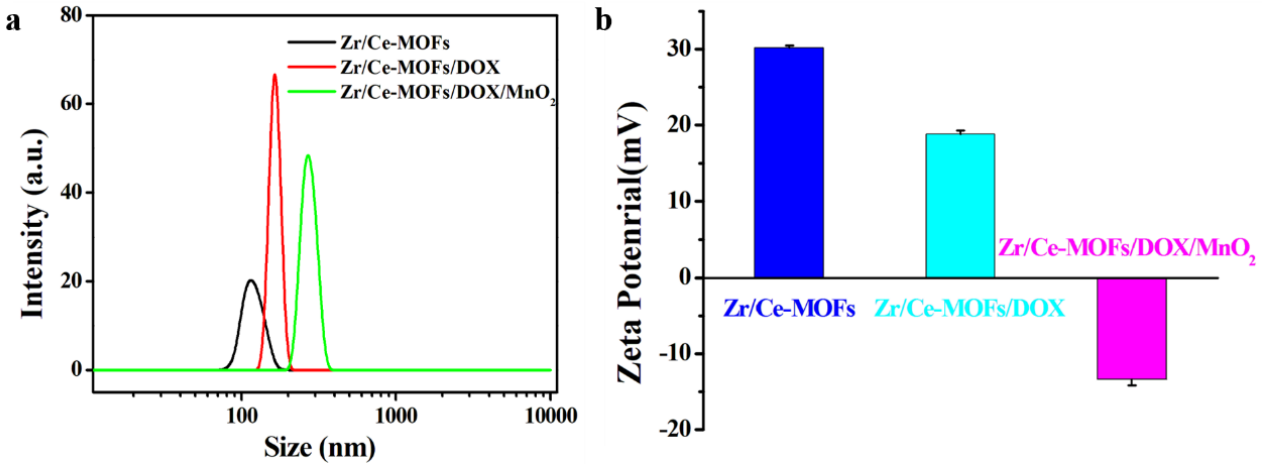

Fig. S2. (a) DLS and (b) Zeta potential of Zr/Ce-MOFs, Zr/Ce-MOFs/DOX and Zr/Ce-MOFs/DOX/MnO_2. The error bar is the standard deviation of experimental data for three times.

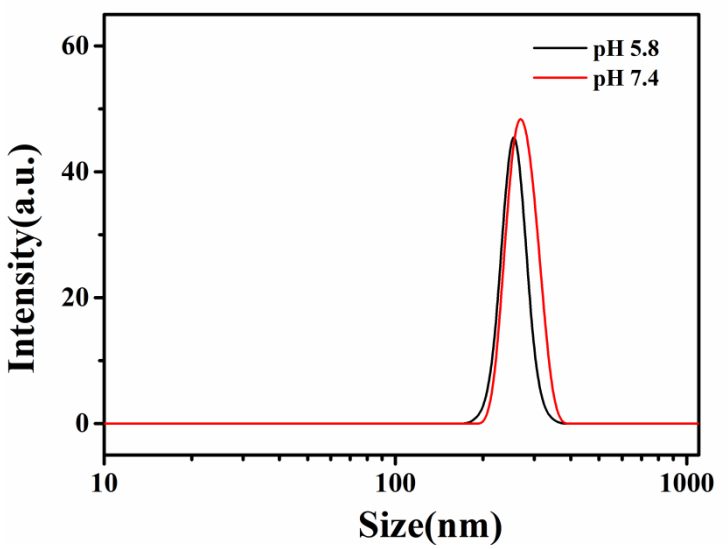

Figure S3. DLS size distribution of Zr/Ce-MOFs/DOX/MnO_2 in PBS of different pH.

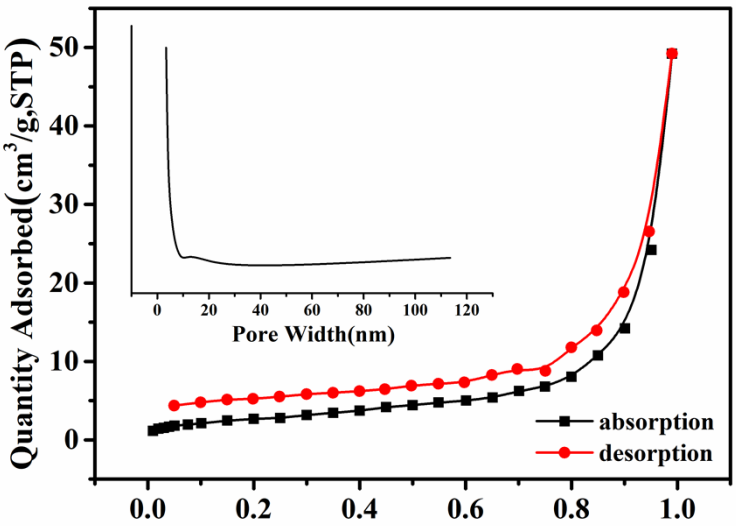

Figure S4. Nitrogen adsorption curve of Zr/Ce-MOFs.

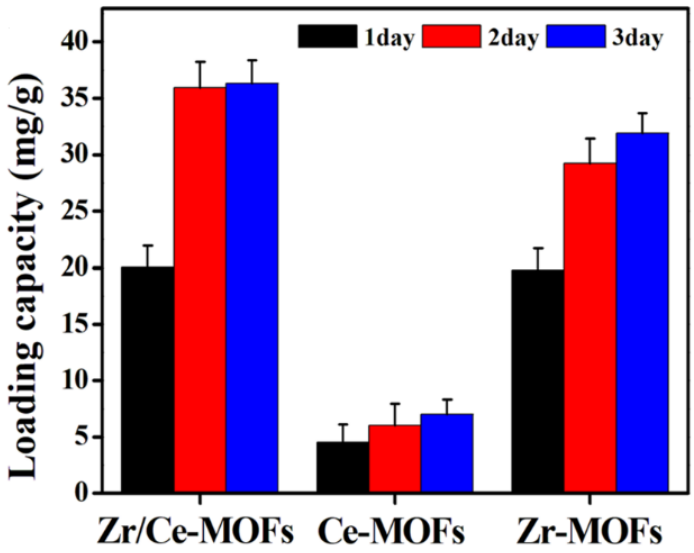

Fig. S5. The drug loading of different particle. The error bar is the standard deviation of experimental data for three times.

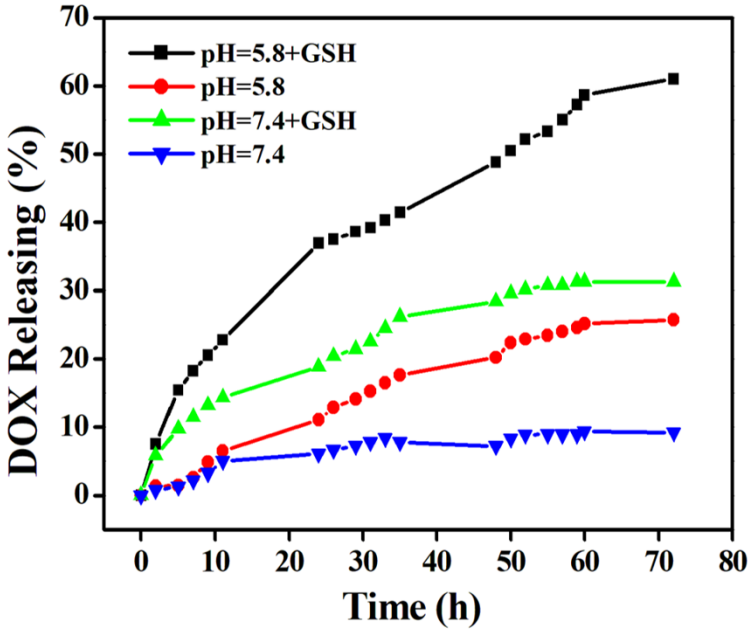

Fig. S6. The drug release of Zr/Ce-MOFs/DOX/MnO_2 at different pH values (pH = 7.4 and 5.8) and GSH concentrations (0 and 10 mM).

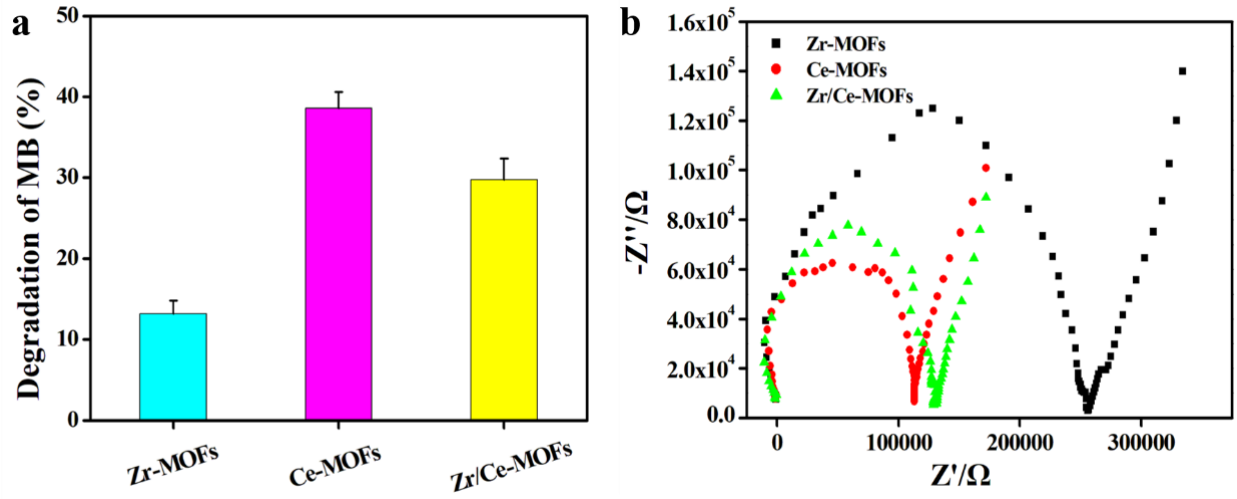

Fig. S7. (a) The degradation rate of MB of different materials; (b) EIS Nyquist plots of different materials. The error bar is the standard deviation of experimental data for three times.

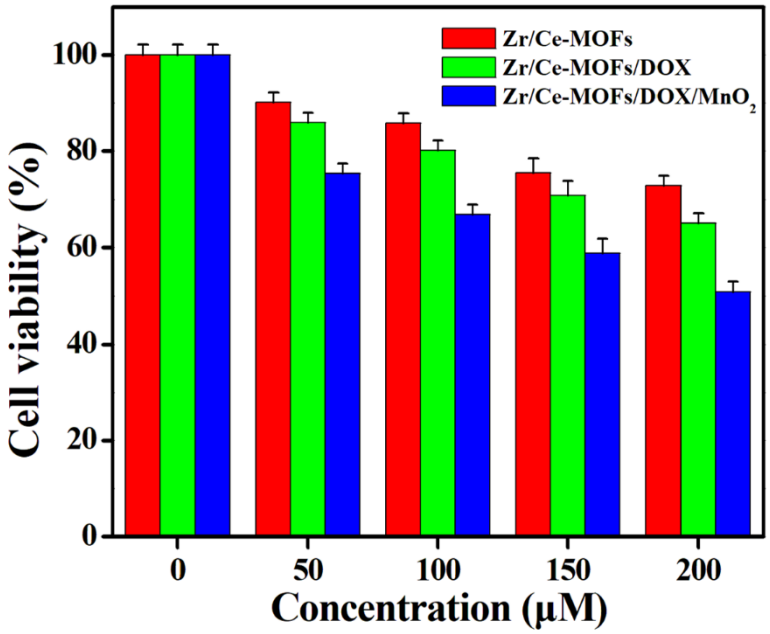

Fig. S8. Cell viability of Zr/Ce-MOFs, Zr/Ce-MOFs/DOX and Zr/Ce-MOFs/DOX/MnO_2. The error bar is the standard deviation of experimental data for three times.

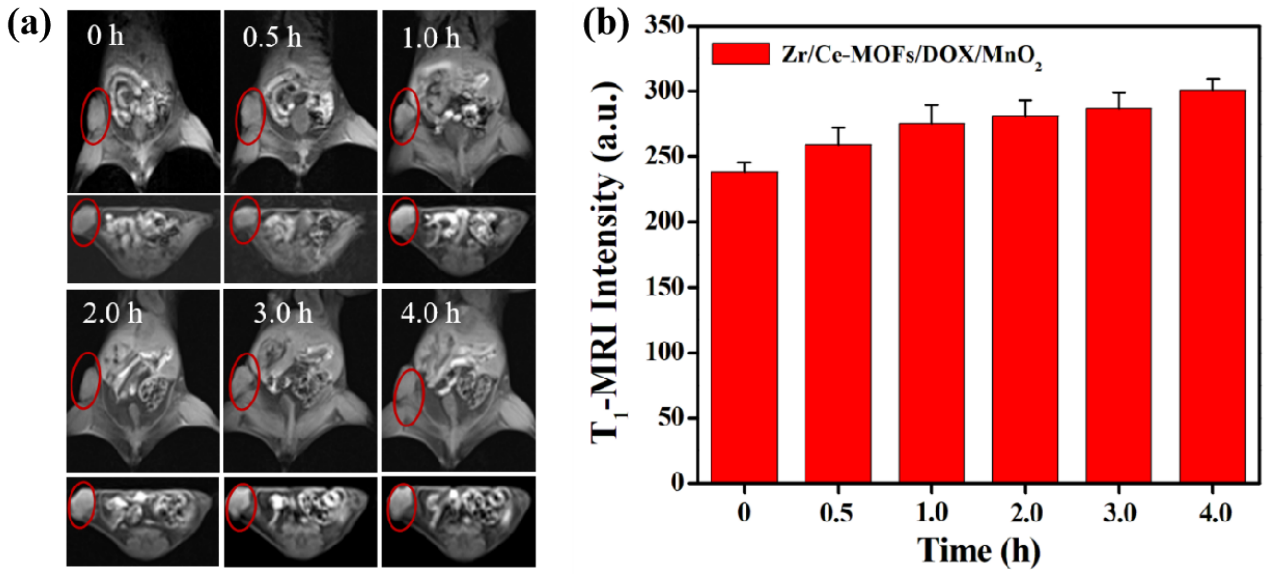

Fig. S9. (a)T_1-weighted images of tumor after injection with Zr/Ce-MOFs/DOX/MnO_2 at different time points; (b) The MRI signal at the injection site. The error bar is the standard deviation of experimental data for three times.