Electronic Supplementary Material (ESI) for Nanoscale.

Supporting Information

Dimensional Reduction Boosts the Peroxidase-Like Activity of Bimetallic MOFs for Enhanced Multidrug-Resistant Bacteria Eradication

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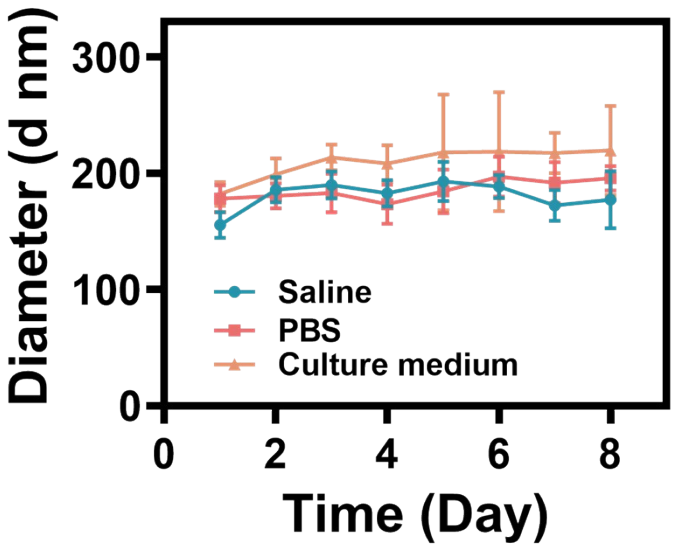

FigureS1. The colloidal stability of Co-Fe NDs in saline, PBS, and culture medium at different time.

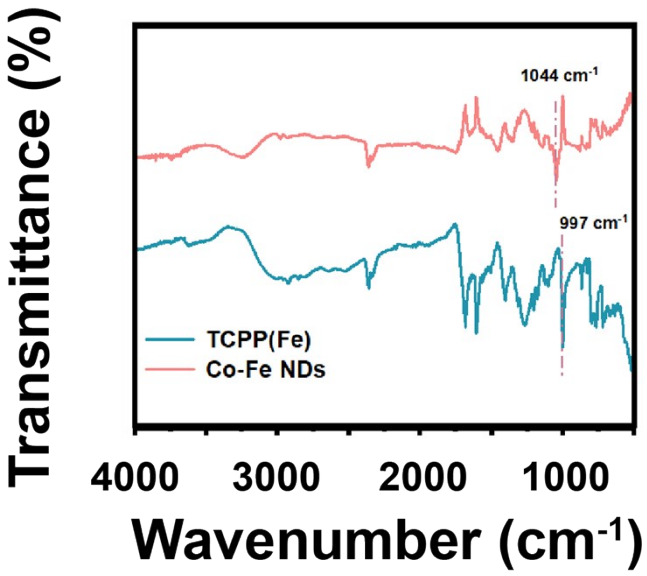

Figure S2. FTIR spectra of TCPP(Fe) and Co-Fe NDs nanosheets.

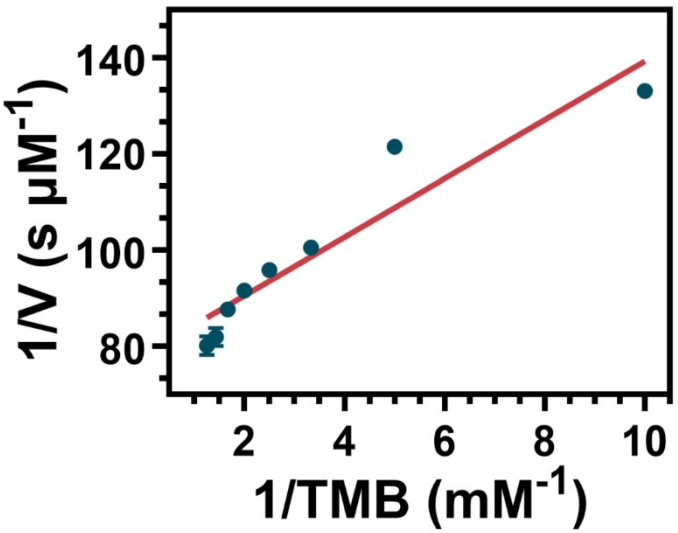

Figure S3. Double-reciprocal plots of (Figure 2f), respectively. Condition: 0.25μg mL^{-1} Co-Fe NDs in acetate buffer (pH 4.0) at room temperature.

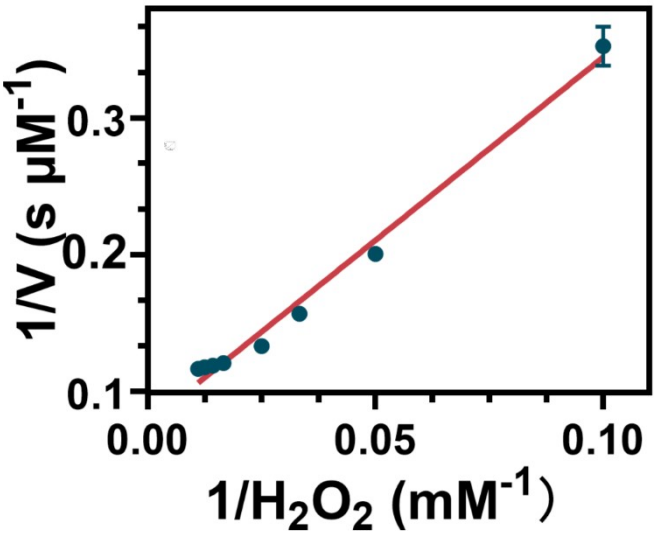

Figure S4 Double-reciprocal plots of (Figure 2g), respectively. Condition: 0.25μg mL^{-1} Co-Fe NDs in acetate buffer (pH 4.0) at room temperature.

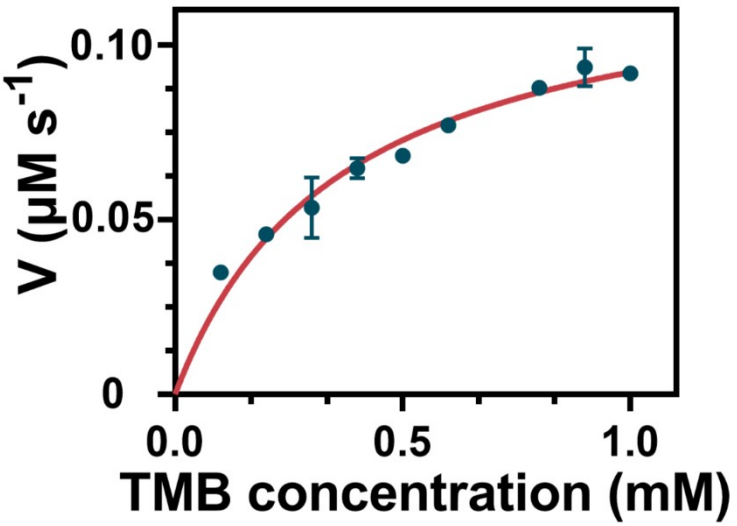

Figure S5. The steady-state kinetic analysis of Co-Fe NDs as peroxidase mimetics. 10 mM H_2O_2 with different concentrations of TMB. Condition: 0.25μg mL^{-1} Co-Fe NDs in acetate buffer (pH 4.0) at room temperature.

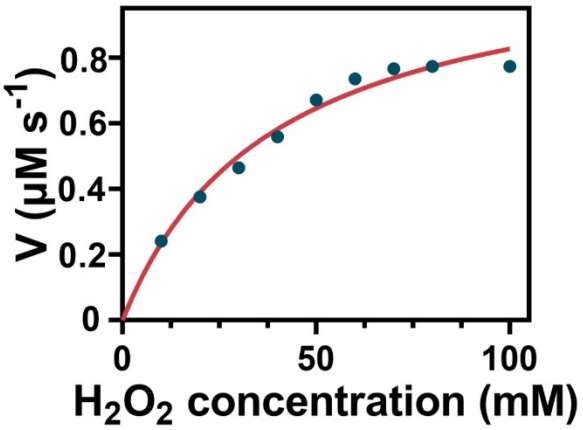

Figure S6. The steady-state kinetic analysis of Co-Fe NDs as peroxidase mimetics. 0.5 mM TMB with different concentrations of H_2O_2. Condition: 0.25μg mL^{-1} Co-Fe NDs in acetate buffer (pH 4.0) at room temperature.

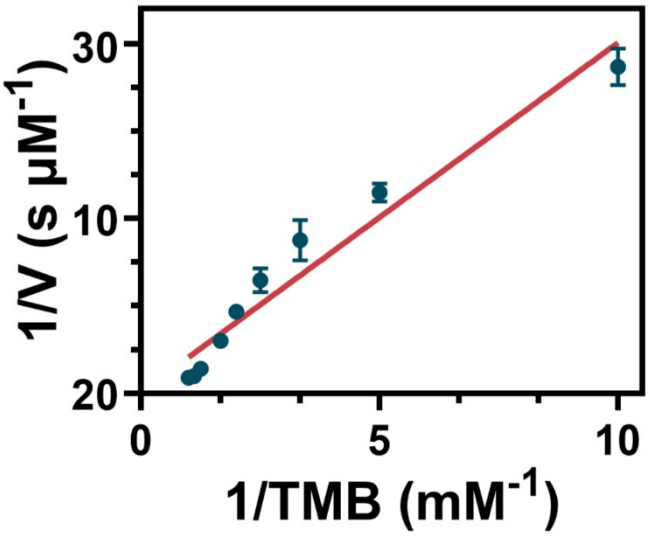

Figure S7. Double-reciprocal plots of (Figure S3), respectively. Condition: 0.25μg mL^{-1} Co-Fe NDs in acetate buffer (pH 4.0) at room temperature.

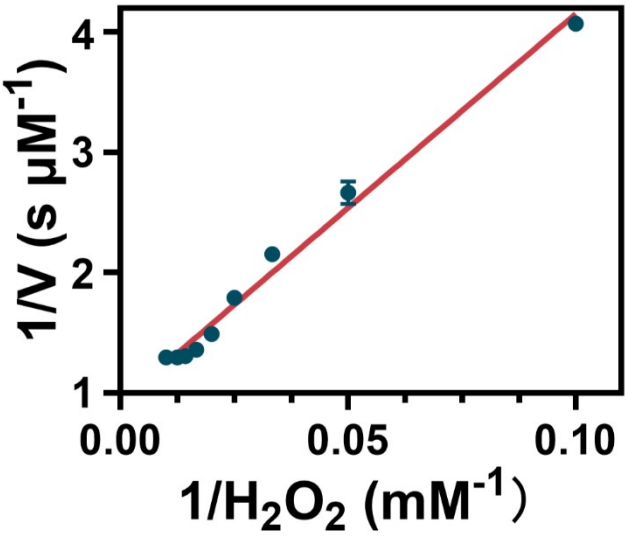

Figure S8. Double-reciprocal plots of (Figure S4), respectively. Condition: 0.25μg mL^{-1} Co-Fe NDs in acetate buffer (pH 4.0) at room temperature.

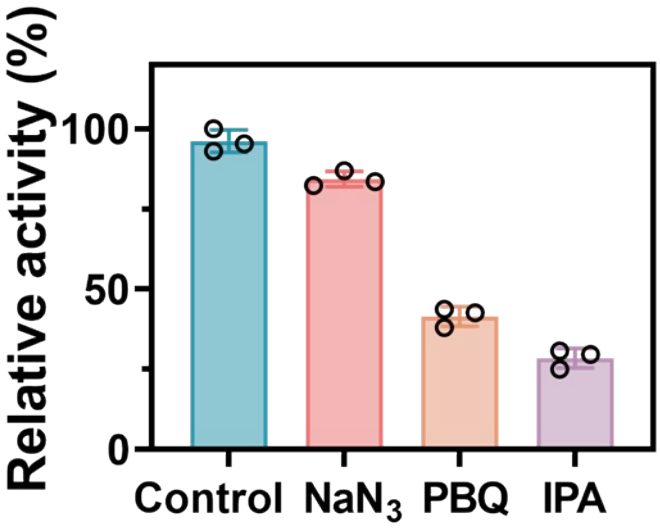

Figure S9. Free radical scavenger effect of Co-Fe NDs

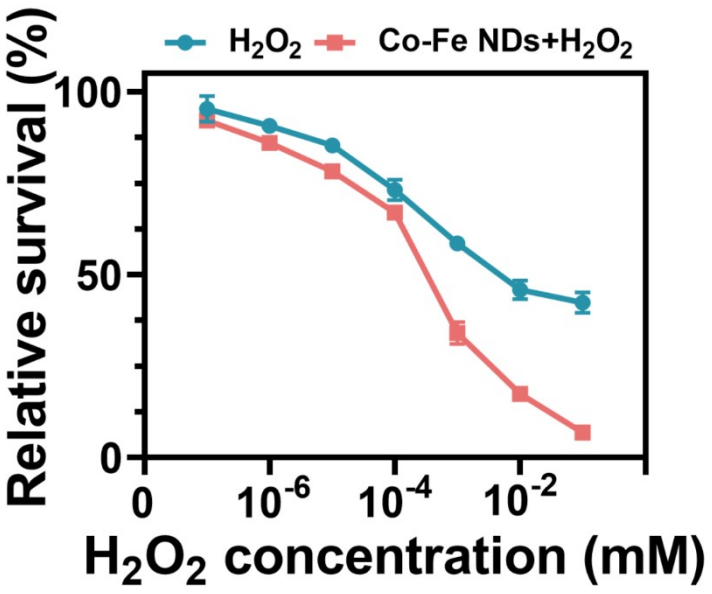

Figure S10. Survival rate of MRSA under different concentrations of H_2O_2.

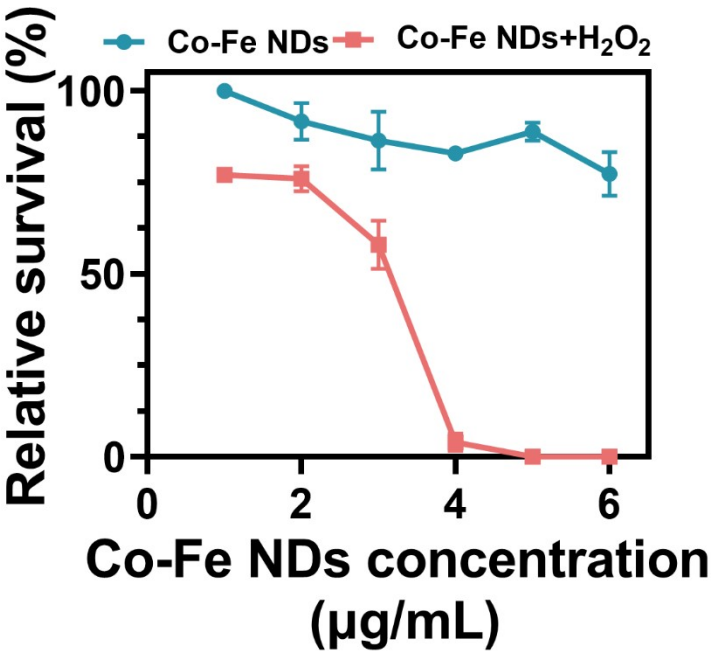

Figure S11. Survival rate of MRSA under different concentrations of Co-Fe NDs.

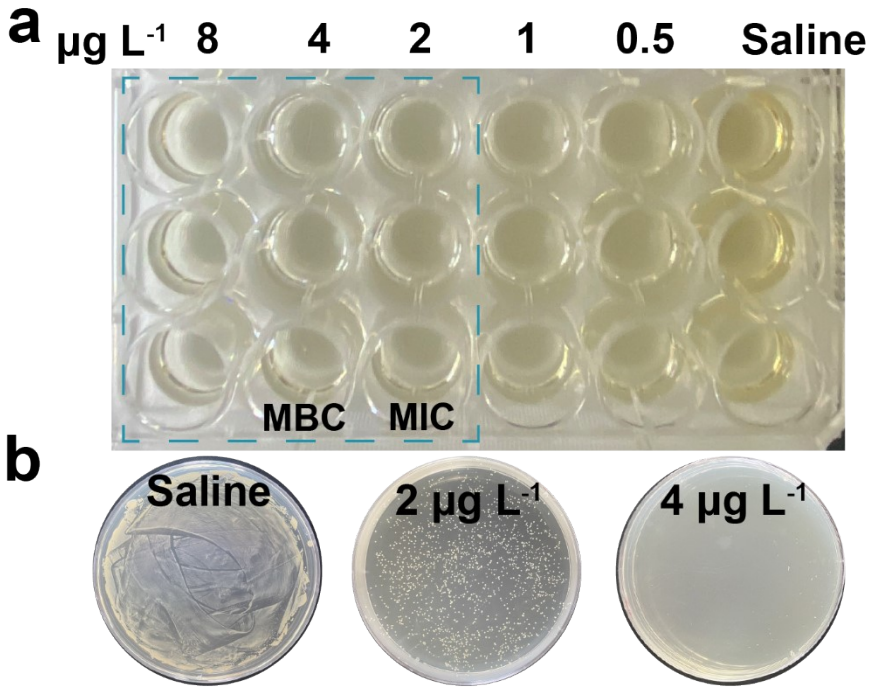

Figure S12. MIC and MBC measurement results of MRSA by Co-Fe NDs.

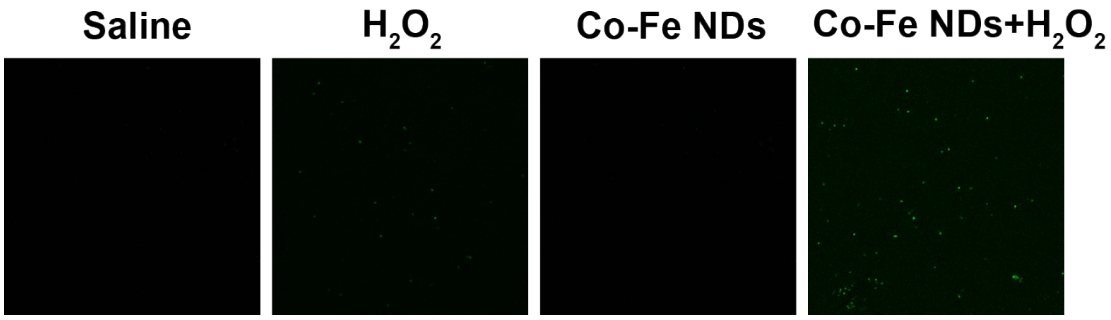

Figure S13. Fluorescence images of MRSA stained by DCFH-DA.

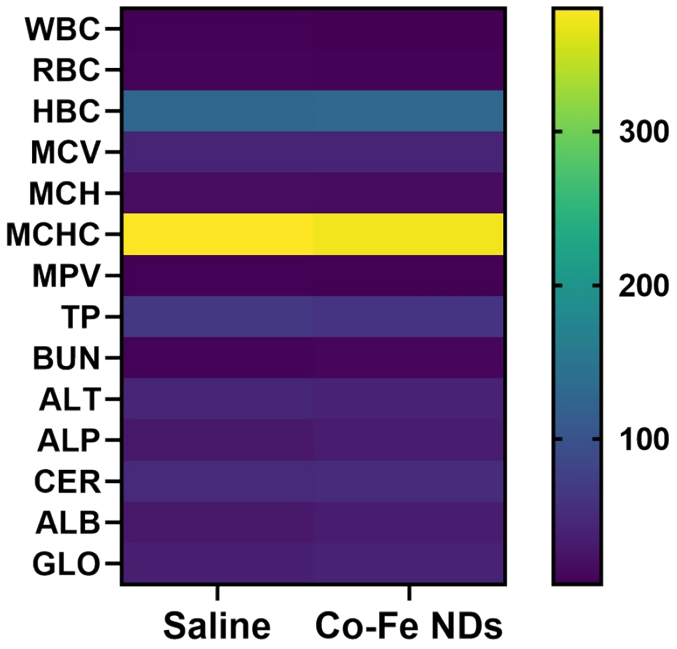

Figure S14. Blood biochemical indicators of mice after 7 days of treatment.

Table S1. Comparison of Michaelis-Menten constants (Km) and maximum initial reaction rates (Vmax) of the peroxidation reaction catalyzed by Co-Fe NDs, HRP and some peroxidase mimetics.

Catalysts	K_m(mM)		V_{max}(10^{-8}M s^{-1})		Reference
	TMB	H_2O_2	TMB	H_2O_2	
Co-Fe NDs	0.130	22.595	1.425	1114	this work
Co-TCPP(Fe)	0.383	35.703	12.856	112	this work
HRP	0.434	3.702	10	8.71	1
Hemin-Au@MOF	2.67	2.58	-	-	2
Fe-loaded MOF-545(Fe)	2.34	1.69	85.4	12	3
Ni-MOF	0.365	2.49	6.53	8.98	4
Tα-MOF	3.18	1.09×10^{-5}	8220	5340	5

Table S2. Comparison of germicidal efficacy of Co-Fe NDs and some peroxidase mimetics.

Nanomaterial	Nanomaterial Concentration ($\mu g\ mL^{-1}$)	H_2O_2 Concentration(mM)	Time （min）	Reference
Co-Fe NDs	4	10	5	this work
GQDs	100	10	10	6
Cu-PBG	30	2	120	7
PMCS	100	0.1	30	8
CNA	20	0.1	30	9
Fe_3O_4@MoS_2-Ag	100	0.1	15	10

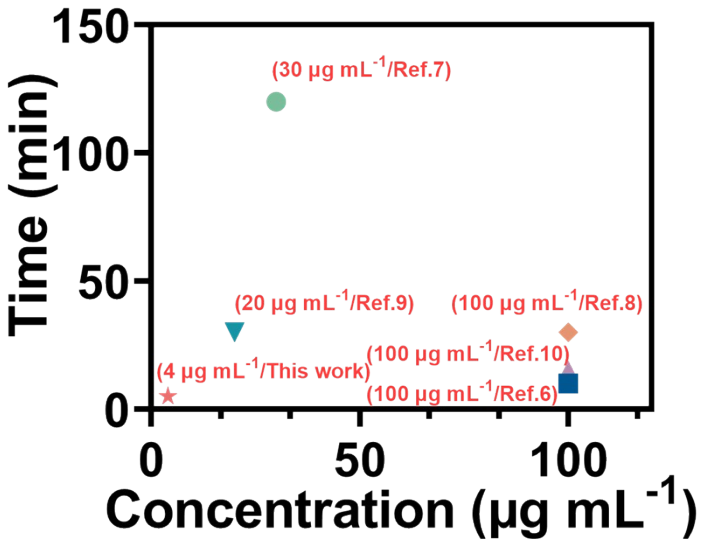

Figure S15. Antibacterial properties of Co-Fe NDs s and the previously reported nanomaterials toward MRSA

Reference

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