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SUPPLEMENTARY INFORMATION for ANALYST

Electronic Supplementary Information

Label–Free Fluorescent Catalytic Biosensor for Highly Sensitive and Selective Detection of Ferrous Ion in Water Samples Using Layered Molybdenum Disulfide Nanozyme Coupled with an Advanced Chemometric Model

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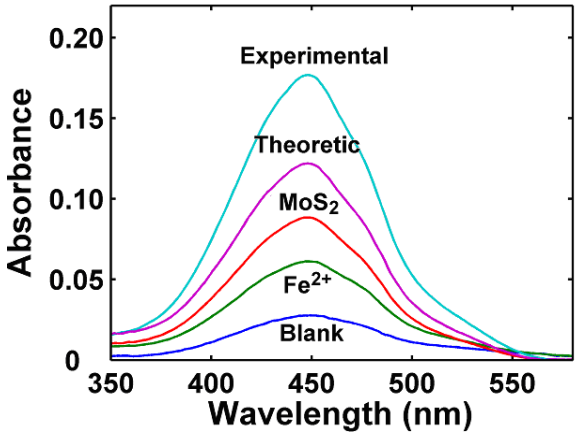

Fig. S1 UV–Vis absorption spectra of the OPD/H_2O_2 system (blank), the MoS_2/OPD/H_2O_2 system, the Fe^{2+} OPD/H_2O_2 system, as well as the theoretic and experimental spectra of the MoS_2/OPD/H_2O_2 system and the Fe^{2+} OPD/H_2O_2. Condition: Fe^{2+}, 0.10 μM; MoS_2, 1.0 μg mL^{-1}; OPD, 0.5 mM; H_2O_2, 0.1 mM; pH, 4.5, reaction time, 30 min.

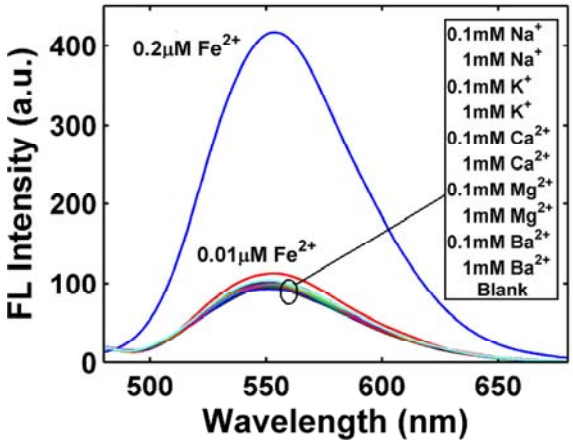

Fig. S2 Fluorescence spectra of the MoS_2/OPD/H_2O_2 system with different individual metal ions (Ba^{2+}, Mg^{2+}, Ca^{2+}, K^+, or Na^+).

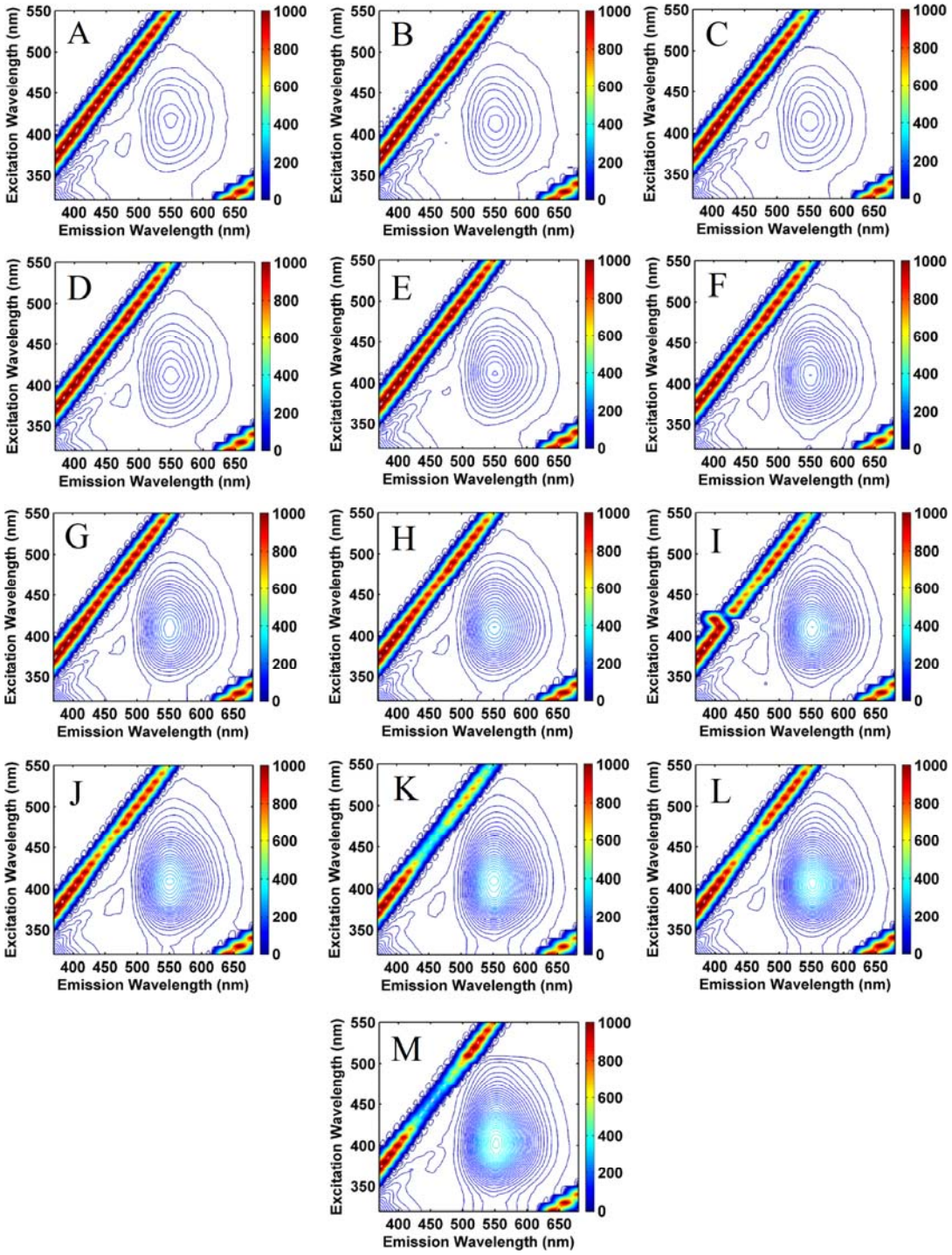

Fig. S3 Contour map of the fluorescence excitation–emission matrix data of the calibration samples for the MoS_2/OPD/H_2O_2 biosensory system in the presence of different concentrations (μM) of Fe^{2+}, (A) 0, (B) 0.005, (C) 0.01, (D) 0.02, (E) 0.04, (F) 0.06, (G) 0.08, (H) 0.10, (I) 0.12, (J) 0.14, (K) 0.16, (L) 0.18, (M) 0.20.

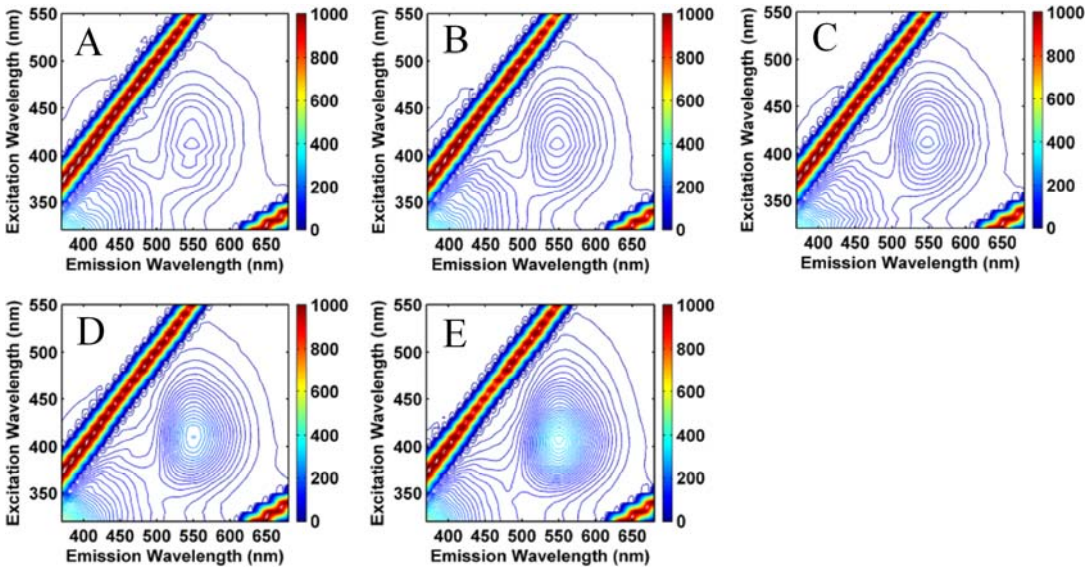

Fig. S4 Contour map of the fluorescence excitation–emission matrix data of water samples for the MoS_2/OPD/H_2O_2 biosensory system in the presence of different concentrations (μM) of Fe^{2+}, (A) 0, (B) 0.03, (C) 0.06, (D) 0.09, (E) 0.15.

Table S1. Determination of Fe^{2+} in water samples (n=3).

Samples	Added (μM)	Mean found (μM) by proposed method	Mean found (μM) by standard method	Recovery (%)[a] by proposed method	CV (%) by proposed method
1	0	0.007	0.010	—	—
2	0.030	0.040	0.038	110	2.5
3	0.060	0.062	0.066	92	1.6
4	0.090	0.099	0.102	102	6.1
5	0.150	0.150	0.158	95	4.7

[a] Recovery (%) = 100 × ($c_{\text{mean found}}/c_{\text{added}}$).