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Supporting Information

Magnetic MOF composites for the electrocatalysis and biosensing of dopamine released from living cells

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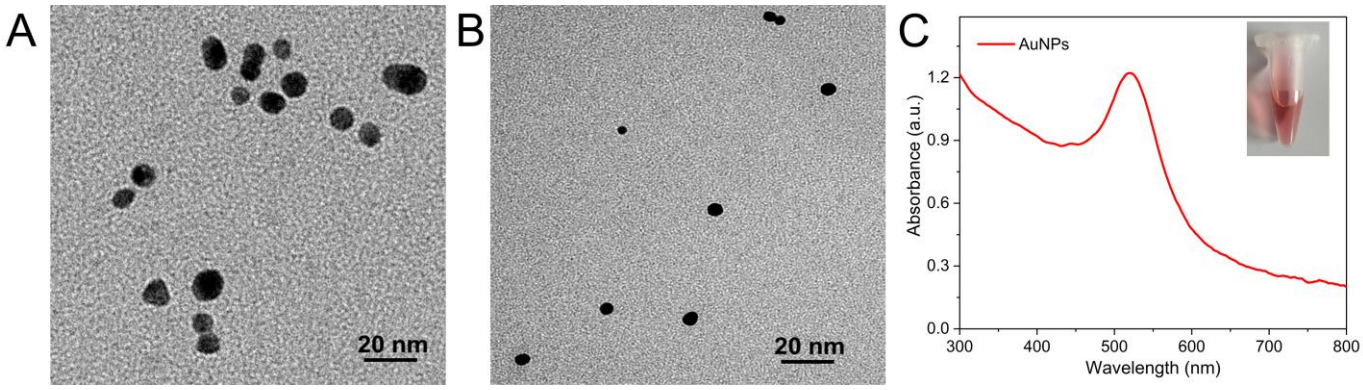

Figure S1. TEM images of (A) Fe_3O_4 and (B) AuNPs. (C) UV-vis absorption spectrum of AuNPs. Inset is the picture under daylight.

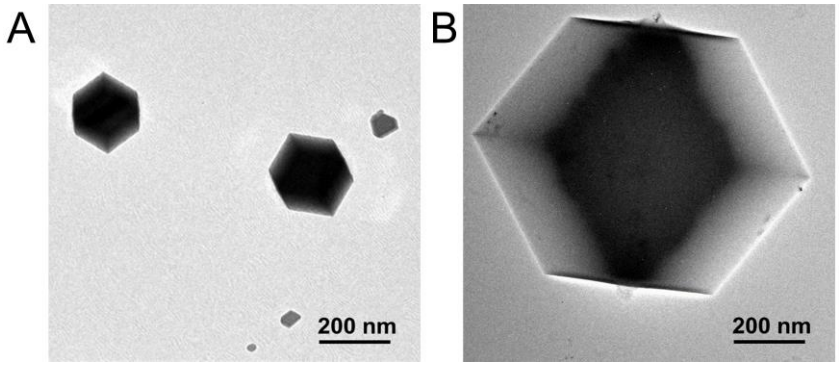

Figure S2. TEM images of (A) ZIF-8 and (B) Fe_3O_4@ZIF-8.

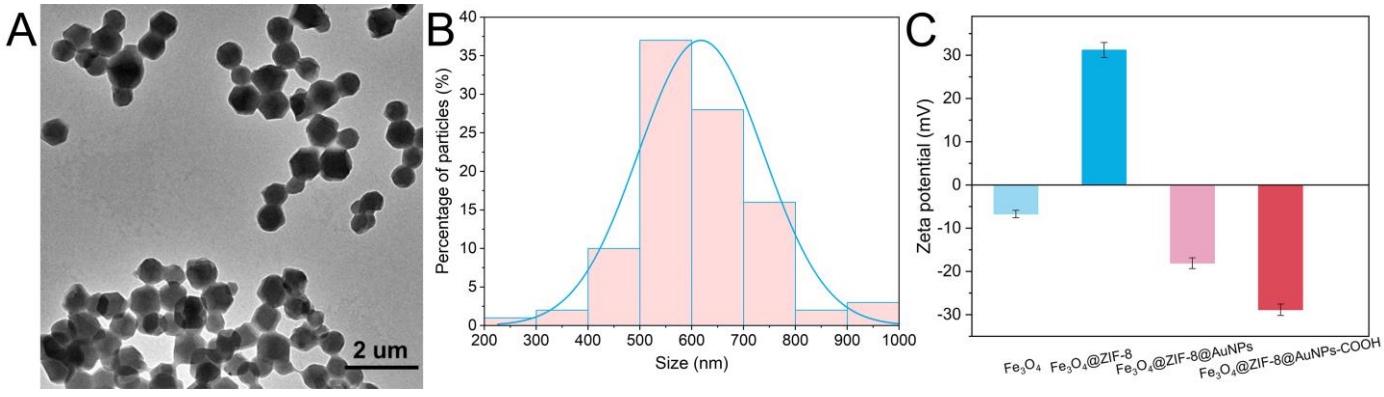

Figure S3. (A) TEM image and (B) size distribution of Fe_3O_4@ZIF-8@AuNPs-COOH. (C) Zeta potentials of Fe_3O_4, Fe_3O_4@ZIF-8, Fe_3O_4@ZIF-8@AuNPs and Fe_3O_4@ZIF-8@AuNPs-COOH, respectively.

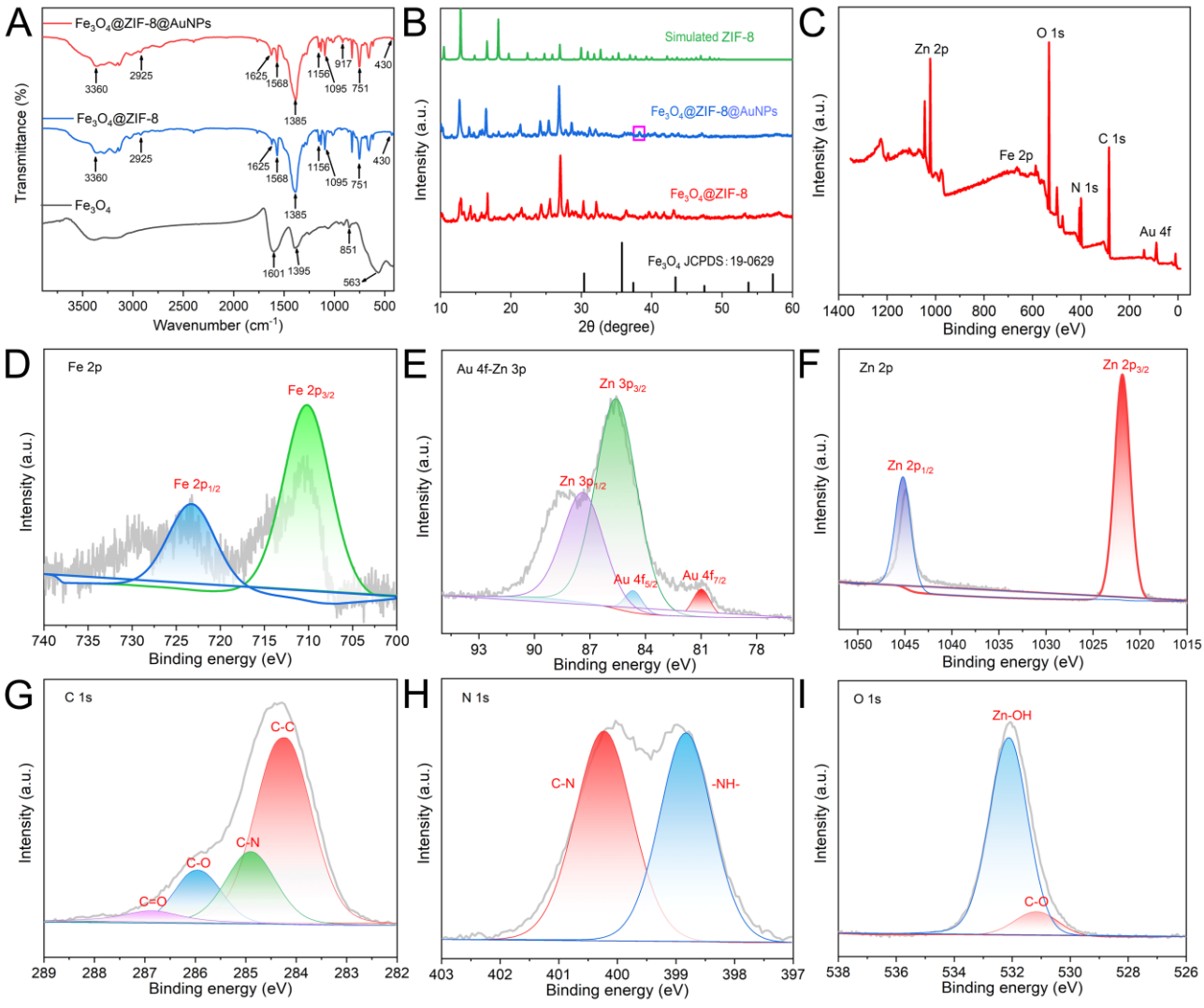

Figure S4. (A) FTIR spectra of Fe_3O_4, Fe_3O_4@ZIF-8 and Fe_3O_4@ZIF-8@AuNPs. (B) XRD patterns of Fe_3O_4@ZIF-8 and Fe_3O_4@ZIF-8@AuNPs. (C) XPS survey spectrum of Fe_3O_4@ZIF-8@AuNPs-COOH. High-resolution XPS spectra of (D) Fe 2p, (E) Au 4f, Zn 3p, (F) Zn 2p, (G) C 1s, (H) N 1s and (I) O 1s.

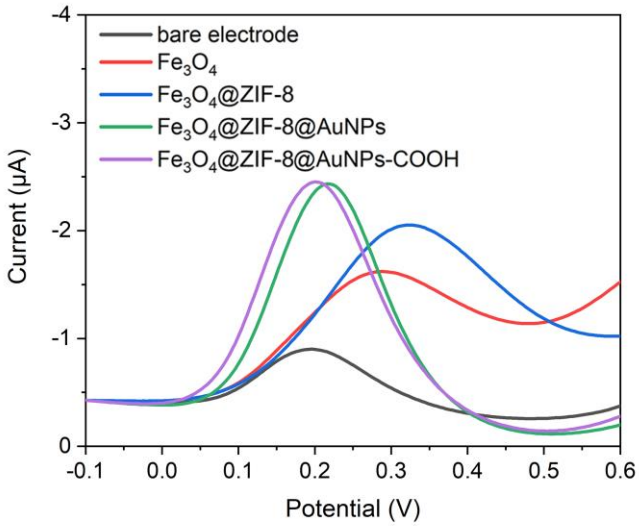

Figure S5. Differential pulse voltammograms of bare electrode, after modified with Fe_3O_4, Fe_3O_4@ZIF-8, Fe_3O_4@ZIF-8@AuNPs and Fe_3O_4@ZIF-8@AuNPs-COOH in 0.1 M PBS (pH 7.0) containing 500 μM dopamine.

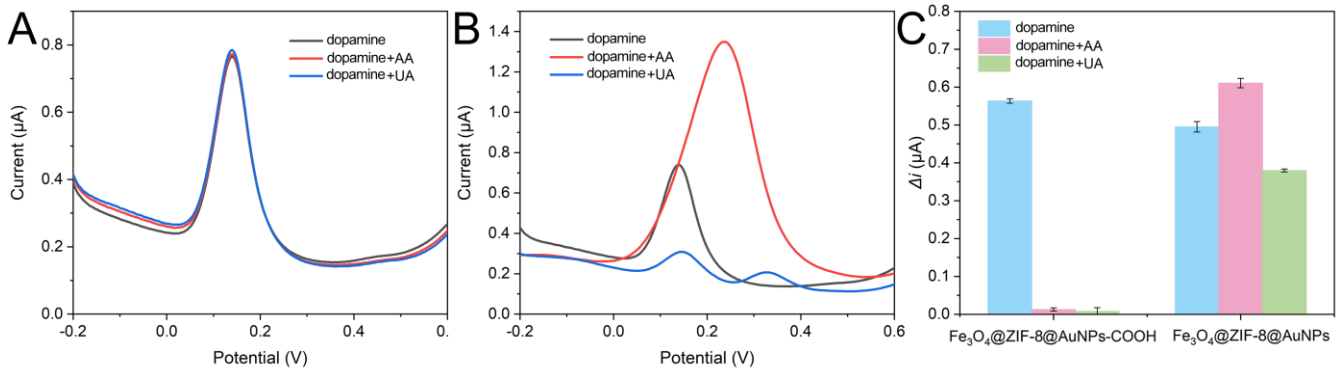

Figure S6. Differential pulse voltammograms of magnetic electrodes modified with (A) Fe_3O_4@ZIF-8@AuNPs-COOH and (B) Fe_3O_4@ZIF-8@AuNPs in 0.05 mM dopamine (PBS buffer) without and with AA (1 mM) or UA (1 mM). (C) The selectivity of the magnetic electrodes modified with Fe_3O_4@ZIF-8@AuNPs-COOH and Fe_3O_4@ZIF-8@AuNPs towards AA and UA.

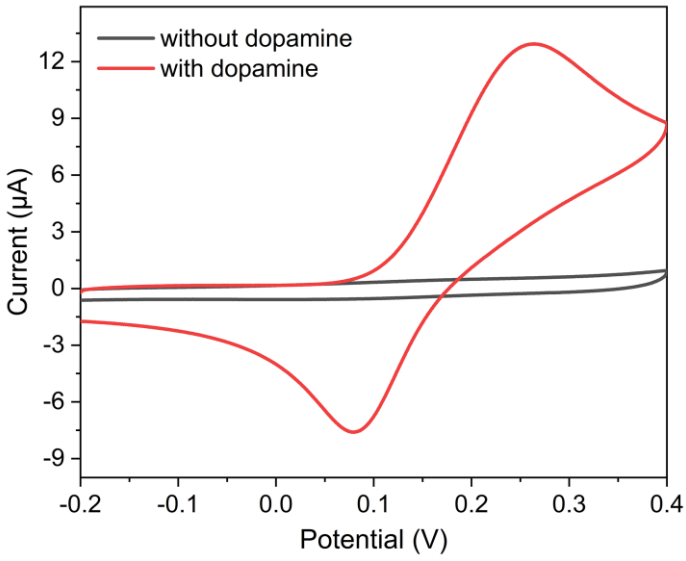

Figure S7. Cyclic voltammograms of magnetic electrodes modified with Fe_3O_4@ZIF-8@AuNPs-COOH in 0.1 M PBS (pH 7.0) without and with dopamine (0.1 mM).

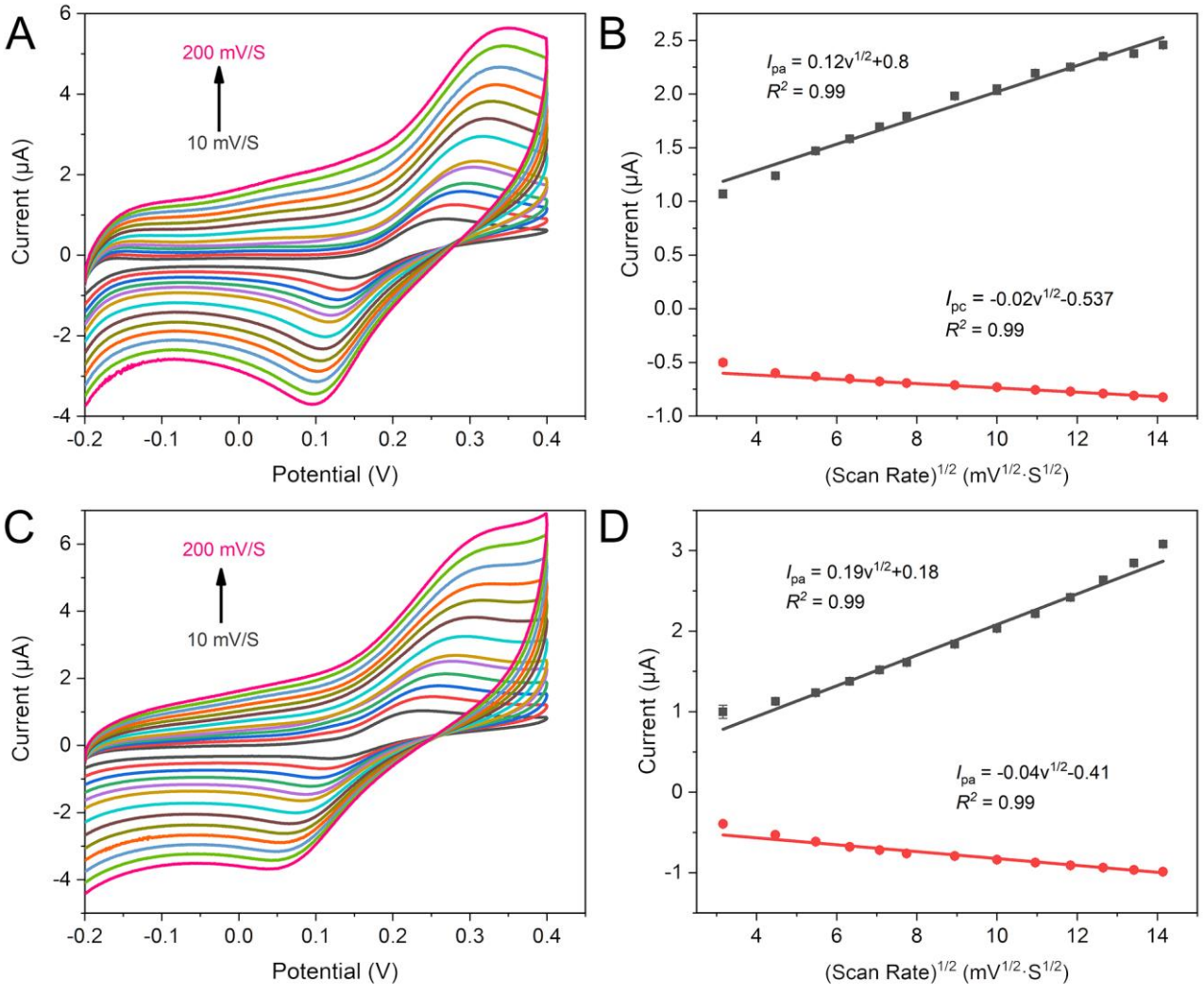

Figure S8. (A) Cyclic voltammograms at different scan rates (from 10 to 200 mV/s) with Fe_3O_4@ZIF-8. (B) Relationships between oxidation/reduction peaks of Fe_3O_4@ZIF-8 and scan rate. (C) Cyclic voltammograms at different scan rates (from 10 to 200 mV/s) with Fe_3O_4@ZIF-8@AuNPs. (D) Relationships between oxidation/reduction peaks of Fe_3O_4@ZIF-8@AuNPs and scan rate.

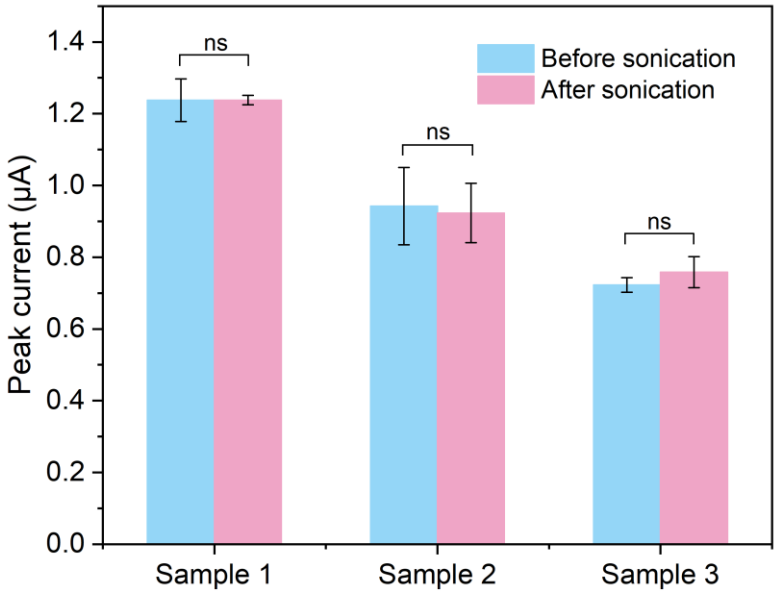

Figure S9. Comparison of DPV peak currents for the detection of dopamine in three samples using Fe_3O_4@ZIF-8@AuNPs-COOH without and with sonication.

Table S1. Comparison of different MOFs based sensors for electrochemical detection of dopamine.

Sensor	Technique	LOD (μM)	Linear range (μM)	Ref
N and Co-doped carbon particles/GCE	DPV	0.34	2 - 69.5	1
Cu-MOFs/MWCNT-Au@Ag/GCE	DPV	0.082	0.6 - 70	2
Ag-ZIF-67p/GCE	DPV	0.05	0.1 - 100	3
$Co_3O_4/NiCo_2O_4$	CA	0.241	24 - 329	4
$BC/Co_3O_4/FeCo_2O_4$/GCE	DPV	0.04587	0.1 - 250	5
Ni-MOFs/GCE	DPV	0.06	0.2 - 100	6
GO-UiO-66-RT	DPV	2.1	20 - 200	7
Fe_3O_4@ZIF-8@AuNPs-COOH	DPV	0.026	0.05 - 120	this work

Table S2. Detection results of dopamine in human serums.

Sample	Spiked (μM)	Found (μM)	Recovery (%)	RSD (%)
1	1	0.97	97.2	0.5
2	30	29.72	99.1	0.3
3	50	49.83	99.7	2.3
4	70	67.57	96.5	3.2
5	100	100.38	100.38	1.4

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