Supporting Information

A novel Electrochemiluminescence sensor based on a molecular imprinting technique and UCNPs@ZIF-8 nanocomposites for sensitive determination of imidacloprid.

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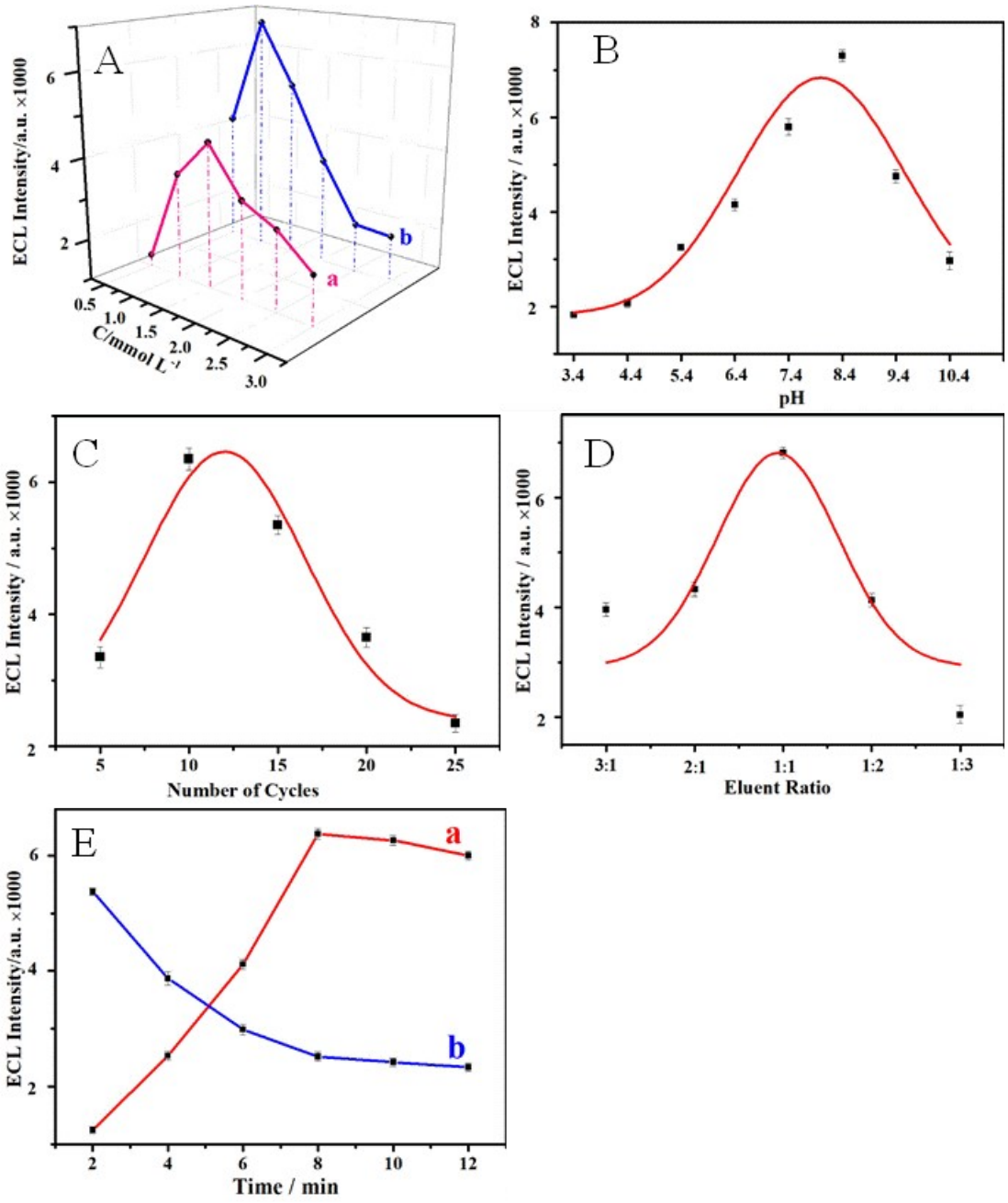

Fig. S1. Optimization results for different experimental conditions: (A) the concentration of (a) IM and (b) o-PD, (B) pH of electropolymerization, (C) the number of electropolymerization cycles, (D) the eluent ratio of methanol: Water, (E) the time of (a) elution and (b) adsorption.

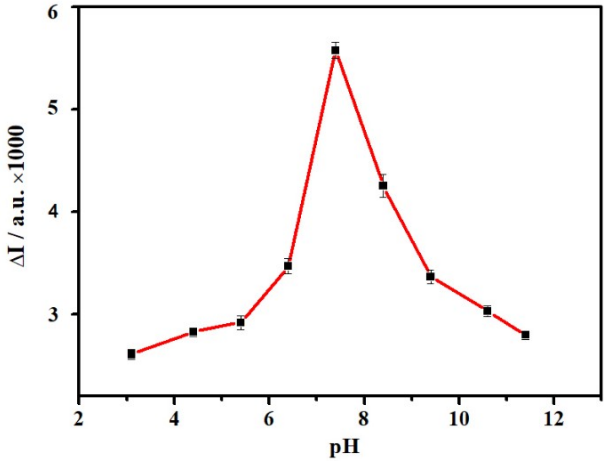

Fig. S2. The optimization of pH (3, 3, 4.4, 5.4, 6.4, 7.4, 8.4, 9.4, 10.4, 11.4) for ECL sensor.

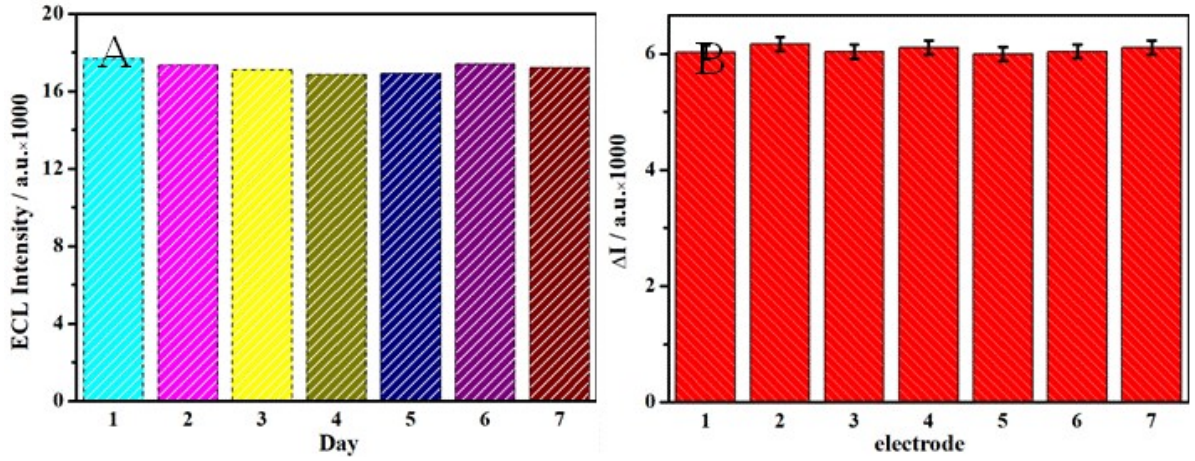

Fig. S3. (A) The ECL signal values were measured at the same time every day for the same UCNPs@ZIF-8 modified electrode stored in a 4°C refrigerator for 7 days. (B) Changes in the response signals of the sensors constructed by seven electrodes with the same modification operation to the same concentration of IM in 1 mg L^{-1}.

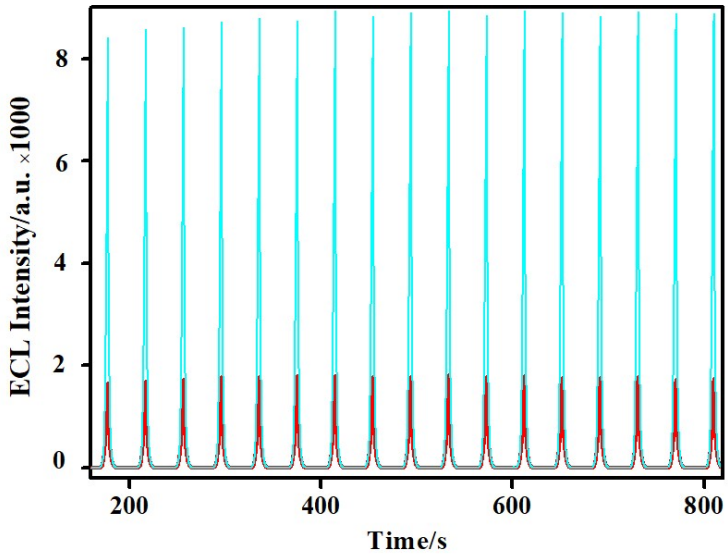

Fig. S4. The signal of the MIT-ECL sensor by 17 cycles (The red line and the blue line are before and after removing IM by elution of the MIPs/UCNPs@ZIF-8/GCE, respectively).

Table S1. Comparison of different probe materials for the detection of IM in the linear range and limit of detection.

Probe materials	Testing method	Linear range ($g \cdot L^{-1}$)	LOD ($ng \cdot L^{-1}$)	Ref.
Ce-MOF nanowires	ECL	5.1×10^{-7}-3.1×10^{-5}	8.7×10^{1}	1
[a] I-[b] IL-Au NPs	Colorimetric	2.6×10^{-6}-2.6×10^{-1}	1.3×10^{5}	2
[c] ERGO	Electrochemistry	7.7×10^{-6}-2.8×10^{-4}	2.6×10^{3}	3
[d] GQDs/C-dots	Fluorescence	1.3×10^{-6}-1.0×10^{-3}	2.1×10^{2}	4
UCNPs@ZIF-8	ECL	1.0×10^{-10}-1.0×10^{-3}	0.01	This work

[a] imidazole

[b] ionic liquid

[c] electrochemically reduced graphene oxide

[d] graphene- and carbon quantum dots

Table S2. Determination of IM in fish by the proposed method and the HPLC (n=3).

Sample	Added (mg·L-1)	Amount found by MIT-ECL method (mg·L-1)	Amount Found by HPLC Method (mg·L-1)	Relative error (%)
Fish	1	0.9502	0.9823	5%

References

1. X. Ma, C. Pang, S. Li, ACS Appl. Mater. Interfaces., 2021, **13**, 41987-41996.

2. X. Y. Zhang, Z. Y. Sun, Z. M. Cui, Sens. Actuators B Chem., 2014, **191**, 313-319.

3. L. Yan, Z. C. Li, S. J. Zhang, NANO., 2016, **11**, 1650074.

4. J. M. Luo, S. H. Li, C. H. Pang, Microchem. J., 2022, **175**, 107172.