Supplementary Information

Preparation of hydrophilic surface-imprinted ionic liquid polymer on multi-walled carbon nanotubes for the sensitive electrochemical determination of imidacloprid

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1.1 Preparation of 1-MA-3VI-Br

1-MA-3VI-Br was prepared according to the literature with some modification.[1] 2-(Bromomethyl)acrylic acid (495 mg, 3 mmol) was slowly added to 10 mL round bottom flask with 1-vinylimidazolium (307 mg, 3.27 mmol), and then let them react under 70 °C for 24 h. The resulting mixture was washed with ether. Finally, the product was dried under vacuum at 60 °C for overnight. 1HNMR (300 MHz, DMSO), δ 4.90 (d, 2H, CH_2), 5.08 (s, 2H, CH_2), 6.00 (s, 1H, =CH), 6.05 (m, 1H, CC*CCH_2), 6.36 (s, 1H, =CH), 7.78 (2H, d, NC*HCHN), 9.30 (1H, s, NC*HN).

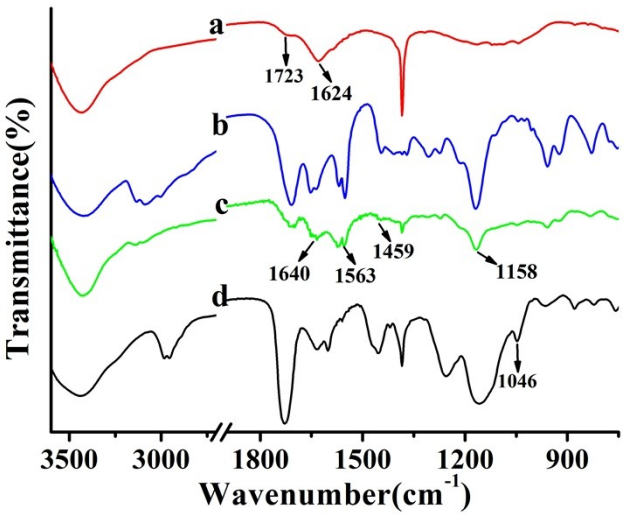

Fig. S1. FT-IR spectra of MWNTs-COOH (a), 1-MA-3VI-Br (b), MWNTs-IL (c) and MWNTs@RAFT-MIP (d).

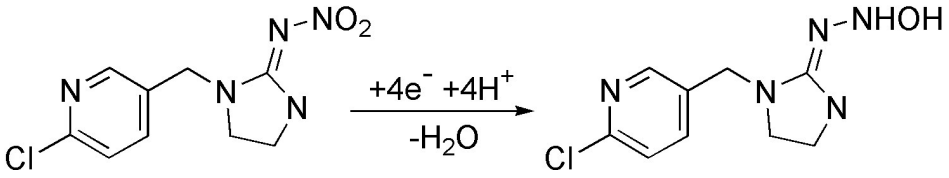

Fig. S2. Electrochemical reaction mechanism of imidacloprid.

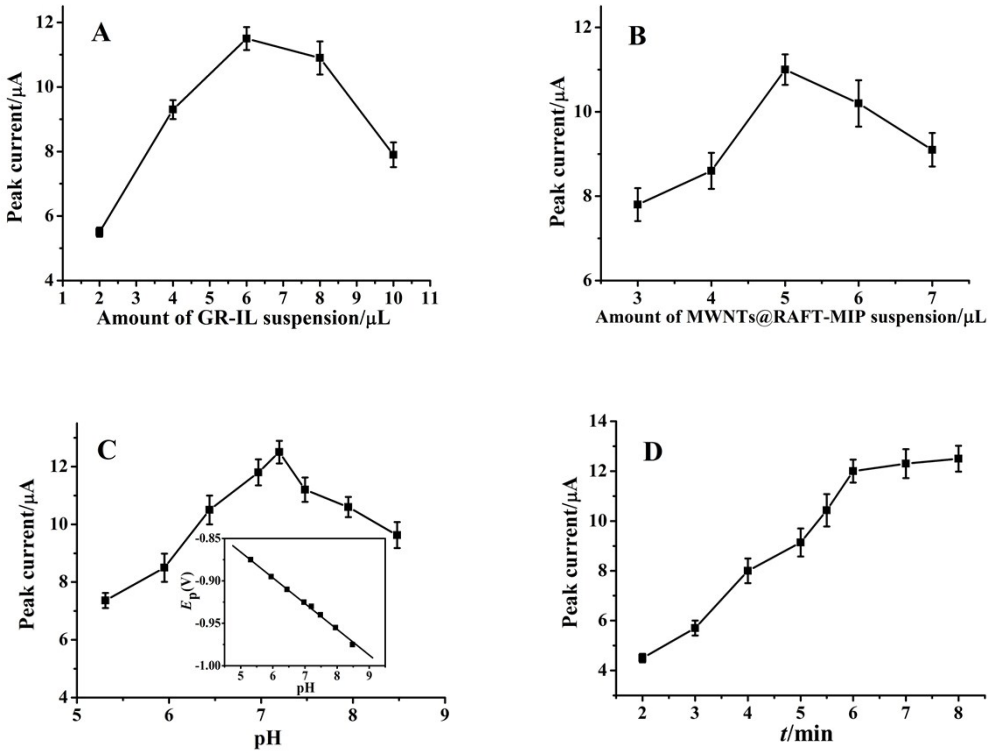

Fig. S3. Optimization of different conditions. (A) Influence of the amount of GR-IL; (B) influence of the amount of MWNTs@RAFT-MIP; (C) influence of solution pH, inset: the plot of peak potential versus pH; (D) influence of accumulation time. Imidacloprid concentration: 5.0 μM.

Table S1 Comparison of different electrochemical sensors for imidacloprid detection

Electrochemical sensors	Sensitivity (μA/μM mm^2)	Linear range (μM)	Detection limit (μM)	References
β-Cyclodextrin polymer functionalized r-GO modified electrode	-	0.05−15	0.02	[2]
Nano silver Nafion/nano TiO_2 Nafion composite modified GCE	-	0.5−3.5	0.25	[3]
Imprinted PoPD membranes at RGO modified electrode	0.15	0.75−70	0.04	[4]
Poly(carbazole)/ chemically reduced graphene oxide modified GCE	0.006	3−10	0.44	[5]
Activated glassy carbon electrode	-	4−20	0.61	[6]
Water-compatible surface-imprinted polymer modified GR-IL electrode	0.71	0.2−24	0.08	This work

Reference

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