Electronic Supplementary Material (ESI) for Analytical Methods.

Supplementary Information

A Highly-Sensitive Electrochemical Sensor Based on Cu/Cu_2O@Carbon Nanocomposite Structures for Hydrazine Detection

Zhenting Zhao,[a] Ying Wang,[a] Pengwei Li,[a] Shengbo Sang,[a] Wendong Zhang,[a] Jie Hu *[a] and Kun Lian *[abc]

[a] Micro and Nano System Research Center, Information Engineering College, Taiyuan University of Technology, Taiyuan 030024, Shanxi, China. hujie@tyut.edu.cn; liankun@tyut.edu.cn.

[b] School of Nano-Science and Nano-Engineering, Suzhou & Collaborative Innovation Center of Suzhou Nano Science and Technology, Xi'an Jiaotong University, Xi'an 710049, China.

[c] Center for Advanced Microstructures and Devices, Louisiana State University, Baton Rouge, Louisiana 70806, USA.

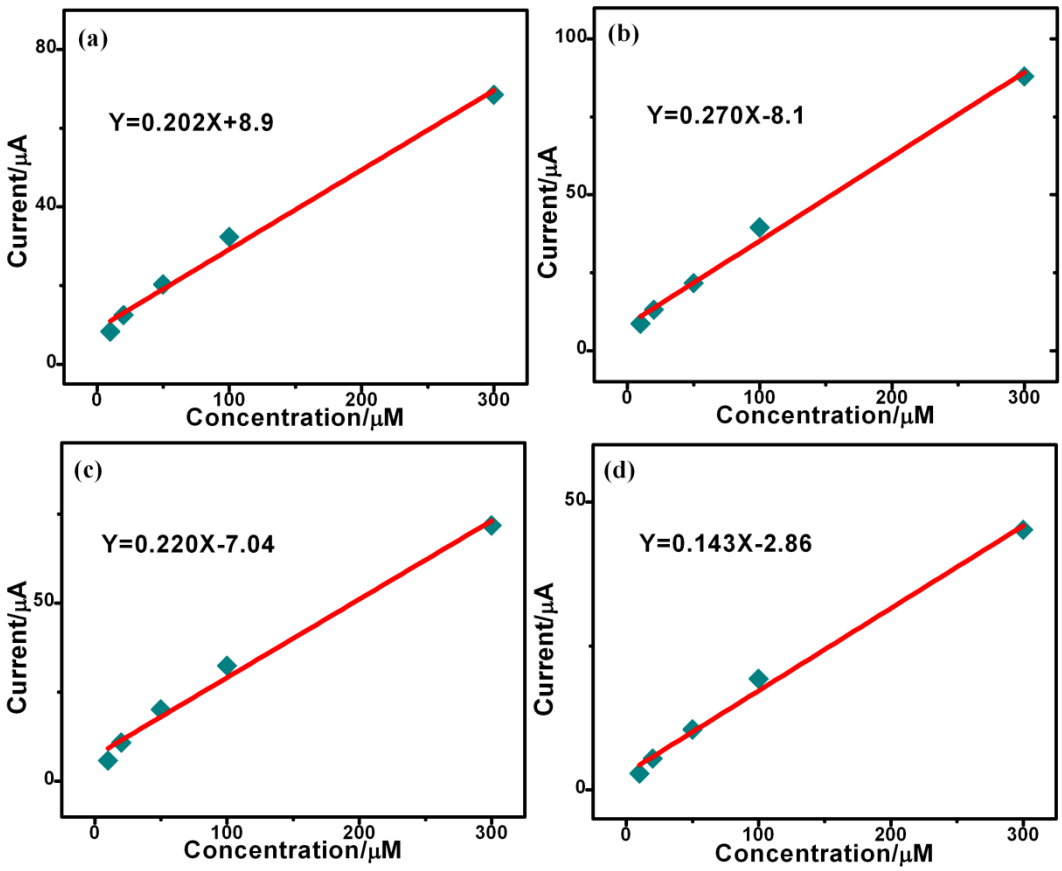

Fig. S1 The linear plot of oxidation peak current value vs. hydrazine concentration for Nafion/Cu/Cu_2O@carbon/GCE sensors which modified with different amounts of Cu/Cu_2O@carbon: (a) 340 μg·cm^{-2}, (b) 510 μg·cm^{-2}, (c) 680 μg·cm^{-2} and (d) 1180 μg·cm^{-2}.

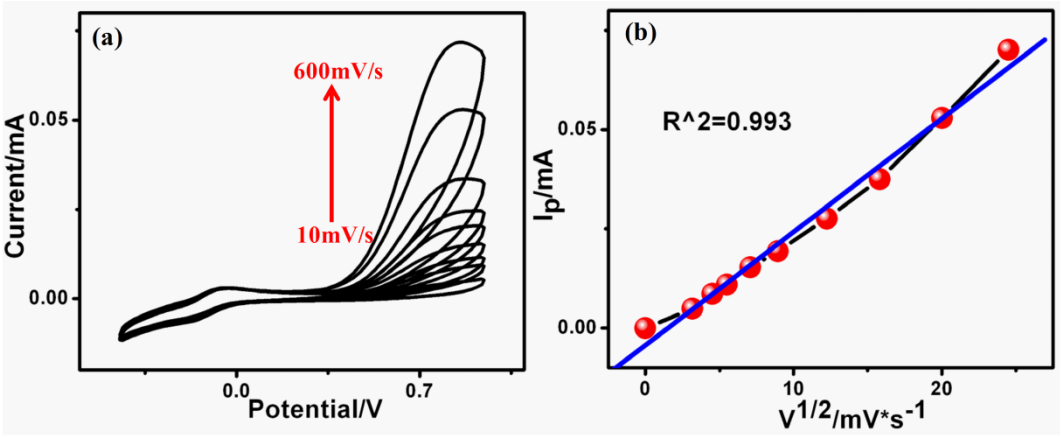

Fig. S2 CVs of Nafion/Cu/Cu_2O@carbon/GCE at different scan rates in 0.1M PBS (pH=7.4) with 100 μM hydrazine. The scan rates are 10, 20, 30, 50, 80, 150, 250, 400 and 600 mV/s; (b) is the linear fitting plot of peak current vs. scan rate.

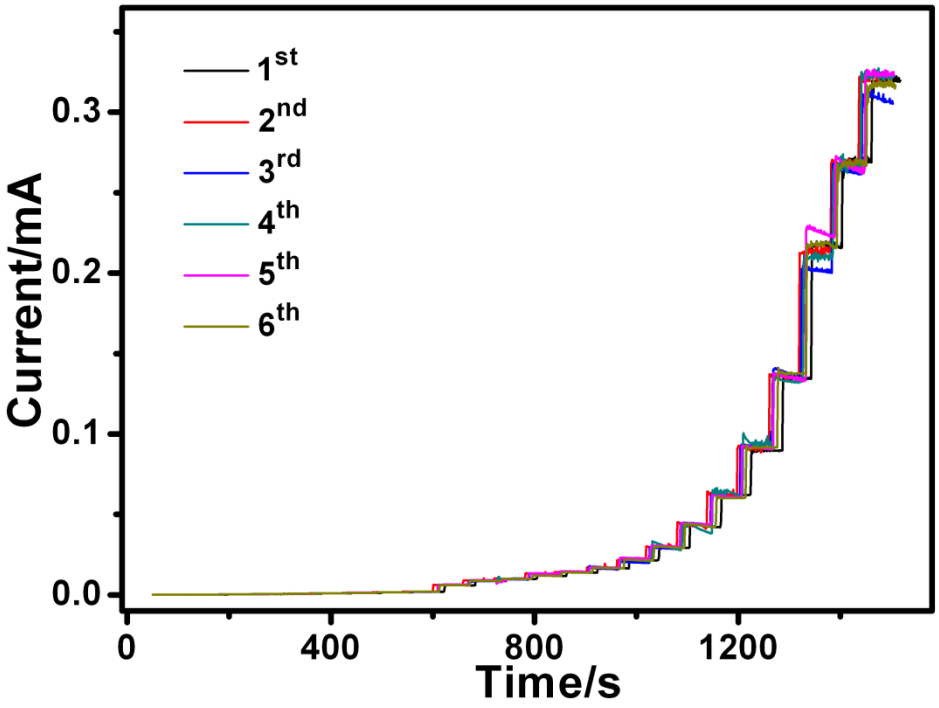

Fig. S3 The amperometric current responses (6 times reproducible results) of Nafion/Cu/Cu_2O@carbon/GCE for successive addition of hydrazine range from 0.25 μM to 1700 μM in 0.1 M PBS (pH=7.4).

Table S1: The correlation coefficients (R_i^2) of calibration curves which obtained from Fig. S3, and the calculated standard deviation of the results.

R_1^2	R_2^2	R_3^2	R_4^2	R_5^2	R_6^2
0.99488 S=0.0038	0.99278	0.98675	0.9878	0.99283	0.9976

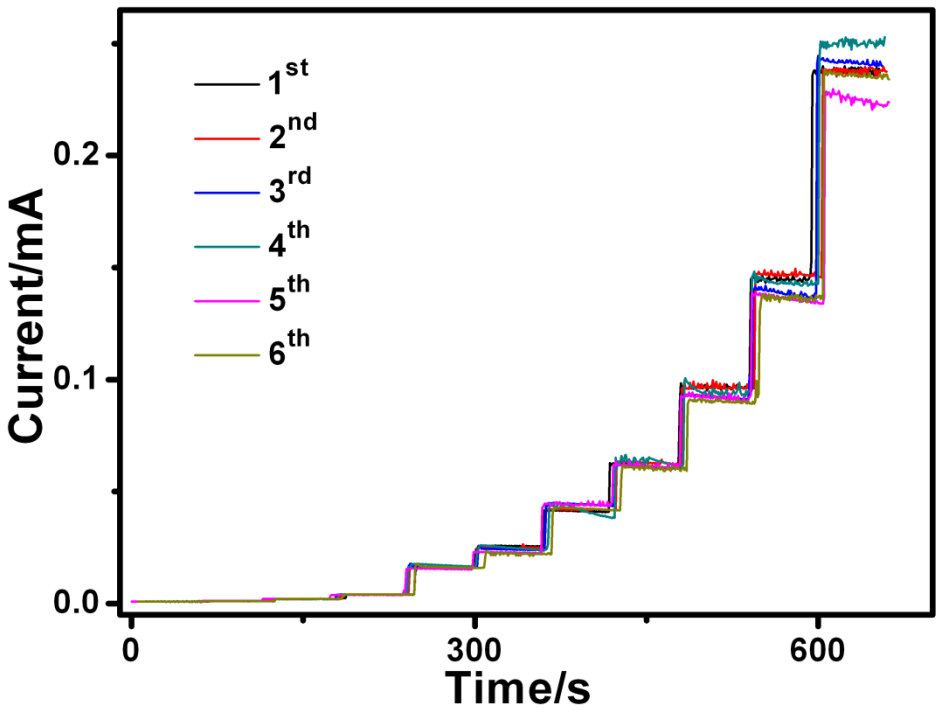

Fig. S4 Amperometric current responses (6 times reproducible results) of Nafion/Cu/Cu_2O@carbon/GCE for successive addition of hydrazine range from 3.0 μM to 800 μM in 0.1 M PBS which contains 30 μM interference substances.

Table S2: The correlation coefficients (R_i^2) of calibration curves which obtained from Fig. S4, and the calculated standard deviation of the results.

R_1^2	R_2^2	R_3^2	R_4^2	R_5^2	R_6^2
0.9861	0.98778	0.99705	0.9856	0.99341	0.9912
S=0.0041					

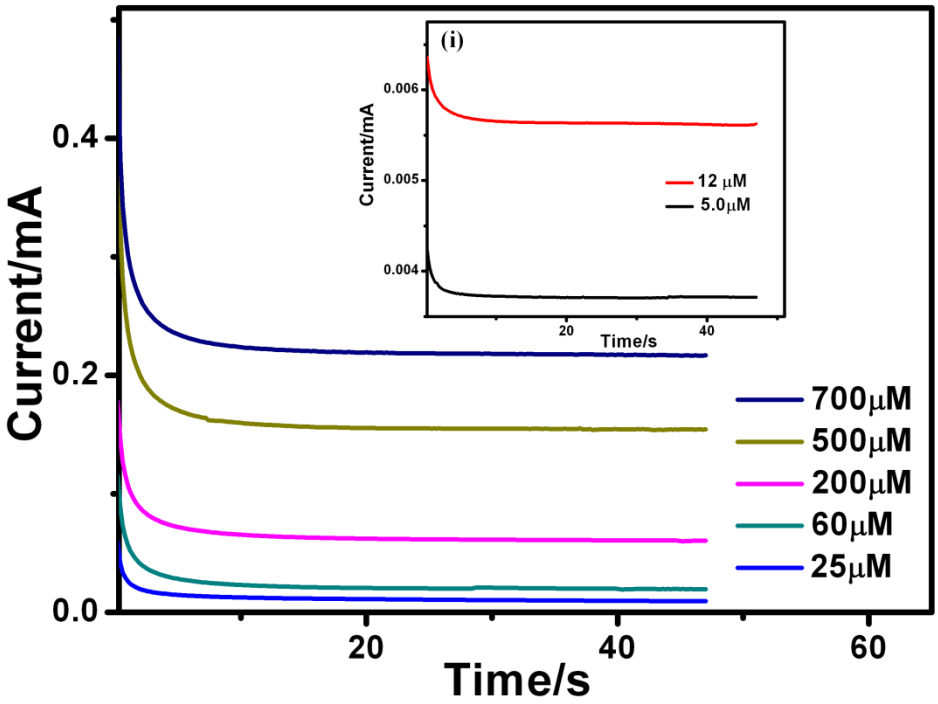

Fig. S5 Chronoamprometric current responses for real samples.

Table S3: Preparation of the diluted samples from 0.25 μM to1700 μM, which were used in the amperometric (i-t) response experiments.

Concentration/ μM	**Continuous dropping amount/μL (5mM)**	**Continuous dropping amount/μL (100mM)**	**Continuous dropping amount/μL ($N_2H_4 \cdot H_2O$)**
0.25	5.0	--	--
0.65	8.0	--	--
1.1	9.0	--	--
1.9	16	--	--
2.9	20	--	--
4.1	24	--	--
5.6	30	--	--
7.3	34	--	--
17.3	--	10	--

25	--	7.8	--
30	--	5.0	--
38	--	8.0	--
45	--	7.0	--
55	--	10	--
65	--	10	--
90	--	25	--
130	--	40	--
180	--	50	--
280	--	--	0.49
500	--	--	1.10
800	--	--	1.50
1200	--	--	1.95
1700	--	--	2.40