

In-Situ Synthesis of Sandwich MOF on Reduced Graphene Oxide for Electrochemical Sensing of Dihydroxybenzene Isomers

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Supplementary Methods

Synthesis of Pt nanoparticles (NPs)

Pt NPs were synthesized on the basis of the literature and some modifications were made ^a. First, 16.6 mg of PVP was dispersed in 45 mL of ethanol, and then 5 mL of H₂PtCl₆ (6.0 mM) was added drop by drop to the above mixed solution. After stirring at room temperature for 5 mins, the solution was refluxed at 110 °C for 3 h to obtain a mixed solution containing Pt NPs (0.6 mM), which can be used in the next experiment without further treatment.

Synthesis of M

M was synthesized on the basis of the literature with some modifications ^b. 266.5 mg of CrCl₃·6H₂O and 166.1 mg of H₂BDC were dispersed in 7.2 mL of ultrapure water. After vigorously stirring at room temperature for 5 mins, the mixed solution was transferred to a reaction vessel and heated at 210 °C for 1 day. After the green reaction solution was cooled to room

temperature, it was centrifuged at 1000 rpm for 3 mins to remove the remaining H₂BDC. The green solution without H₂BDC was centrifuged at 5000 rpm for 10 minutes to get the green sediments, which was washed four times with DMF. Finally, the obtained M was dispersed in 40 mL of DMF for use in the next experiment.

Synthesis of M@Pt

20 ml of synthetic Pt NPs solution was drop by drop into 20 mL of DMF solution containing M with vigorous stirring. The mixed solution was stirred for 2 h at room temperature. Subsequently, M@Pt was collected by centrifugation at 5000 rpm for 10 mins and washed four times with DMF. Finally, the collected M@Pt was dispersed in 10 mL of DMF solution for the next experiment.

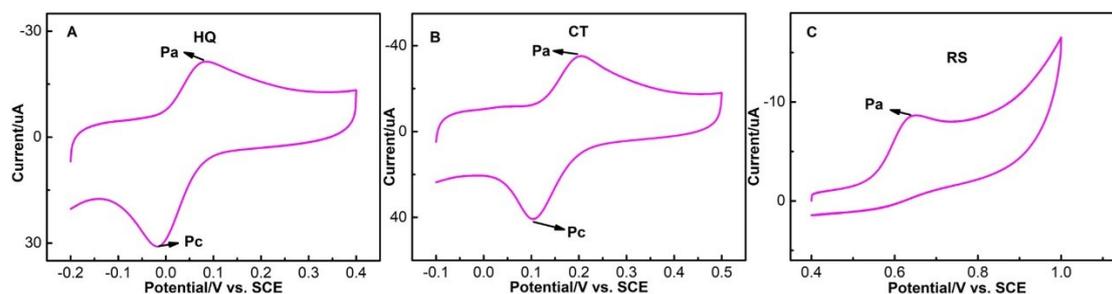


Fig. S1. CV curves of 50 μM HQ (A), 50 μM CT (B) and 50 μM RS (C) at M@Pt@M - rGO/GCE. pH=7, scan rate: 100 mV s^{-1} .

We used Cyclic Voltammetry (CV) to investigate the electrochemical responses of HQ, CT and RS at M@Pt@M -rGO/GCE, as shown in Fig. S1. It can be observed from Fig.S1 A that the CV curve of HQ on M@Pt@M -rGO/GCE has a pair of reduction peaks and oxidation peaks, and the peak positions are at -0.021 mV and 0.09 mV, respectively. Similarly, in Fig. S1 B, it can be observed that the oxidation peak and the reduction peak of CT appear at 0.199 mV and 0.102, respectively. Interestingly, we observed only one oxidation peak in Fig.S1C, which appeared at 0.651mV. In the CV curves of the three analytes, the positions of each oxidation peak are different, and between adjacent oxidation peaks has a large spacing.

Supplementary References

- a. Teranishi, T., Hosoe, M., Tanaka, T. & Miyake, M. Size control of monodispersed Pt nanoparticles and their 2D organization by electrophoretic deposition. *J. Phys. Chem. B* 103, 3818–3827 (1999).
- b. Zhao, M. et al. Metal-organic frameworks as selectivity regulators for

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