Electronic Supplementary Material (ESI) for Analytical Methods.

Electronic Supplementary Information

Efficient detection of carbendazim using electrochemical sensor for a novel NiFeLDH@HsGY-NH_2/MWCNTs heterostructure with lattice-strain

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S1. Preparation of the real samples

2.0 g of Atractylodes macrocephala powder was weighed and ultrasounded for 1 h in a round flask containing 50 mL of 70% methanol solution, centrifugation, filtration. Subsequently, the extraction was concentrated to 10 mL. Finally, the solution diluted 100 folds with a phosphate buffer solution (PBS) (0.1M, pH 4.0). Tomatoes and oranges were bought from the local supermarket. These samples were weighed, juiced, filtered and centrifuged. which was diluted 100 times with PBS (0.1 M, pH 4.0). These samples were reserved in a refrigerator at 4 °C for subsequent experiments.

S2. Supporting Figures and Table

Scheme S1 Synthesis diagram of HsGY-NH_2

Scheme S2 Mechanism of electrochemical oxidation of CBZ.

Fig. S1 XRD patterns of HsGY, HsGY-NH_2 and MWCNTs.

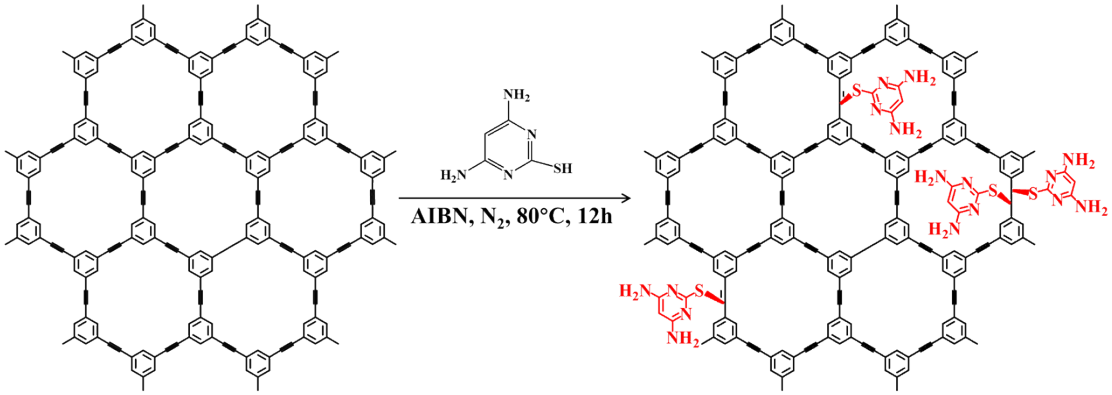
Fig. S2 (A) XPS full spectrum of the HsGY and HsGY-NH_2; the high resolution (B) C 1s; (C) N 1s and (D) S 2p spectra of HsGY-NH_2.

Fig. S3 XPS full spectrum of the NiFeLDH@HsGY-NH_2 and NiFeLDH@HsGY-NH_2/MWCNTs.

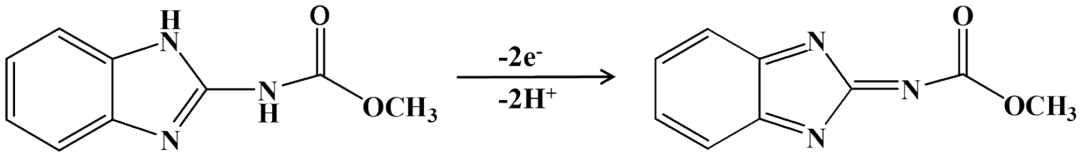
Fig. S4 FT-IR spectra of HsGY (a), HsGY-NH_2 (b).

Fig. S5 (A-C) BET N_2 adsorption-desorption and (D-F) BJH pore size distribution curves of different materials.

Table S1. The linear equations of each modified electrode about Q- $t^{1/2}$.



Scheme S1 Synthesis diagram of HsGY-NH_2



Scheme S2 Mechanism of electrochemical oxidation of CBZ.

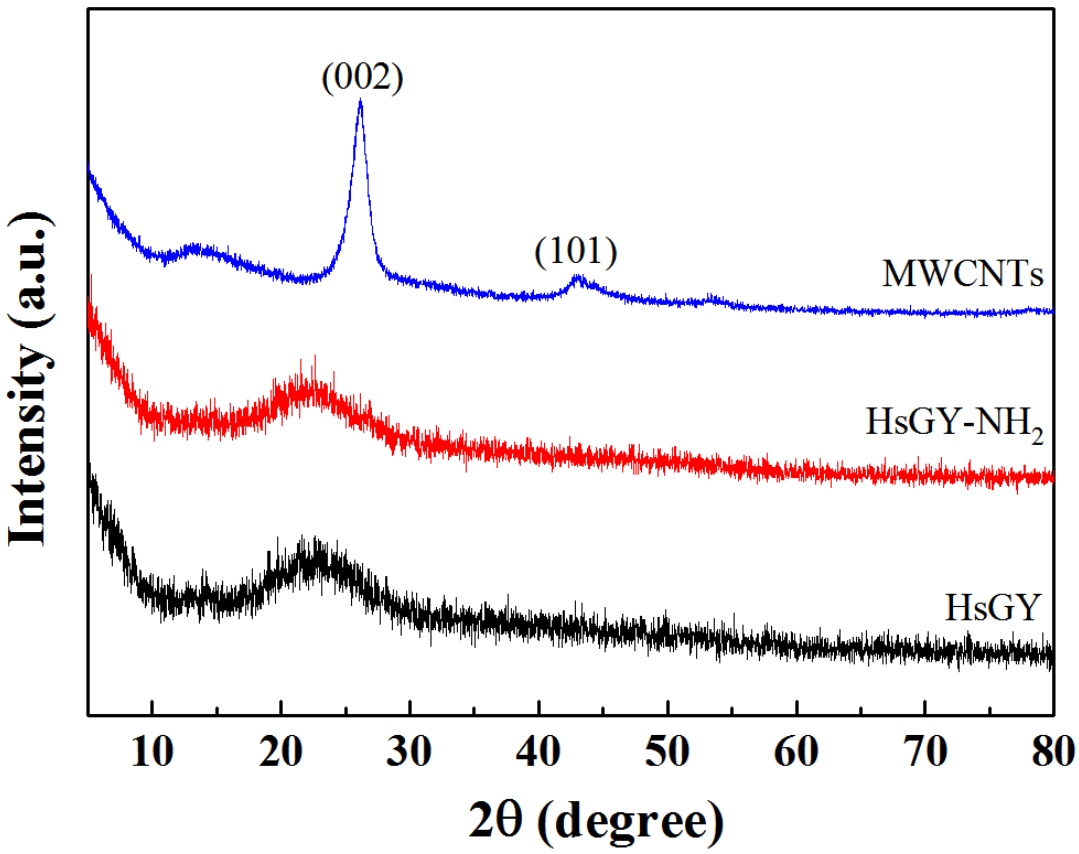


Fig. S1 XRD patterns of HsGY, HsGY-NH_2 and MWCNTs.

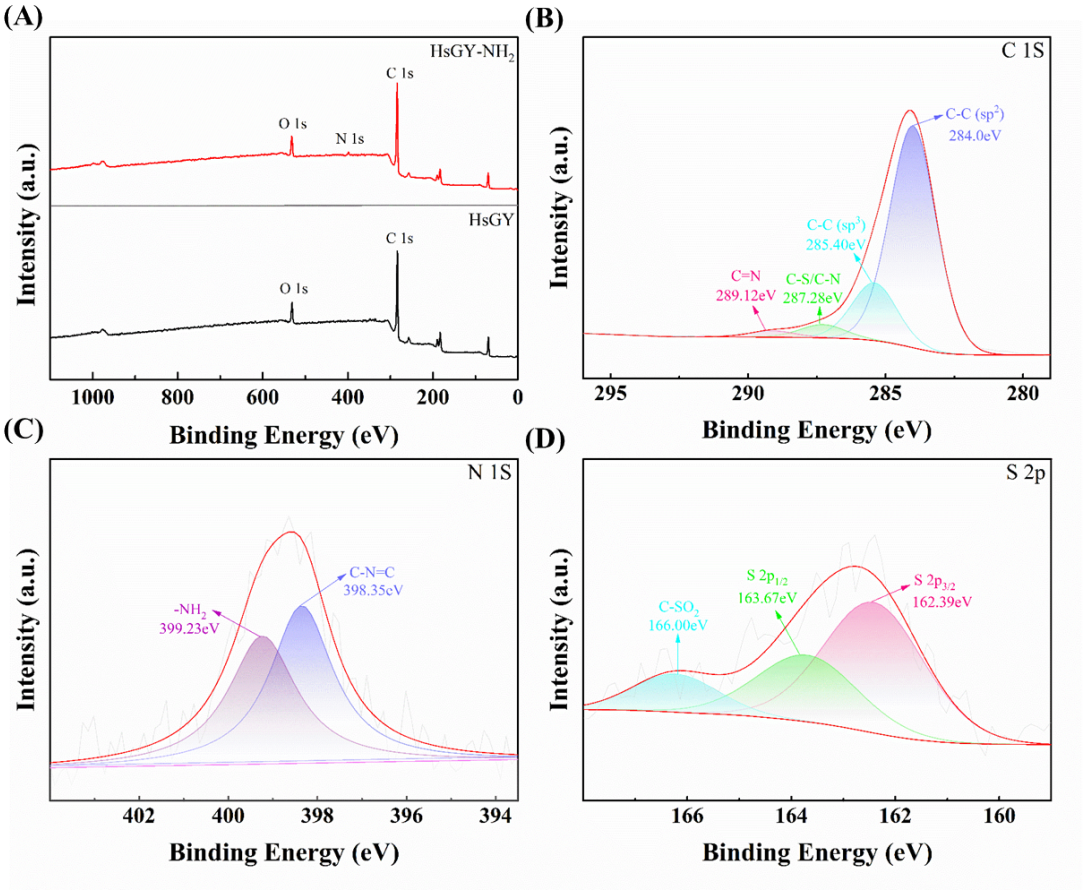


Fig. S2 (A) XPS full spectrum of the HsGY and HsGY-NH_2; the high resolution (B) C1s; (C) N 1s and (D) S 2p spectra of HsGY-NH_2.

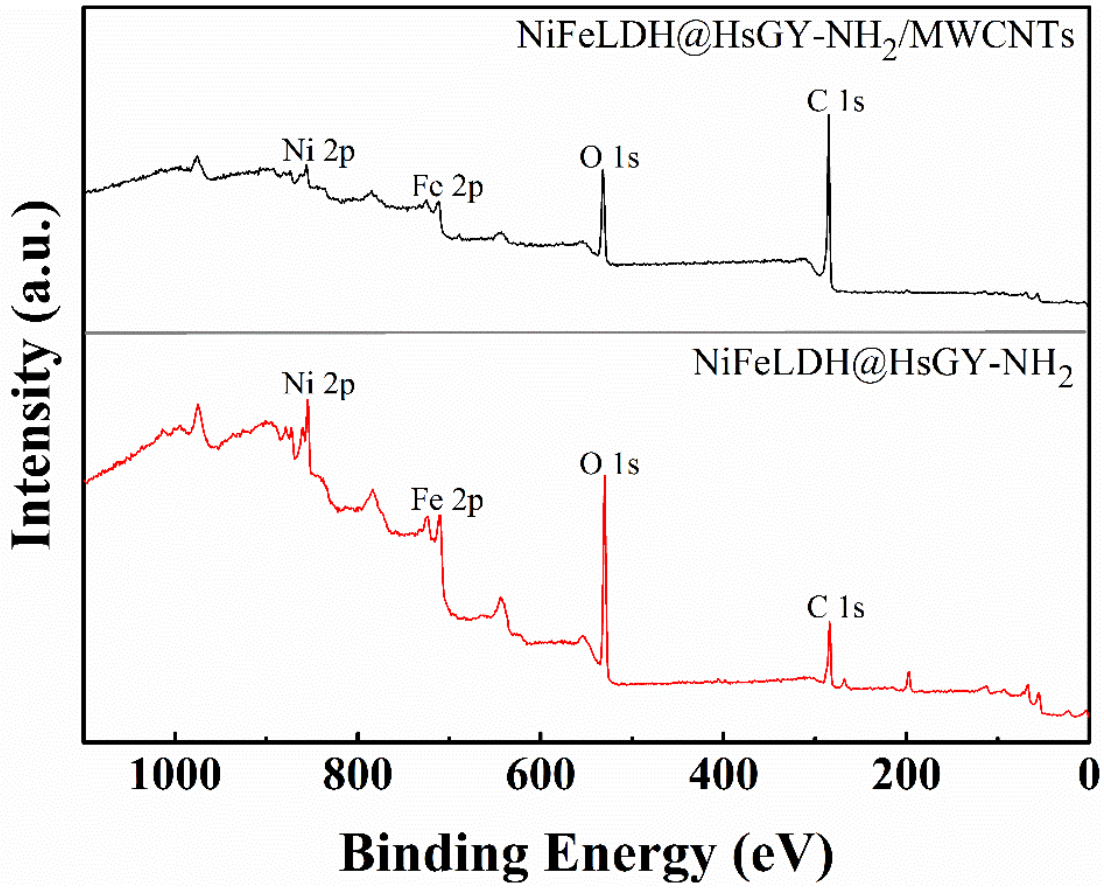


Fig. S3 XPS full spectrum of the NiFeLDH@HsGY-NH_2 and NiFeLDH@HsGY-NH_2/MWCNTs.

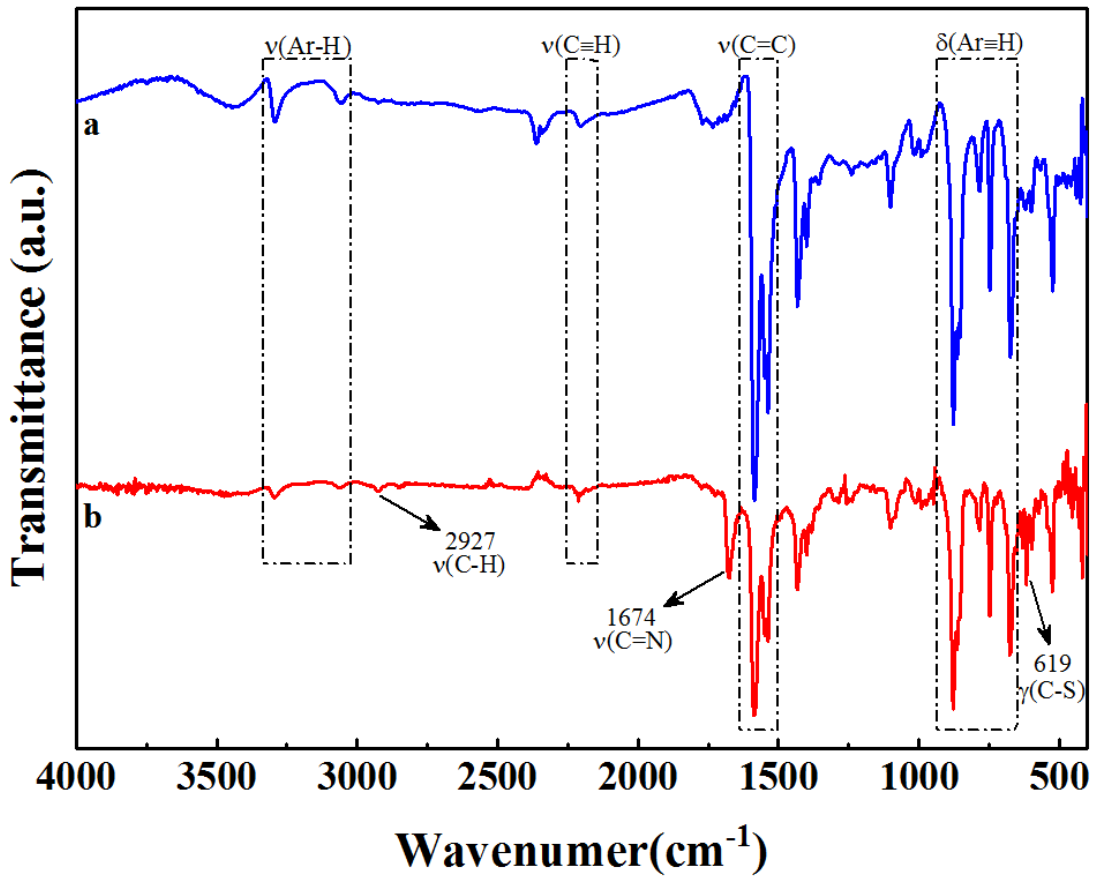


Fig. S4 FT-IR spectra of HsGY (a), HsGY-NH_2 (b).

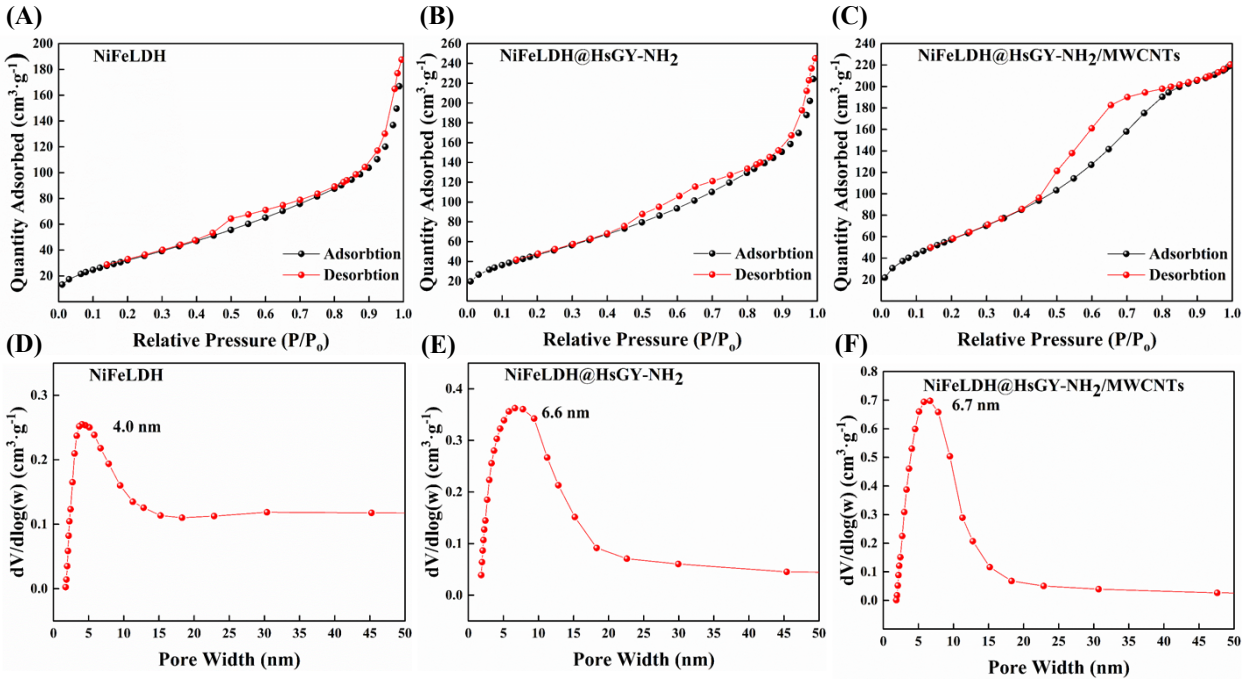


Fig. S5 (A-C) BET N_2 adsorption-desorption and (D-F) BJH pore size distribution curves of different materials.

Table S1. The linear equations of each modified electrode about Q- $t^{1/2}$.

Electrode	Linear equation of Q-$t^{1/2}$
GCE	$5.700t^{1/2}+1.626$
NiFeLDH/GCE	$3.982t^{1/2}+1.209$
NiFeLDH@HsGY/GCE	$4.634t^{1/2}+0.818$
NiFeLDH@HsGY-NH_2/GCE	$4.752t^{1/2}+1.236$
NiFeLDH@HsGY/MWCNTs/GCE	$26.214t^{1/2}+21.817$
NiFeLDH@HsGY-NH_2/MWCNTs/GCE	$34.603t^{1/2}+23.984$

An explanation of the relevant parameters in Anson 's equation: n represents the number of electron transferred in the electrochemical reaction, F denotes the Faraday's constant, A signifies the effective surface area, c expresses the molality concentration of the electroactive molecules, D represents the standard diffusion coefficient, t denotes the scanning time, Q_{dl} and Q_{ads} are the double-layer charge and faradic charge.