Supplementary Information

A novel electrochemical sensor with $COF_{TZT\text{-}DVA}$/CNT@PB nanoflower for hydrogen peroxide detection

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Chemical reagents: 2,4, 6-tri (4-aminophenyl) -1,3, 5-triazine (TZT) and 2,5-Divinyl-1,4-benzenedicarboxaldehyde (DVA) were bought from Jilin Chinese Academy of Sciences - Yanshen Technology Co., Ltd. Amino carbon nanotubes (NH_2-CNT), Potassium ferricyanide, ferric chloride ($FeCl_3$), H_2O_2, NaCl, KCl, $CaCl_2$, uric acid (UA) and glucose were acquired from Aladdin (Shanghai, China). Methanol, acetonitrile, N,N-dimethylformamide (DMF), tetrahydrofuran (THF), acetic acid (HAc) and hydrochloric acid (HCl) were prepared with Xilong Science Co., Ltd. (Shantou, China).

Instruments. All electrochemical experiments were conducted on the CHI-760E electrochemical workstation (Shanghai, China). Three-electrode system consisted of a saturated calomel electrode (SCE) as the reference electrode, a platinum wire electrode as the counter electrode and the modified electrode using as the working electrode. Cyclic voltammetry (CV) was carried out in 0.2 M PBS (pH=7.0). N_2 adsorption-desorption isothermal test was operated in liquid nitrogen environment (77 K) using Belsorp-mini II (McKiebel Co. Ltd, Japan). D/Max 2500 V/PC X-ray powder diffract meter (PXRD) was conducted using Cu Kα radiation with range from 2° to 50° and scanning step maintained 3°/min. Fourier transform infrared spectroscopy (FTIR) was recorded on a Nicolet 6700 FT-IR spectrophotometer. X-ray photoelectron spectroscopy (XPS) was tested using ESCA-LAB-MKII with Al Kα as excitation source and C1s (284.6 eV) as reference line.

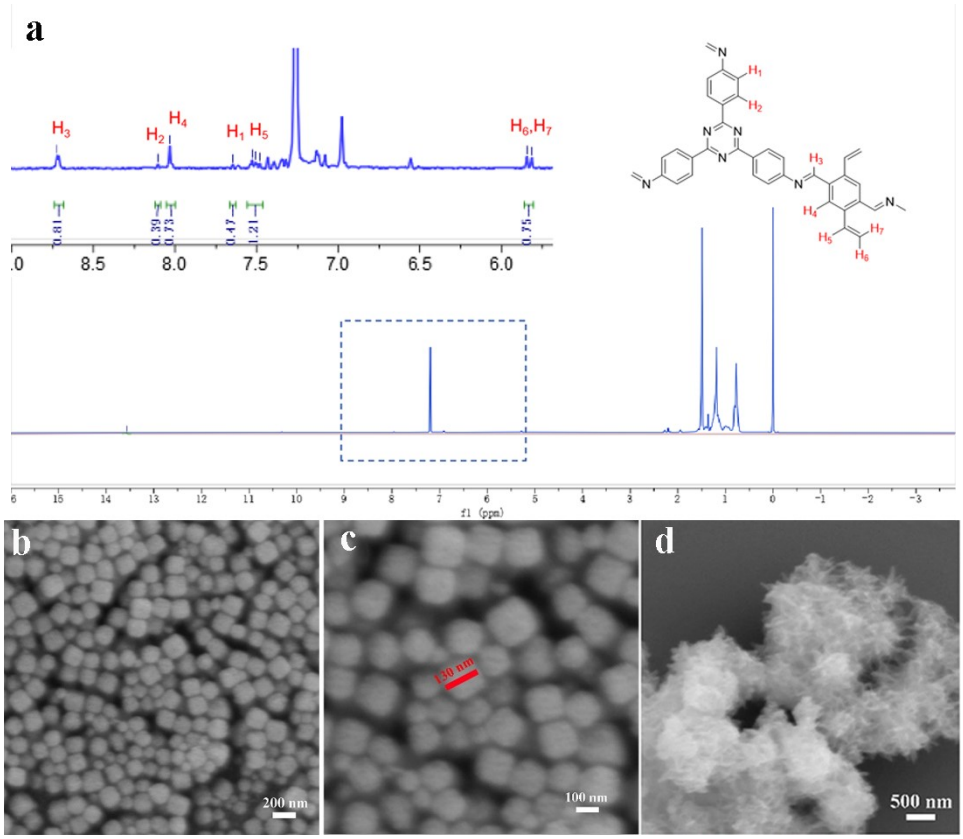

Figure S1. (a) ^{1}H NMR spectrum of $COF_{TZT\text{-}DVA}$ in $CDCl_{3;}$ (b), (c) FESEM diagram of PB; (d) FESEM diagram of $COF_{TZT\text{-}DVA}$@PB**.**

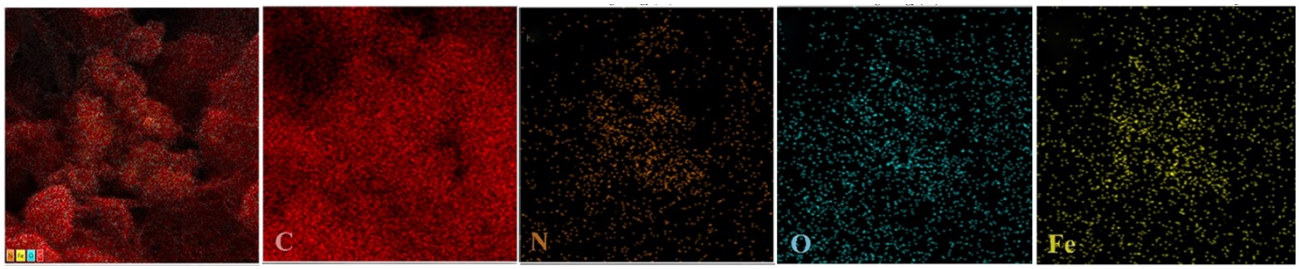

Figure S2. Corresponding mapping of $COF_{TZT\text{-}DVA}$/CNT@PB.

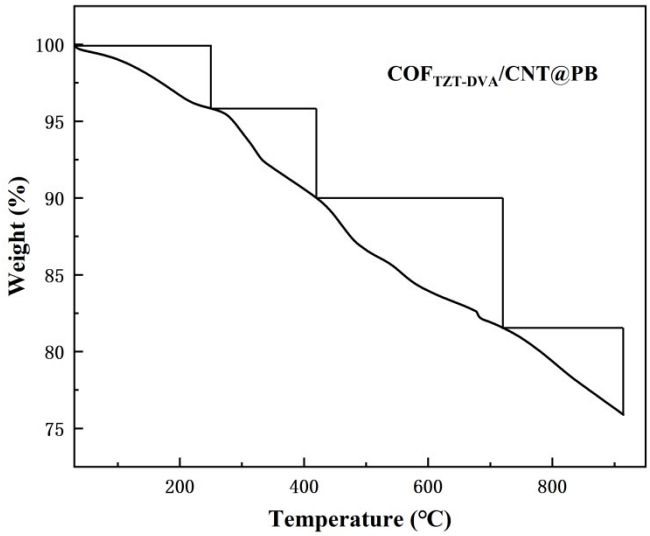

Figure S3. Thermogravimetric analysis (TGA) curves of the $COF_{TZT-DVA}$/CNT@PB nanocomposite material.

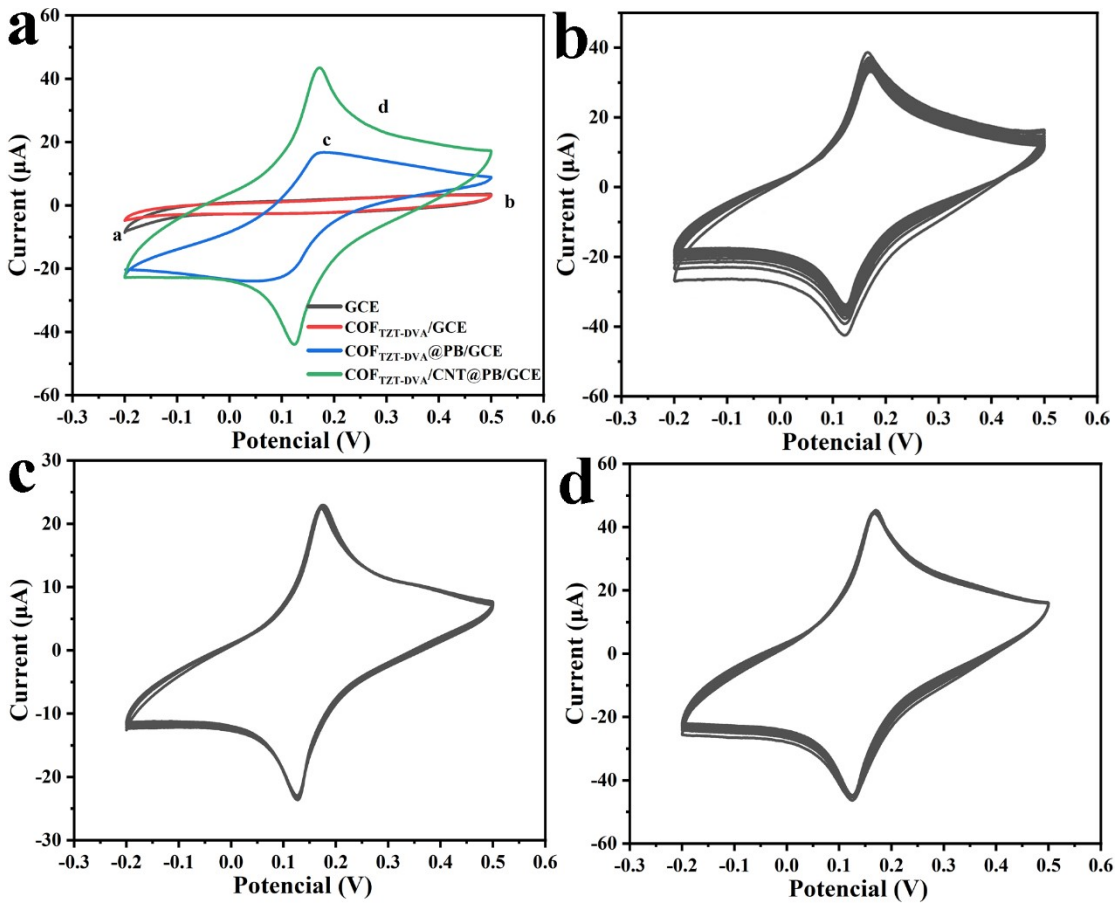

Figure S4. (a) CV curves of GCE (curve a), $COF_{TZT-DVA}$/GCE (curve b), $COF_{TZT-DVA}$@PB/GCE (curvec) and $COF_{TZT-DVA}$/CNT@PB/GCE (curve d) in PBS (pH = 6) solution containing 0.1 M KCl; CV curves of (b) PBNPs/GCE, (c) $COF_{TZT-DVA}$@PB/GCE, and (d) $COF_{TZT-DVA}$/CNT@PB/GCE in PBS (pH=6) solution containing 0.2 M KCl for 10 cycles (sweep rate 50 mV s^{-1}).

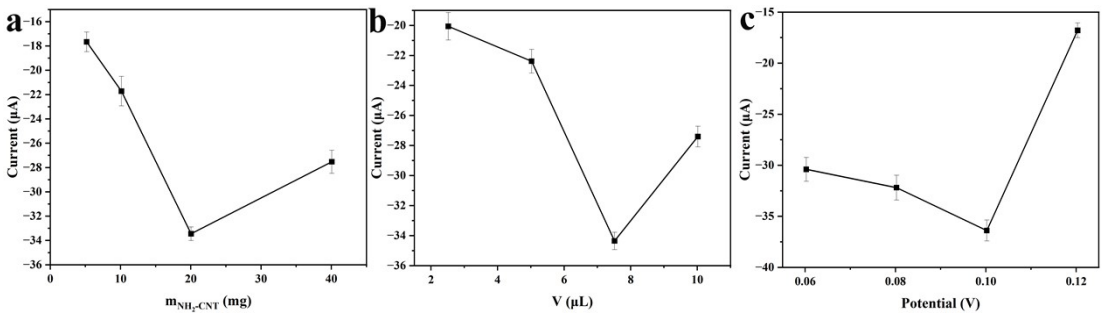

Figure S5. (a) Current responses of modified $COF_{TZT\text{-}DVA}$/CNT@PB/GCE with different NH_2-CNT masses and (b) 2 mg/mL $COF_{TZT\text{-}DVA}$/CNT@PB modified electrodes at 0.1 V in PBS (pH=6) solution containing 0.1 M KCl; (c) Optimization of reduction potential.

Table S1. Performance comparison of different H_2O_2 electrochemical sensors

Electrode Materials	Sensitivity (μA mM^{-1} cm^{-2})	Detection limit (μM)	Linear range	Refs
AgNPs/porous silicon	34.07	0.45	1.65 μM-0.5 mM	[1]
rROGO-S-Au HS/GCE	-	5	5 μM-11.5 mM	[2]
1-WO_3/g-C_3N_4/CC	78	2.07	3-30 μM	[3]
2-WO_3/g-C_3N_4/CC	59	2.53	3-30 μM	
CV-CuNPs-rGO-2	-	0.601	100-18 mM	[4]
Meso-C/ZnO/GCE	5.52	52.60	200-3.1 mM	[5]
PtNPs/CNF	-	1.7	5-1.5 mM	[6]
$COF_{TZT\text{-}DVA}$/CNT@PB	210	0.79	2.38 μM-1.05 mM	**This work**

References

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