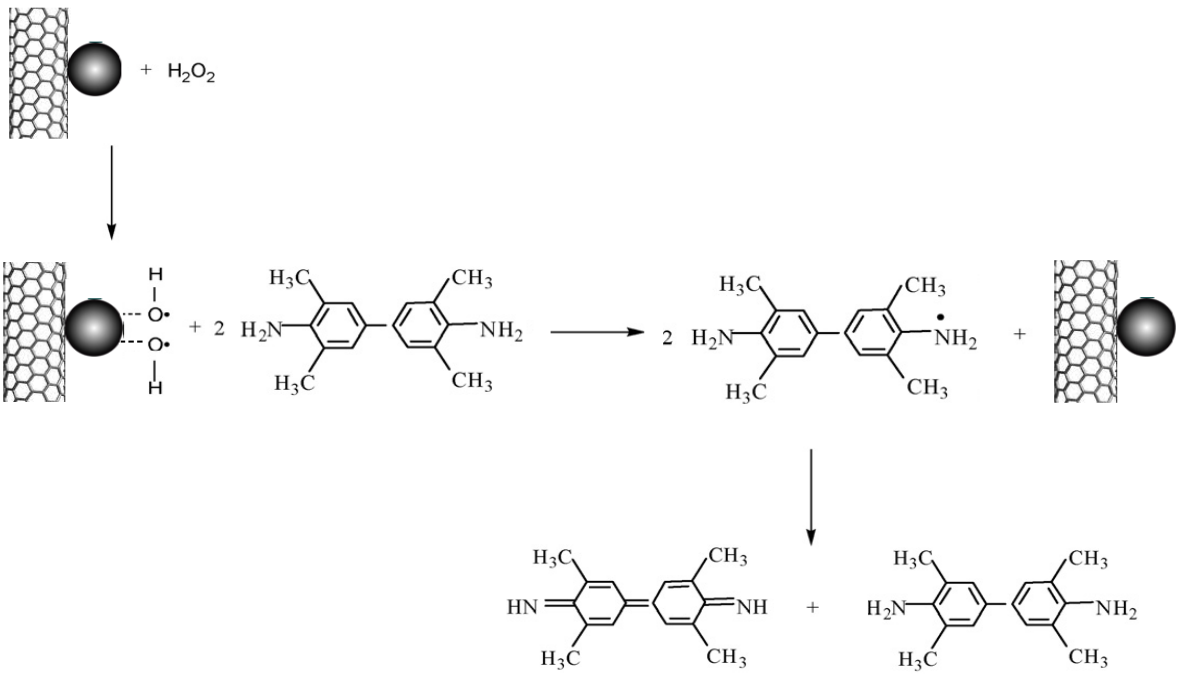
Electronic Supplementary Information

Platinum Nanocatalysts Loaded on Graphene Oxide-Dispersed Carbon Nanotubes with Greatly Enhanced Peroxidase-Like Catalysis and Electrocatalysis Activities

Hua Wang [a] *, Shuai Li [a], Yanmei Si [a], Ning Zhang [a], Zongzhao Sun [a], Hong Wu [b], Yuehe Lin [b] *



Scheme S1. Schematic illustration of radical chain mechanism for the peroxidase-like catalysis of TMB–H_2O_2 reaction by the GOCNT-Pt nanocomposites.

Table S1. Comparison of catalytic dynamic parameters of GOCNT-Pt, CNT-Pt, and GO-Pt nanocomposites with HRP [a]

Catalysts	Substrates	K_m (mM)	V_{max} (10^{-8}M s^{-1})
GOCNT-Pt	H_2O_2	1.82	1.27
GO-Pt	H_2O_2	4.24	1.82
CNT-Pt	H_2O_2	6.24	2.18
HRP [b]	H_2O_2	3.70	8.71
GOCNT-Pt	TMB	0.075	0.302
GO-Pt	TMB	0.228	0.236
CNT-Pt	TMB	0.152	0.422
HRP [b]	TMB	0.434	10.0

[a] K_m is the Michaelis constant, V_{max} is the maximal reaction velocity.
[b] L. Z. Gao, J. Zhuang, L. Nie, J. B. Zhang, Y. Zhang, N. Gu, T. H. Wang, J. Feng, D. L. Yang, S. Perrett and X. Yan, *Nature Nanotechnology*, 2007, 2, 577-583.

Table S2. Interferent effects on selective H_2O_2 detections with the GOCNT-Pt electrode

Interferents	Current ratios [a]
Glucose	**1.22**
Sucrose	1.06
Ethanol	0.98
Cysteine	0.89
L-Tyrosine	0.93
Uric acid	1.01
Citric acid	0.97
Scorbic acid	**0.68**
NO_3^-	0.99
SO_4^{2-}	0.95
F^-	0.92
S^{2-} (0.1 mM)	**0.43**
NH^{3+}	0.96
Ca^{2+}	0.98

[a] Current ratios for the mixtures of 2.0 mM interfering substances and 0.5 mM H_2O_2 compared to that of 0.5 mM H_2O_2 alone

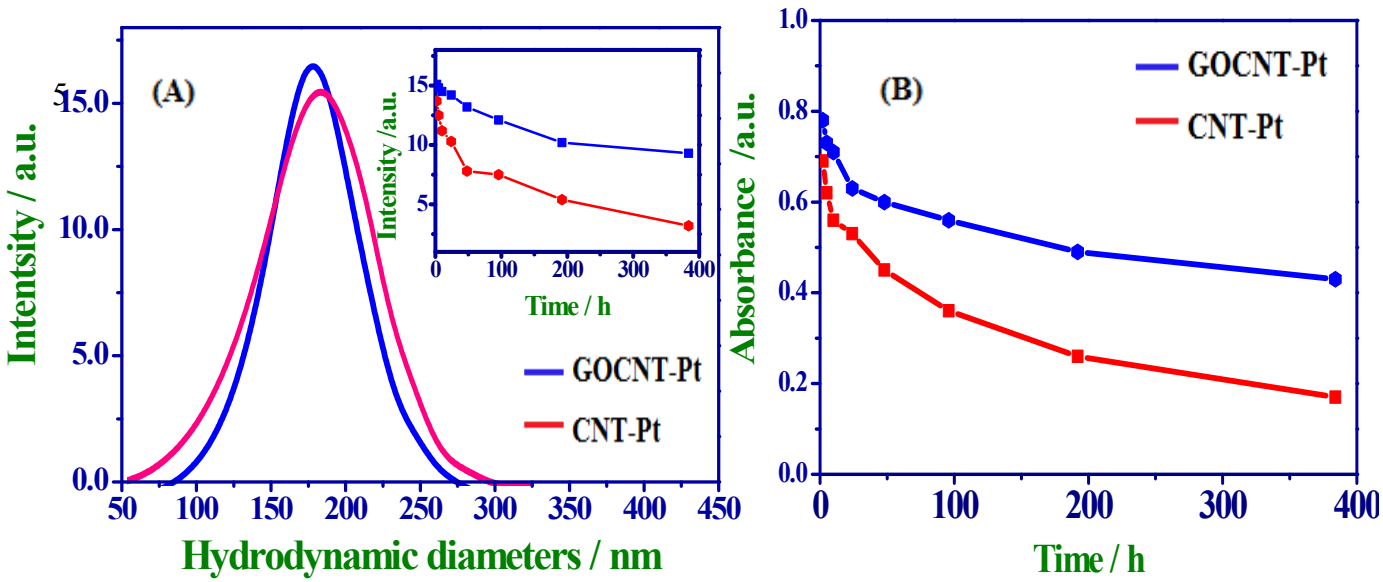


Fig. S1. Comparable investigations of time-dependent dispersion stabilities between the GOCNT-Pt and CNT-Pt nanocomposites by using (A) dynamic light scattering (DLS) at a 90° scattering angle, and (B) UV/vis spectrometry with absorbance values taken at 250 nm. The time-dependent dispersion of two sample suspensions was evaluated by monitoring their supernatants taken out at different time intervals of 2.0, 5.0, 10, 24, 48, 72, 120, 192 h, where the DLS intensities (nanotube sizes ranging from 100 to 250 nm) and optical absorbance values at 250 nm were collected over time.

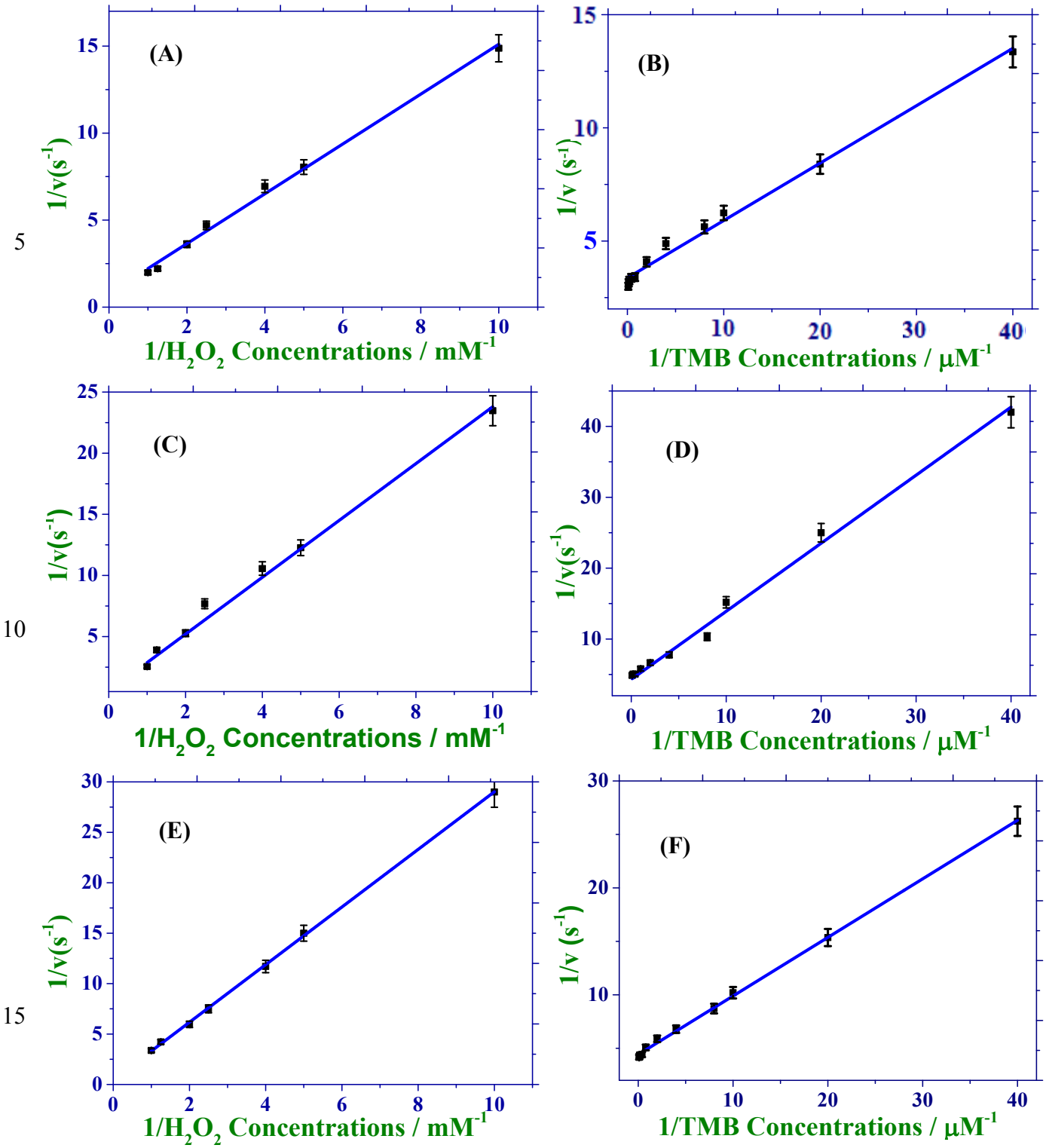


Fig. S2. Double-reciprocal plots of catalysis activities of GOCNT-Pt (A, B), GO-Pt (C, D), and CNT-Pt (E, F) nanocomposites corresponding to H_2O_2 and TMB, which were obtained at a fixed concentration of one substrate versus varying concentrations of the second substrate. The y-axis values are calculated from the observed absorbance values

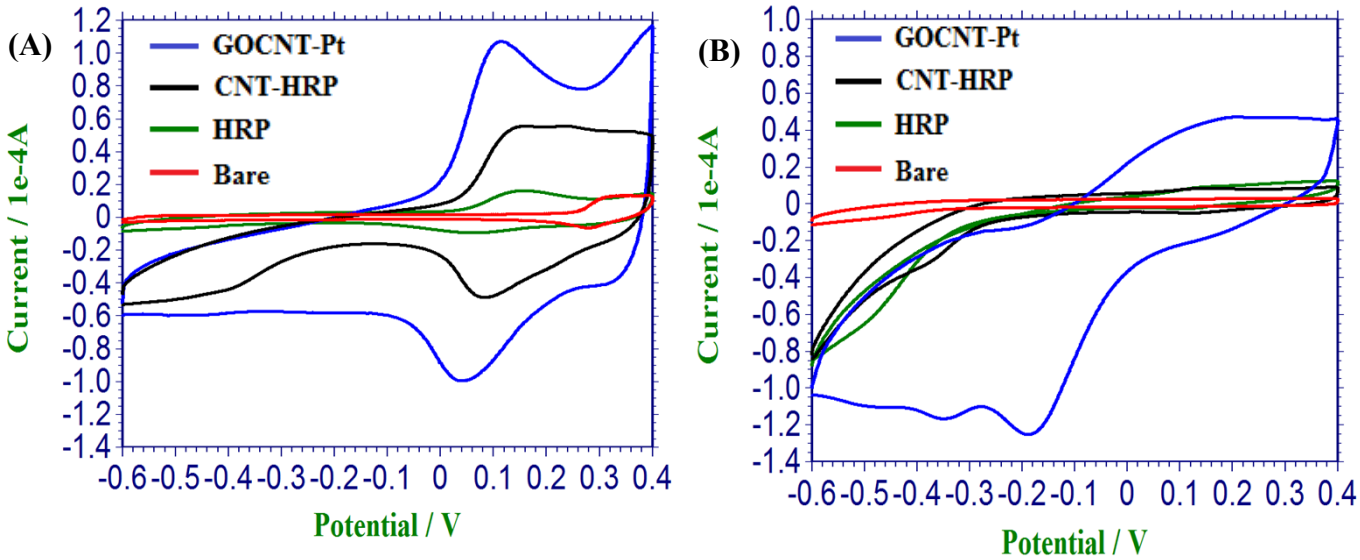


Fig. S3. Comparison of voltammograms (the first scan circle) between the GCE electrodes modified with GOCNT-Pt nanocomposites, CNT-HRP, and HRP in PBS buffer containing (A) 1.0 mM H_2O_2 and 0.4 mM TMB, and (B) 2.0 mM H_2O_2, scanning from - 0.6 to + 0.4 V at a scan rate of 0.10 V/s.