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SUPPLEMENTARY MATERIAL

Highly Sensitive Electrochemical Sensor Modified with Pt/Pd-MnO_2/CNT Nanocomposite for the Determination of Glutamate

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Effect of scan rate

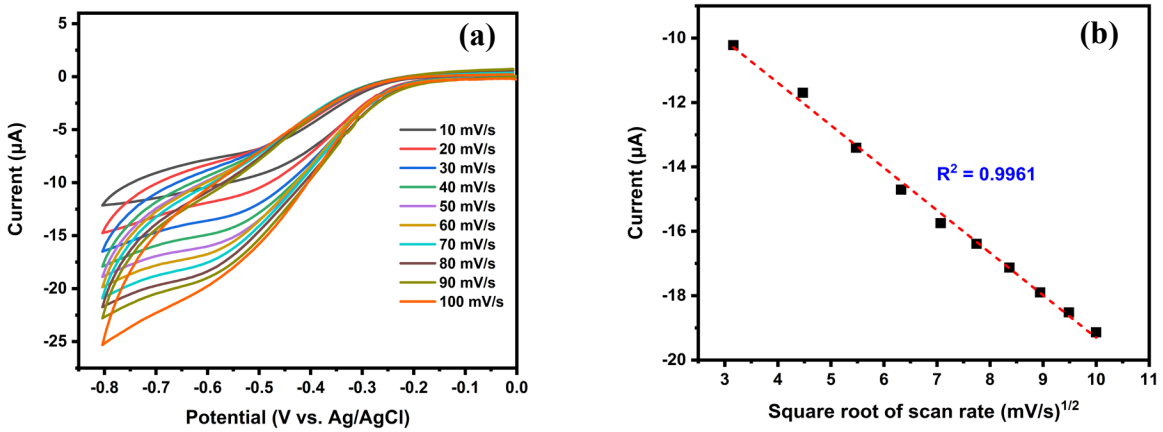

Figure S1 Cyclic voltammograms of 1 mM H_2O_2 in PBS, pH 7.4 on Pt/Pd-MnO_2/CNT/SPE (a) at scan rate of 10-100 mV/s and (b) square root of scan rate.

Repeatability and reproduciblity study

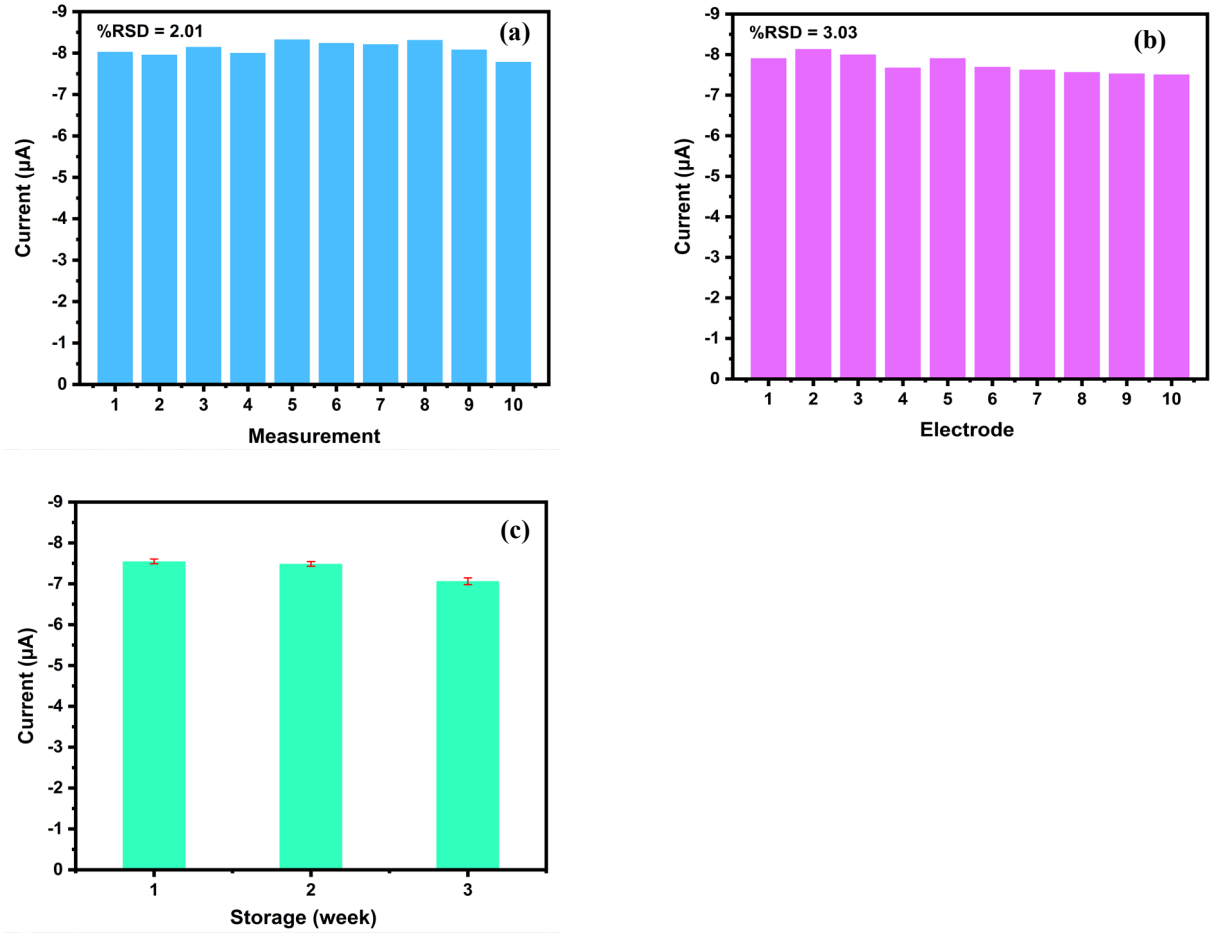

Figure S2 Current responding for study of (a) repeatability, (b) reproducibility, and (c) stability result of 1 mM H_2O_2 in PBS, pH 7.4 on Pt/Pd-MnO_2/CNT/SPE at -0.6 V.

Interferences study

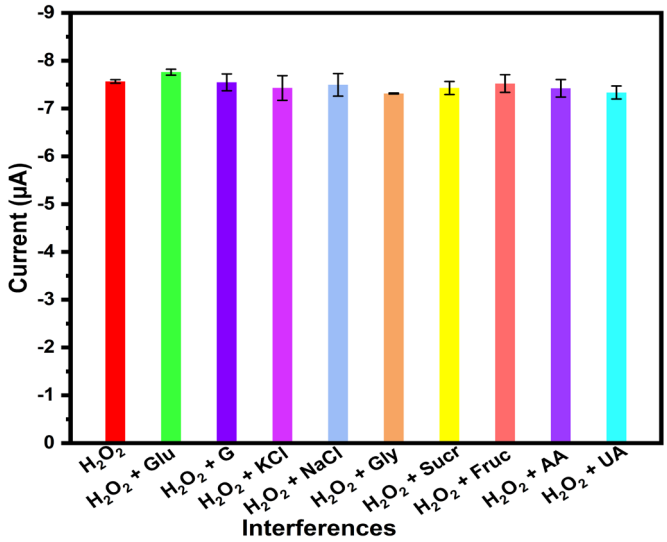

Figure S3 Current responding of 1 mM H_2O_2 mixed 10 mM interferences at Pt/Pd-MnO_2/CNT at -0.6 V.

Cyclic voltammograms of H_2O_2 and Glutamate with and without GluOx

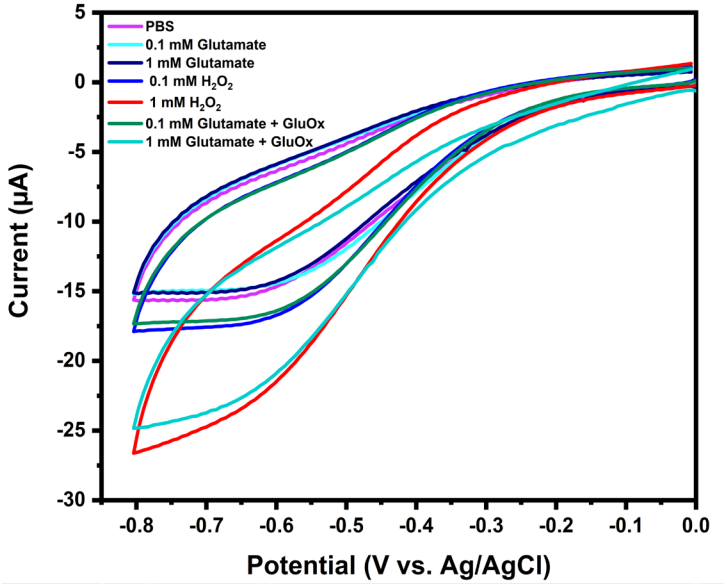

Figure S4 The comparison of the cyclic voltammogram of H_2O_2 (0.1 mM and 1 mM) and glutamate (0.1 mM and 1 mM) with and without GluOx.

Table S1 Comparison of enzymatic electrochemical detection of glutamate at various electrodes.

Electrode	Working electrode	Detection time (sec)	Buffer, pH	Sample	Enzyme	Applied potential (V)	Stability	Selectivity	Linear range (mM)	LOD (µM)	Year, Ref
Pt/ta-C/APTES/GluOx	GCE	N/A	PBS, pH 7.4	N/A	GluOx	+0.6	76%, a week	N/A	0.1-0.5	10	2015, [1]
MWCNT-CHIT-MB/GLDH-NAD^+-CHIT/MWCNT-CHIT	SPCE	20-30	phosphate buffer, pH 7 (0.75 mM, containing 0.05 M NaCl)	Serum and beef OXO cubes	GLDH and co-factor NAD^+	+0.1	N/A	N/A	0.0075–0.105	3	2015, [2]
CFE/PB/PoPD/PEI/GluOx/Gluth	Carbon fiber electrodes (CFEs)	N/A	PBS, pH 7.4	NA	GluOx cross link with glutaraldehyde	+0.05	90%, 4 weeks at 4ºC	Interfere with ascorbic acid (AA)	0-0.15	<2	2016, [3]
GC/Pt-MWCNTs/PPy/GluOx Ox	GCE	3	PBS, pH 7.4	-	GluOx	+0.5	87.4% and 71.2% after 4 weeks at − 20 °C and 4 °C	Not interfering but low concentration AA was studied	0.01- 0.1	0.88	2019, [4]
SPPtE/PPYox/GLOD-GLU-BSA	screen printed platinum electrodes (SPPtEs).	N/A	PBS, pH 7	Stock cubes, ketchup and Parmigiano Reggiano cheese	GluOx	+0.7 V	50 h, over 400 analyses	Interfere with ascorbic acid, cysteine and gallic acid	0.005-1.0	1.8	2020, [5]
P(VI-AA_{NH2})-Os/HRP//P(VBTMA-MMA-GMA)/GluOx	carbon nanoelectrodes (CNEs)	N/A	10 mM HEPES, pH 7.4	cell	GluOx and HRP	-0.0005	N/A	Not interfering with mouse astrocyte cells	0-0.2	70	2020, [6]

Electrode	Working electrode	Detection time (sec)	Buffer, pH	Sample	Enzyme	Applied potential (V)	Stability	Selectivity	Linear range (mM)	LOD (μM)	Year, Ref
GluOx-Co_3O_4 nanocubes/SPE	SPCE	5	PBS, pH 6.5	Fermented food	GluOx	-0.2	79.32%, 4 weeks	Not interfering with AA, UA, glucose and lactate	0.01-0.6	10	2020, [7]
GluOx/Au NPs/GO/CS	Au electrode	N/A	PBS, pH 7.5	Beef	GluOx	0.2–0.6, DPV	92%, 2 weeks	Interfere with AA, citric acid (CA), L-methionine (Met) and L-cysteine (Cys)	0.2-1.4	23	2020, [8]
GCE/PtNP@MXene-$Ti_3C_2T_x$/Chi/GluOx/Chi	GCE	<20	PBS, pH 7.4	Soy sauce, stock cube, mushroom seasoning	GluOx	+0.6	70%, 4 weeks	Current decrease in the presence of interferences	0.01–0.11	0.45	2021, [9]
ChBD-GLOX/PB/SPC	screen-printed Prussian blue nanocube microchip (SPC)	15	PBS, pH 6.5	Microbial fermented broth	GluOx	-0.05	95%, 2 weeks	Not interfering with AA, UA, glucose and lactate	0.025-0.3	9	2023, [10]
Pt/Pd-MnO_2/CNT	SPCE	150	PBS, pH 7.4	Mama instant noodles	GluOx	-0.6	96%, 3 weeks	Not interfering with AA, G, NaCl, KCl, Sucr and Fruc	0.005-0.08	1.98	This work

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