

Electronic Supplementary Information

**Prudently Designed Se@fMWCNT as Peroxidase Mimicking
Nanozyme for Distinctive Electrochemical Detection of H₂O₂
and Glutathione**

Vadakke Purakkal Sruthi and Sellappan Senthilkumar*

Department of Chemistry, School of Advanced Sciences, Vellore Institute of Technology
(VIT), Vellore-632014, India.

*Corresponding author. E-mail: senthilkumar.s@vit.ac.in, senthilanalytical@gmail.com

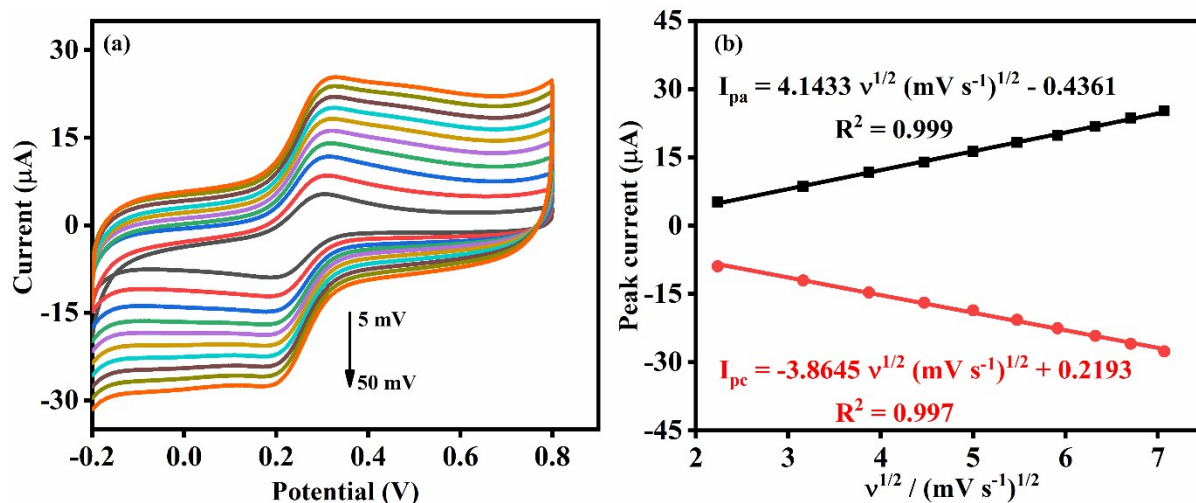


Fig. S1. (a) Effect of scan rate of Se@fMWCNT in 0.1 M KCl containing 2.5 mM $\text{Fe}(\text{CN})_6^{3-}$ at different scan rates from 5 mV s^{-1} to 50 mV s^{-1} . (b) Plot of square root of scan rate vs. peak current.

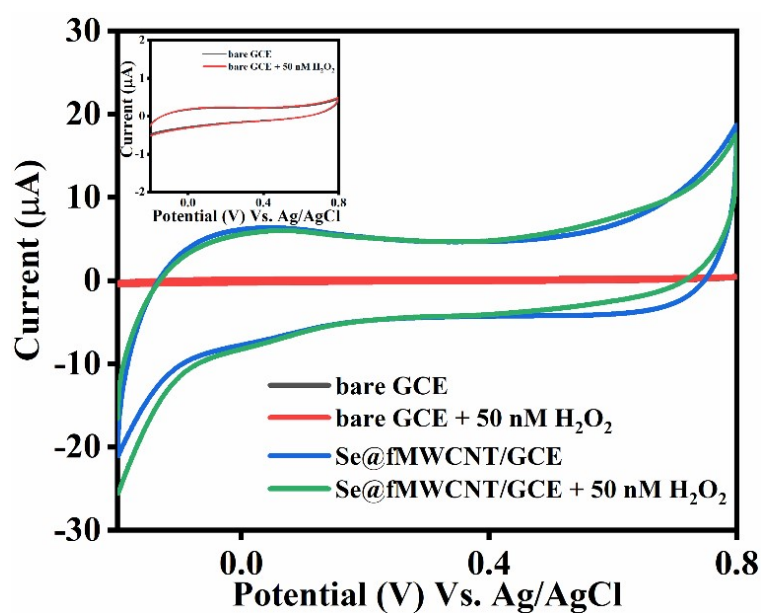


Fig. S2. Electrocatalytic activity of bare and Se@fMWCNT modified GCE in the presence (green) and absence (blue) of 50 nM H_2O_2 in N_2 saturated 0.1 M PBS (pH = 7). Inset: Electrocatalytic activity of bare GCE in the presence (red) and absence (black) of 50 nM H_2O_2 in N_2 saturated 0.1 M PBS (pH = 7).

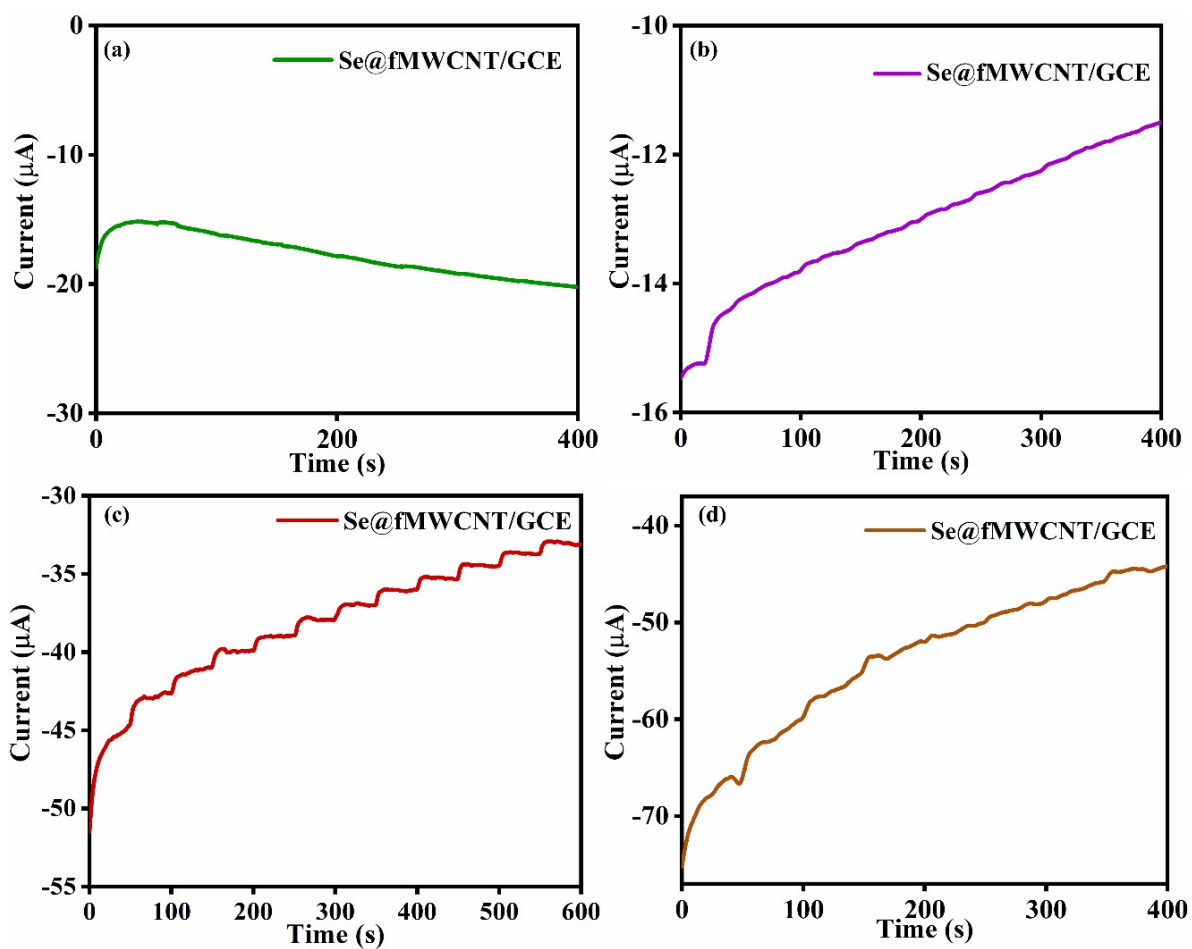


Fig. S3. Amperometric (i-t) curve of Se@fMWCNT for successive addition of GSH in N₂ saturated 0.1 M PBS (pH = 7) at -0.2 V in the (a) absence of H₂O₂ and presence of (b) 0.1 mM H₂O₂ (c) 1 mM H₂O₂ and (d) 10 mM H₂O₂.

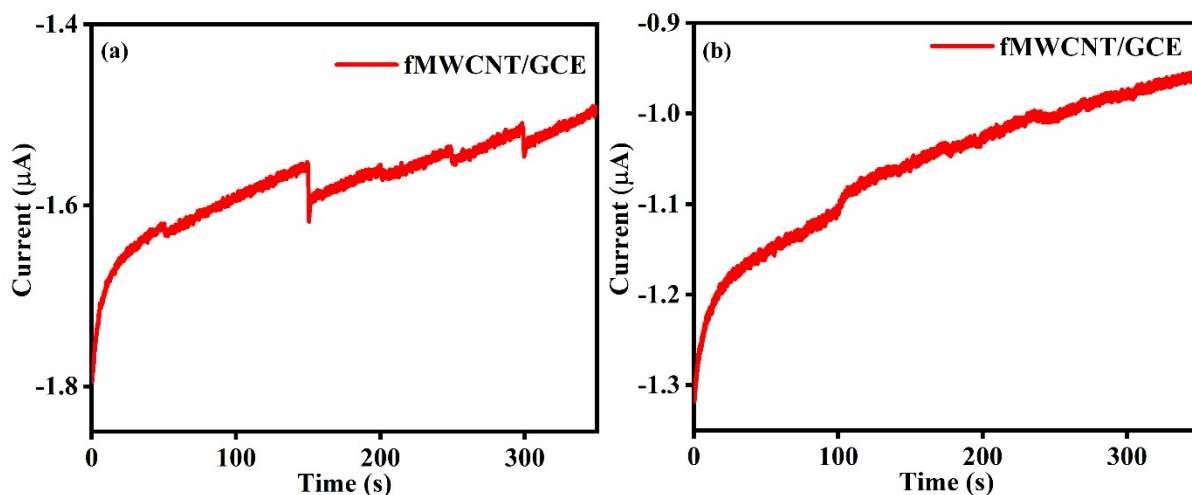


Fig. S4. (a) Amperometric (i-t) curve of fMWCNT/GCE for successive addition of H₂O₂ in 0.1 M PBS (pH=7; N₂ saturated) at an applied potential of -0.2 V. (b) Amperometric (i-t) curve of fMWCNT/GCE for successive addition of GSH in 0.1 M PBS (pH=7; N₂ saturated) containing 1 mM H₂O₂, at an applied potential of -0.2 V.

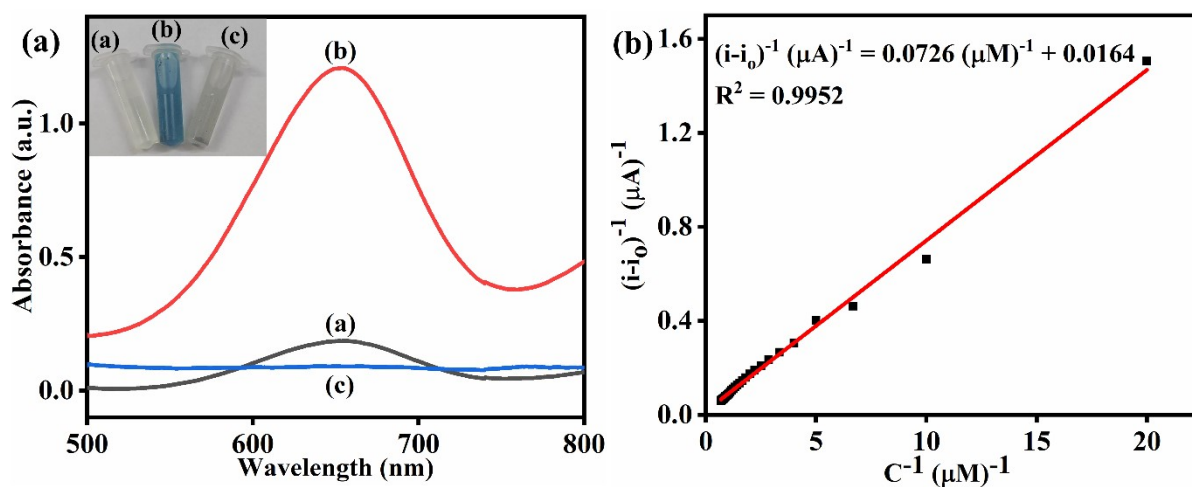


Fig. S5. (a) UV-vis absorbance spectra of TMB in the presence of a) 1 mM H₂O₂, b) 1 mM H₂O₂ + 1 mg/mL Se@fMWCNT and c) 1 mM H₂O₂ + 1 mg/mL Se@fMWCNT + 1 mM GSH (b) 1/C Vs 1/(i-i₀) plot of Se@fMWCNT nanocomposite obtained from amperometric response.

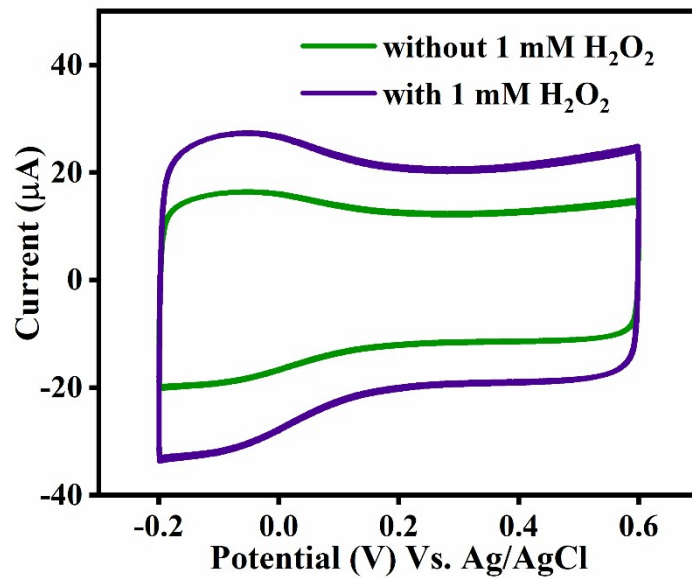


Fig. S6. Cyclic voltammogram of Se@fMWCNT/GCE at a scan rate of 50 mV s^{-1} in N_2 saturated 0.1 M PBS ($\text{pH} = 7$) after 100 cycles with $1 \text{ mM H}_2\text{O}_2$ (blue) and without $1 \text{ mM H}_2\text{O}_2$ (green).

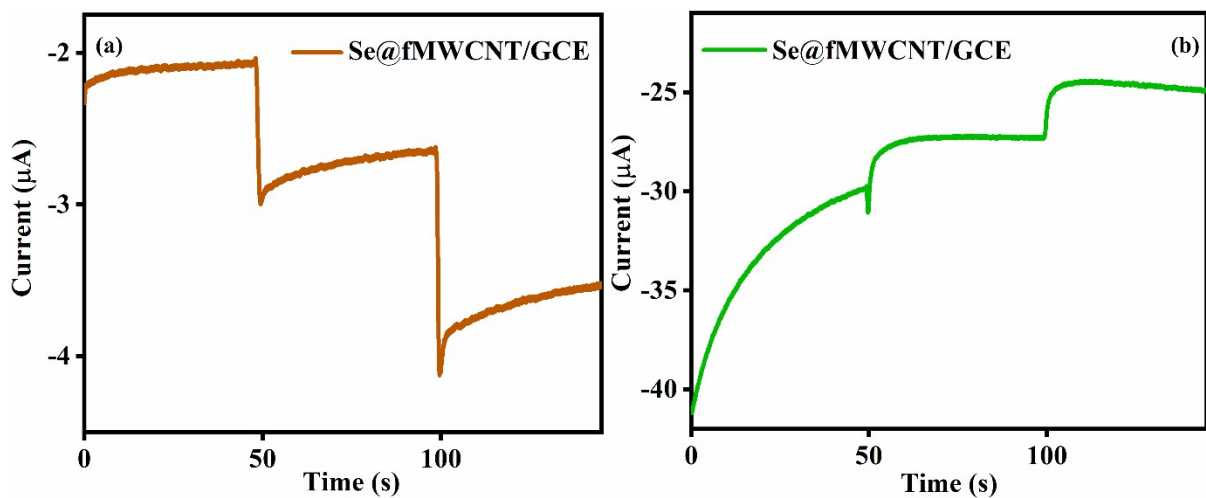


Fig. S7. Amperometric response of Se@fMWCNT/GCE at -0.2 V for successive addition of (a) H_2O_2 to milk sample in 0.1 M PBS ($\text{pH} = 7$; N_2 saturated) (b) diluted GSH solution in 0.1 M PBS ($\text{pH} = 7$; N_2 saturated) containing 1 mM of H_2O_2 .