Supplementary Information

Highly efficient rGO-MoS_2 nanohybrid based laccase biosensor for hydroquinone detection in waste water

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Figure S1. UV visible spectra of (i) GO and (ii) rGO-MoS_2

Figure S2. (A) Adsorption studies of 10 ppm MB under 2.5mg of rGO-MoS_2 nanocomposite using UV-Visible spectroscopy **(B)** Pseudo first order kinetics plot **(C)** Temkin adsorption isotherm plot **(D)** Freundlich adsorption isotherm plot

Figure S3. Zeta potential distribution **of** rGO-MoS_2 nanocomposite in DI

Figure S4. Comparison between CV (i) rGO-MoS_2/ITO (ii) GO/ITO (iii) Lac/rGO-MoS_2/ITO electrode and (iv) Hq/Lac/rGO-MoS_2/ITO electrode measured at 50 mV/s in PBS consisting of 5mM $[Fe(CN)_6]^{3-}$ and $[Fe(CN)_6]^{4-}$

Figure S5. Variation of concentration of Lac enzyme immobilized onto rGO-MoS_2/ITO for 100 µM Hq using Chronoamperometry

Figure S6. Variation of pH for PBS buffer for biosensing of 100 µM Hq using Chronoamperometry

Figure S7. Reproducibility of the fabricated biosensor at 100 µM Hq

Table 1. Comparison of adsorption capacity of different materials towards MB dye

Table 2. Feasibility of adsorption equations and isotherms towards adsorption of MB dye using rGO-MoS_2 with other parameters

Fig.S1

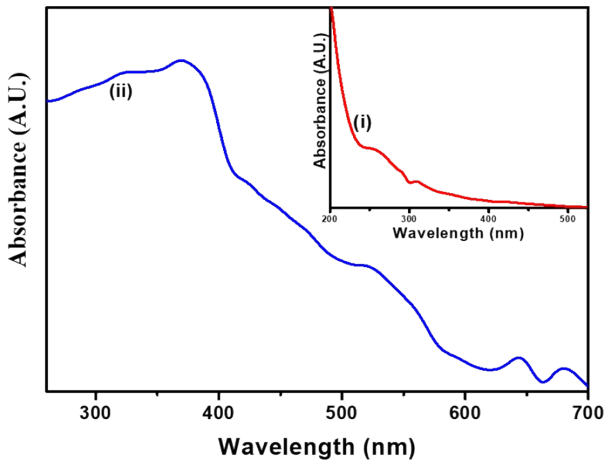
Absorbance (A.U.)
(ii)
(i)
Absorbance (A.U.)
Wavelength (nm)
300
400
500
600
700
Wavelength (nm)

Fig.S2

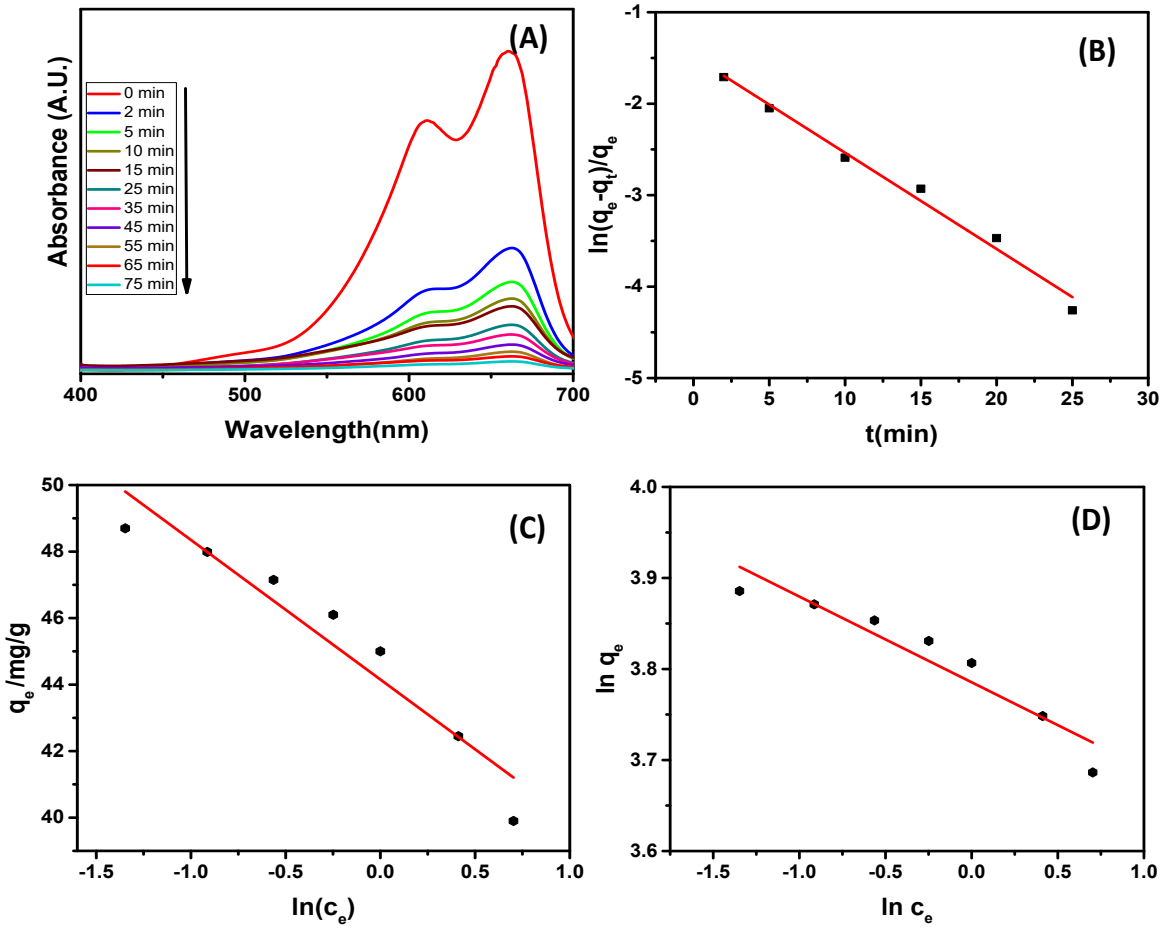
(A)
Absorbance (A.U.)
0 min
2 min
5 min
10 min
15 min
25 min
35 min
45 min
55 min
65 min
75 min
Wavelength(nm)
(B)
ln(qe-qt)/qe
t(min)
(C)
qe /mg/g
ln(ce)
(D)
ln qe
ln ce

Fig.S3

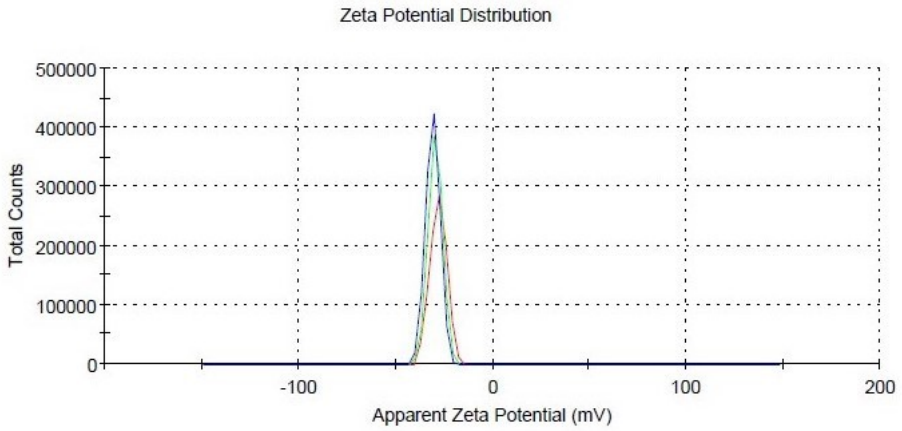

Fig.S4

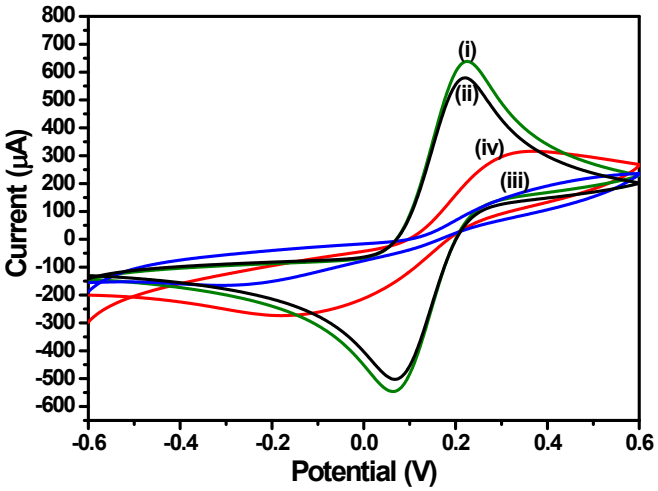

Fig.S5

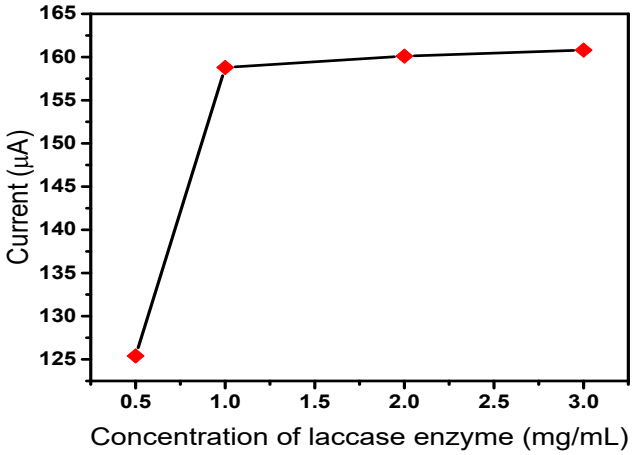

Fig.S6

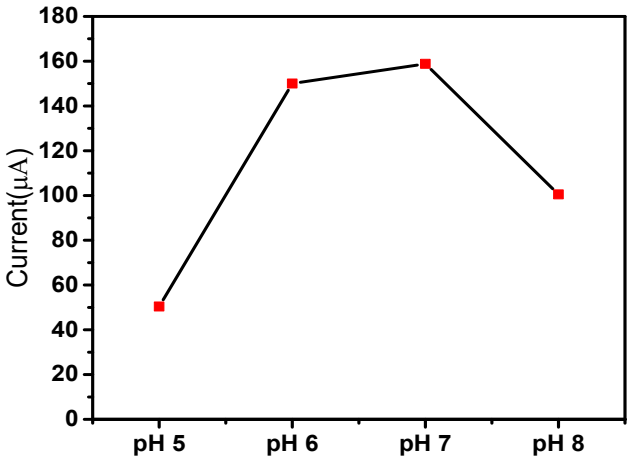

Fig.S7

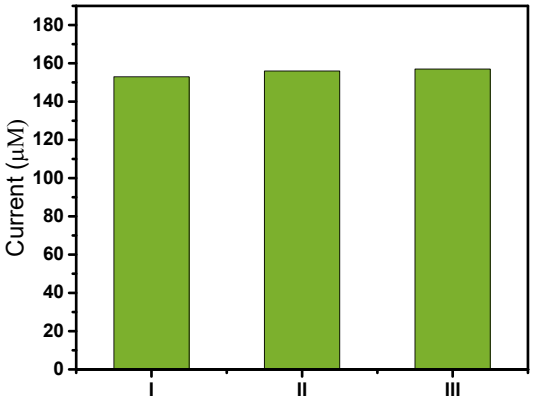

Table S1.

Adsorbent	Adsorption capacity	Concentration of MB	Reference
CNT	35.4 mg/g	20 ppm	[1]
Graphene	39.92 mg/g	20 ppm	[2]
$KMgFe(PO_4)_2$	22.83 mg/g	10 ppm	[3]
Electrolytic manganese anode slime	70.74 mg/g	500 ppm	[4]
Nb-W complex oxide	19.41 mg/g	10 ppm	[5]
CQ-MoS$_2$ nanocomposite	48.7 mg/g	10 ppm	This work

Table S2.

Equations	R^2 value	Other Parameter	Value
Pseudo first order	0.986		
Pseudo second order	**0.999**	Rate constant(k_2) (g mg^{-1} min^{-1})	0.024
Henry	1	Rate constant	4.998
Temkin	0.919		
Langmuir	**0.996**	q_m (mg g^{-1})	39.06

		b (L mg^{-1})	10.7
Freundlich	0.904		

References

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