Fabrication of Mn-TPP/RGO Tailored Glassy Carbon Electrode for Doxorubicin Sensing

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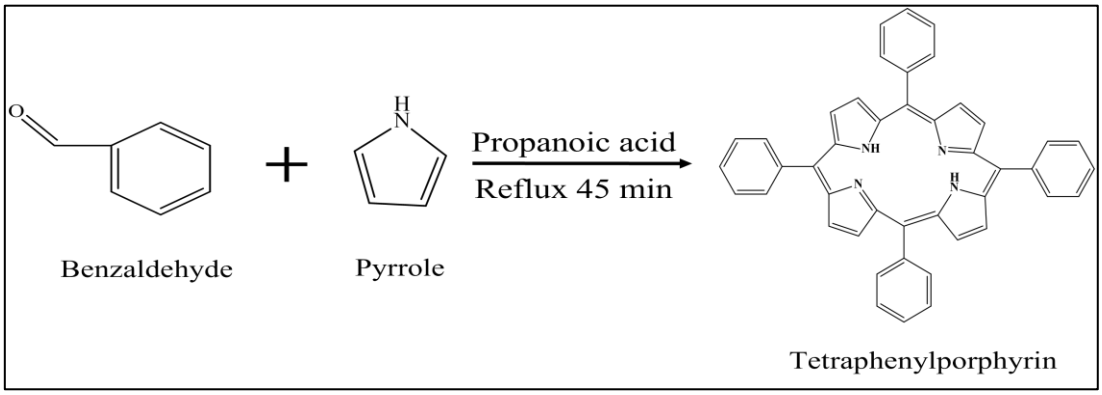
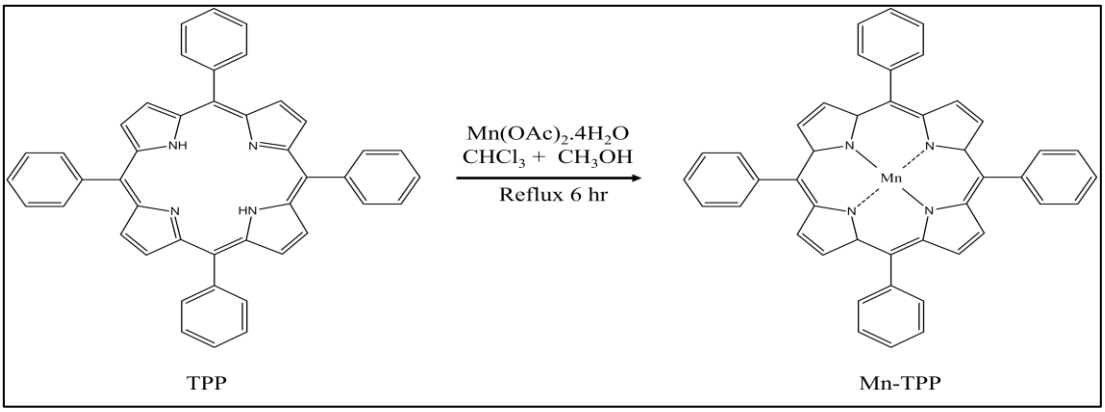
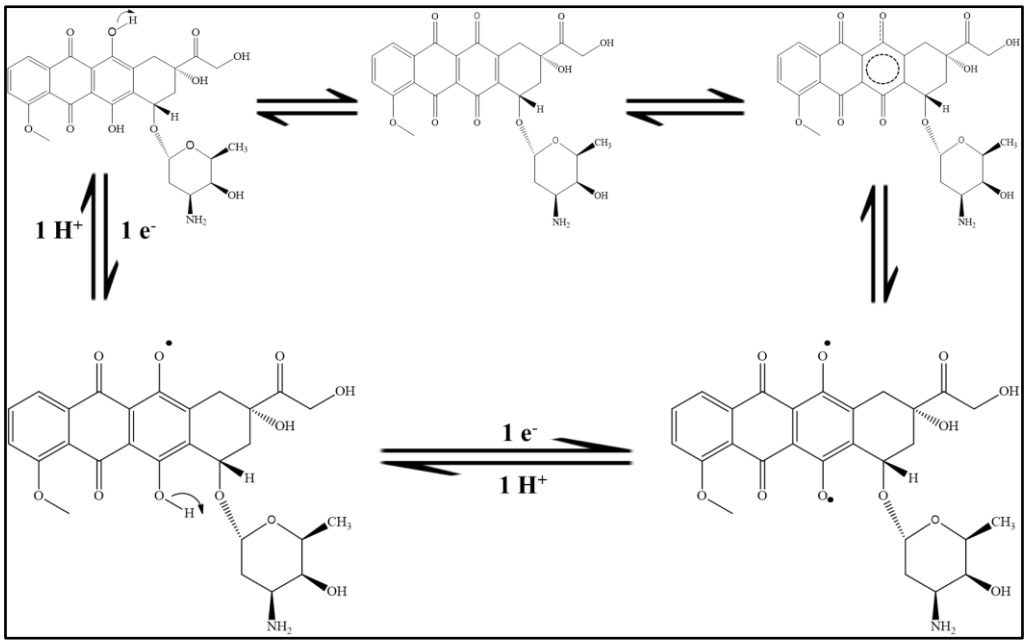
Schemes



Scheme S1. Synthesis scheme of TPP.



Scheme S2. Synthesis scheme of Mn-TPP.



Scheme S3. Electrochemical oxidation of DOX.

Figures

Electrode Fabrication

The electrode was fabricated by following the procedure mentioned in literature [1]. The diameter of GCE was 3mm with geometrical surface area of 0.07 cm^2. Following is the image of fabricated electrode in Figure S1.

Figure S1. Optical image of Mn-TPP/RGO/GCE fabricated electrode with geometrical surface area of 0.07 cm^2.

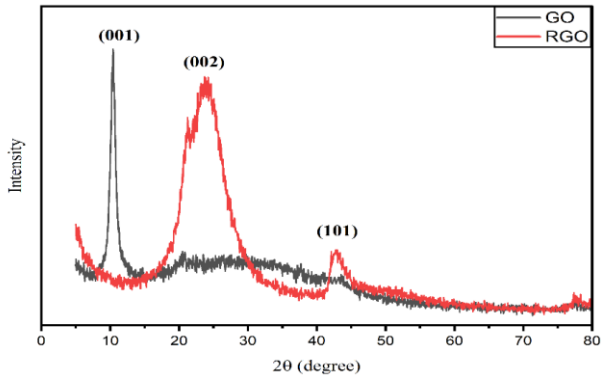


Figure S2. XRD Spectra of GO and RGO.

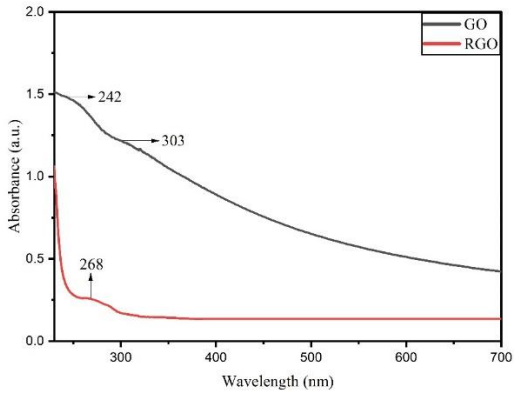
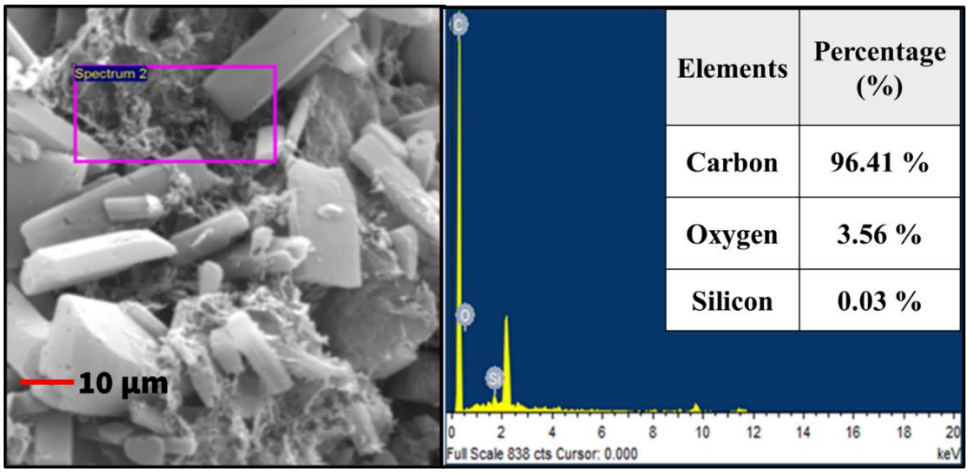


Figure S3. UV/vis analysis of GO and RGO.



Elements	Percentage (%)
Carbon	96.41 %
Oxygen	3.56 %
Silicon	0.03 %

Figure S4. SEM and EDS analysis of TPP/RGO.

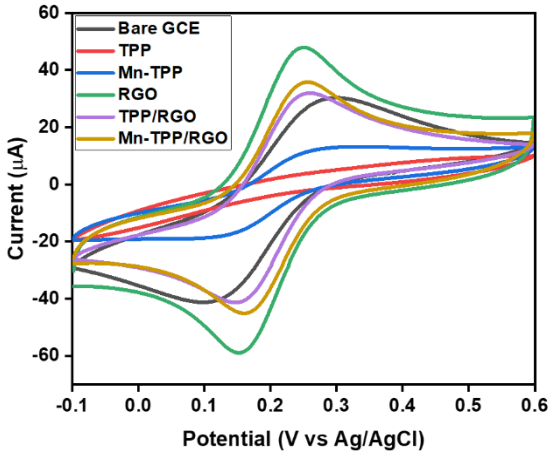


Figure S5. Cyclic voltammetric analysis of Bare GCE, TPP, Mn-TPP, RGO, TPP/RGO and Mn-TPP/RGO in 0.5mM potassium ferricyanide solution.

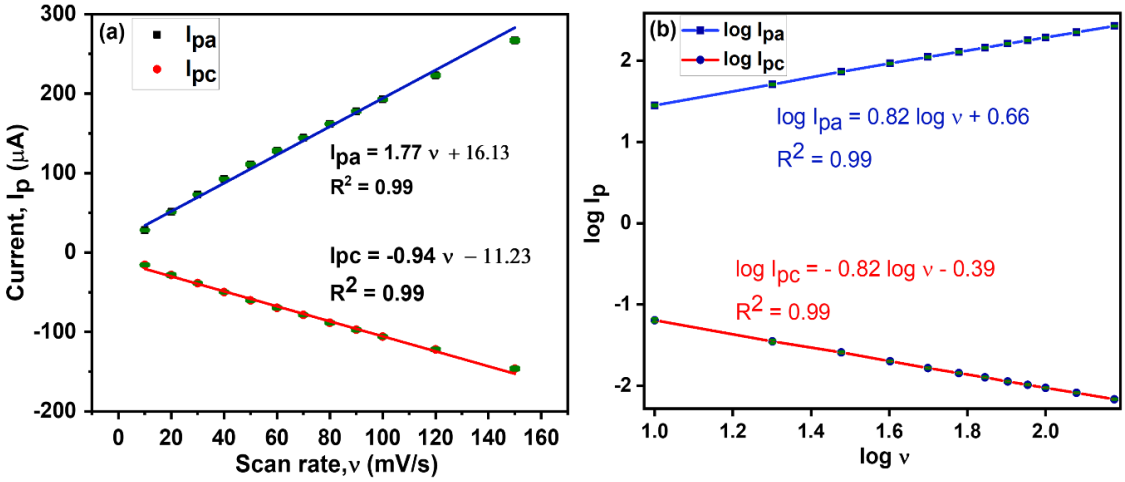


Figure S6. Calibration graphs of (a) scan rate vs. redox current and (b) logarithmic relationship of scan rate versus anodic peak current.

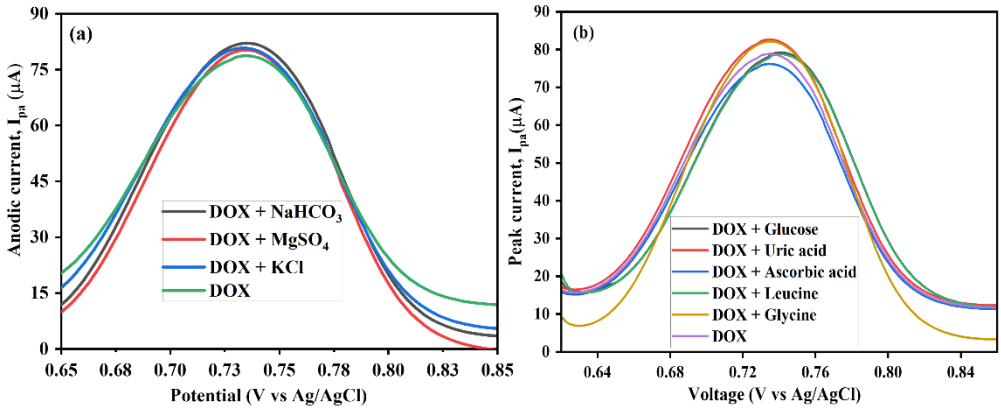


Figure S7. DPV studies of selectivity of Mn-TPP/RGO/GCE towards DOX in the presence (a) inorganic compounds (b) biomolecules commonly present in the blood serum.

Tables

Table S1. Statistical data of EIS analysis of modified electrodes in 0.5 mM potassium ferricyanide solution.

Sr. No	Modified electrodes	Charge Transfer Resistance (R_{ct})	Solution Resistance (R_u)	Interfacial Capacitance (C_{dl})
1	TPP	40.70 kΩ	149.7 Ω	709.5 x 10^{-9} F
2	Bare GCE	29.43 kΩ	308.8 Ω	13.06 x 10^{-6} F
3	Mn-TPP	25.34 kΩ	169.1 Ω	22.59 x 10^{-6} F
4	RGO	3.905 kΩ	137.5 Ω	325.9 x 10^{-6} F
5	TPP/RGO	984.5 Ω	149.4 Ω	9.37 x 10^{-6} F
6	Mn-TPP/RGO	722.9 Ω	212.0 Ω	101.2 x10^{-6} F

Table S2. Data of selectivity studies for Mn-TPP/RGO/GCE towards DOX.

Interfering agents	Current (µA)	Tolerance (%)
DOX	78.57	--
DOX + KCl	80.65	-2.7%
DOX + $NaHCO_3$	82.09	-4.5%
DOX + $MgSO_4$	80.11	-1.9%
DOX + Glucose	78.74	-0.21
DOX + Ascorbic acid	75.68	+3.7%
DOX + Leucine	78.91	-0.43%

DOX + Glycine	81.97	-4.3%
DOX + Uric acid	82.61	-5.1%

Table S3. Comparison of working ability of Mn-TPP/RGO/GCE with electrodes present in literature for the detection of DOX.

Sr No.	Sensors	Method	LOD	Sensitivity	Linear range	References
1.	Nano-TiO2/nafion/GCE	CV	1 nM/L	207.3 μAμM^{-1} cm^{-2}	5 – 2 nM/L	[2]
2.	RGO/Au nanoparticles/Ppy/GCE	CV, EIS	0.02 μM	185 μAmM^{-1}cm^{-2}	0.02 μM -25 mM	[3]
3.	FeV/SCNF	LSV	5 nM	46.04 μAmM^{-1}cm^{-2}	20 nM– 542.5 μM	[4]
4.	VMSF/p-GCE	CV, DPV	0.2 nM	23.94 μAmM^{-1}cm^{-2}	0.5 nM to 23 μM	[5]
5.	**Mn-TPP/RGO/GCE**	**CV**	**63.5 μM**	**112.09 μAmM^{-1}cm^{-2}**	**0.1-0.6 mM**	**This work**
6.	**Mn-TPP/RGO/GCE**	**DPV**	**27.0 μM**	**0.174 μAμM^{-1}cm^{-2}**	**0.1-0.6 mM**	**This work**

References

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