Synthesis of Conductive Polymethylred Film for Electrochemical Sensing Application

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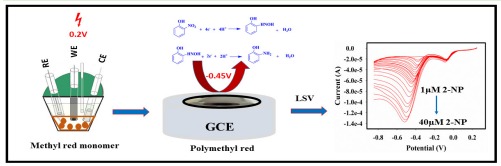
RSC INTEREST GROUP FORMULATION SCIENCE & TECHNOLOGY

i. Graphical Abstract



ii Introduction

2-NP: *Sources*- production of explosives, dyes and paints, fungicides, insect-killers, textile and rubber, pharmaceutical and agricultural processes (crop protection)

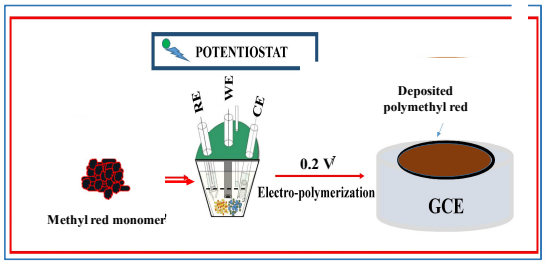
- ❖Effects- cancer, liver impairment, kidney failure and blood disorder (oxygen-deficient haemoglobin)
- ❖Detection-fluorescence, chromatography, electrophoresis, UV-spectroscopy and electrochemical methods.

iii Methodology

PMR Synthesis

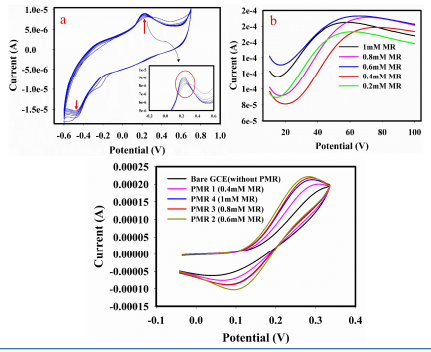
- ***Potentiodynamic method***: - 0.6 V to 0.7 V, 10 cycles
- ***Chronoamperometric method***: 0.2 V, 100 seconds.

Characterization: FESEM, XPS, FTIR, CV
Application: CV & LSV

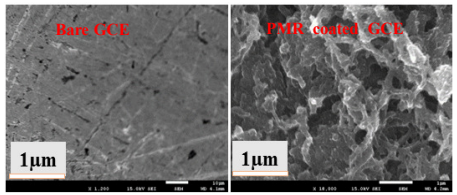


iv. Results

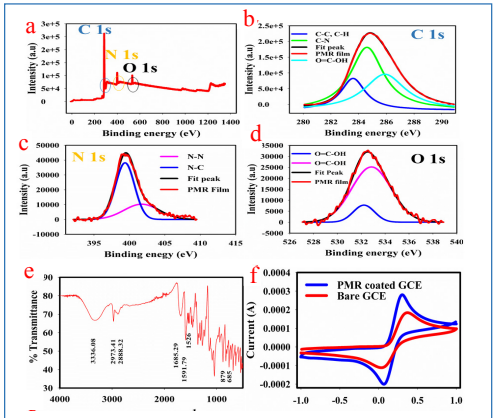
a) Electropolymerization of methyl red



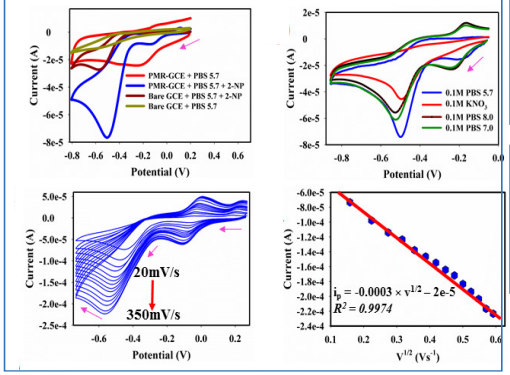
b) Characterization: Surface Morphology



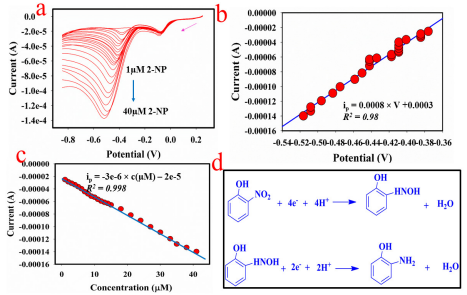
Binding energy, optical & electrochemical



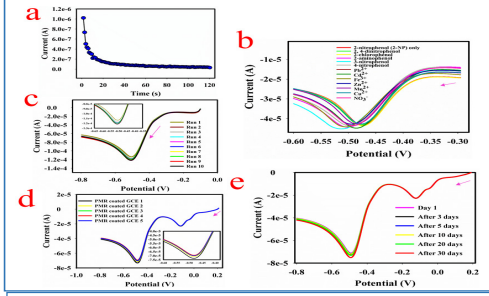
c) Application- 2-NP sensing



2-NP detection by linear sweep voltammetry



Stability test for the proposed sensor



Real Sample Analysis

Samples	Spiked (μM)	Found (μM)	RSD	Bias	Recovery (%)
Sea water	0	-	-	-	-
	10	9.7 ±0.015	0.15	-0.3	97
	100	101.4±0.04	0.04	+1.4	101.4
Effluent	0	-	-	-	-
	10	9.9±0.07	0.71	-0.1	99
	100	102.6± 0.02	0.02	+2.6	102.6

v. Conclusion

- ❖ PMR film was synthesized electrochemically
- ❖ The PMR film catalyzed reduction process of 2-NP
- ❖ Good stability, high sensitivity and selectivity
- ❖ Applicable for real environmental samples

vi. Reference

W. A Adeosun, A. M Asiri and H.M Marwani, *Synthetic Metals*. **2020**, *261*, 116321.

ACKNOWLEDGEMENT

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