

## Nanosensor for the Detection of Bromothymol Blue Dye and its Removal from Wastewater by Sustainable Methods

Nashra Sheraz<sup>a</sup>, Afzal Shah<sup>a\*</sup>, Syed Sakhawat Shah<sup>a</sup>

<sup>a</sup>Department of Chemistry Quaid-i-Azam University, Islamabad 45320, Pakistan

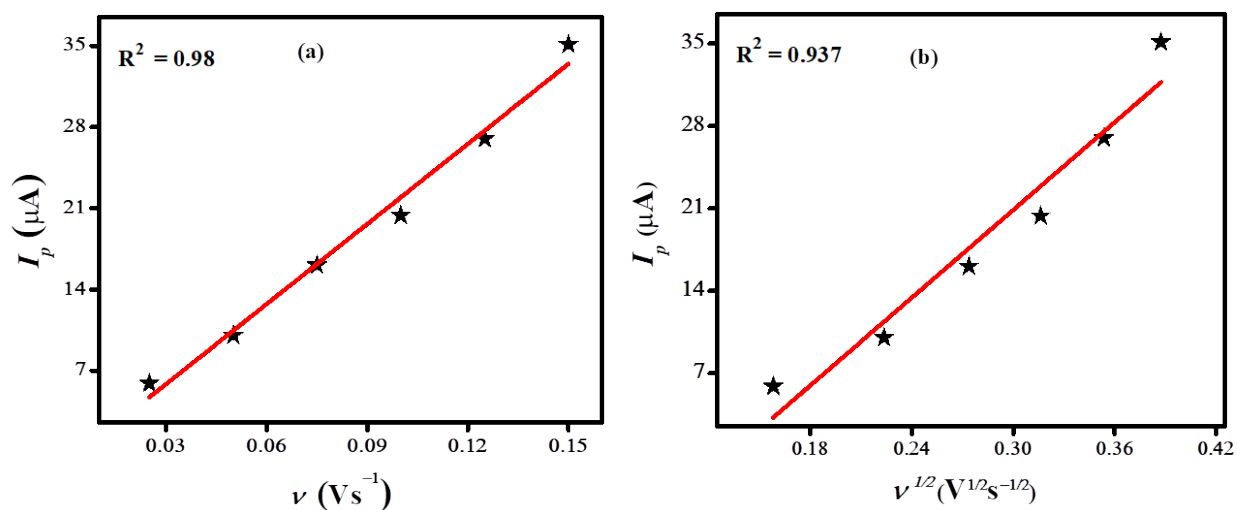
\*Correspondence: [afzals\\_qau@yahoo.com](mailto:afzals_qau@yahoo.com)

**Table S1:** Equivalent circuit model-fitted to experimental impedance data for the evaluation of EIS parameters through modified and unmodified GCEs.

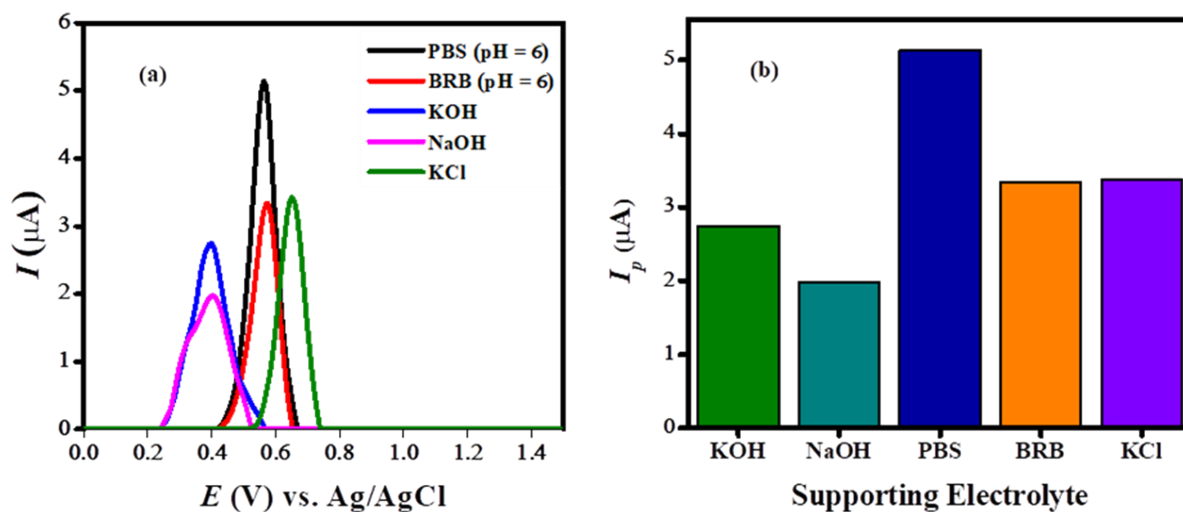
Working electrode	$R_s$ ( $\Omega$ )	$R_{ct}$ ( $\Omega$ )
Bare GCE	99.06	4214
TiO <sub>2</sub> /GCE	102.1	3067
NH <sub>2</sub> -fMWCNTs/GCE	104.6	1562
NH <sub>2</sub> -fMWCNTs/TiO <sub>2</sub> /GCE	108.5	515.2

**Table S2:** Surface area of bare and modified electrodes calculated according to Randles-Sevcik equation.

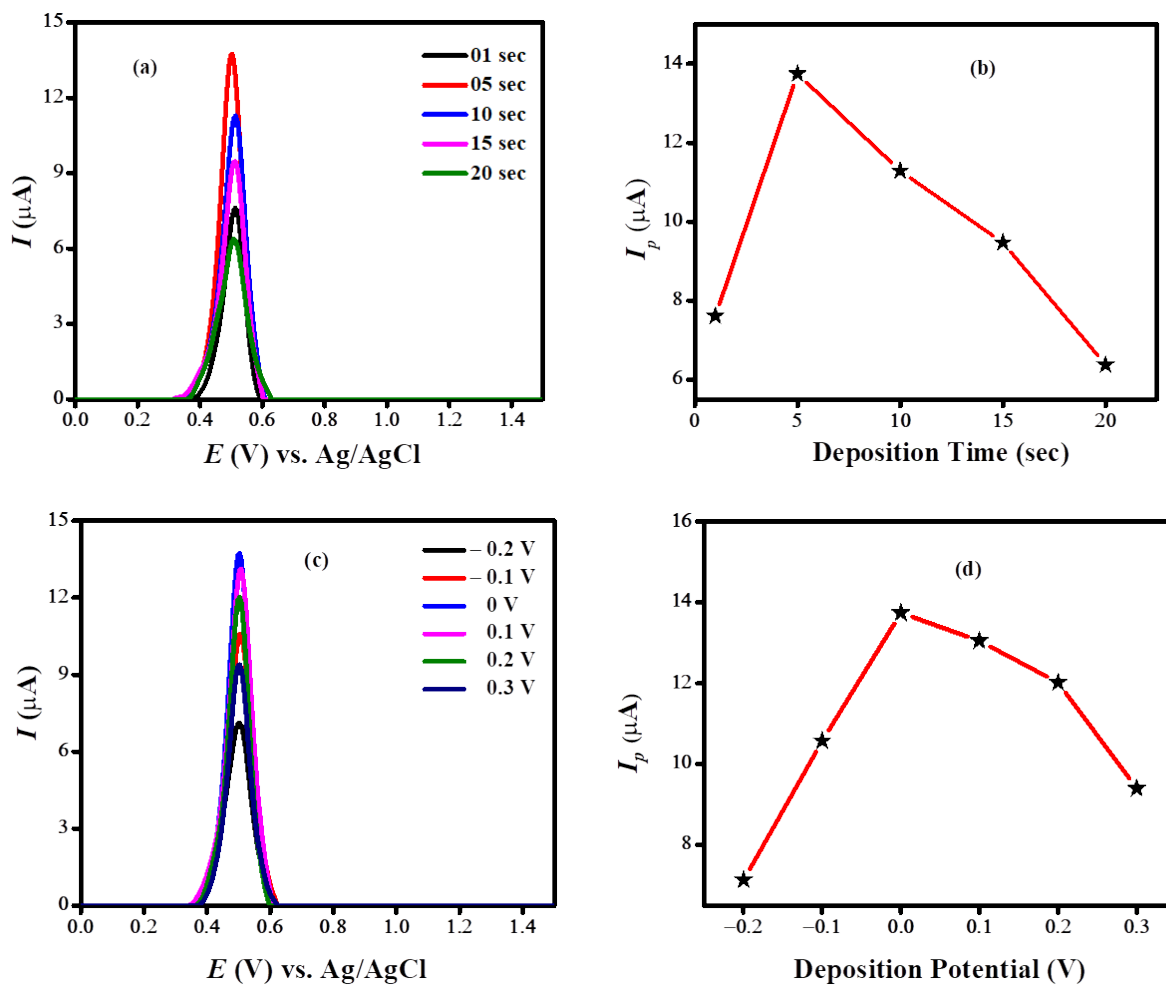
Working electrode	Surface area (cm <sup>2</sup> )	Peak separation (mV)
Bare GCE	0.027	87
TiO <sub>2</sub> /GCE	0.048	82
NH <sub>2</sub> -fMWCNTs/GCE	0.068	78
NH <sub>2</sub> -fMWCNTs/TiO <sub>2</sub> /GCE	0.085	72



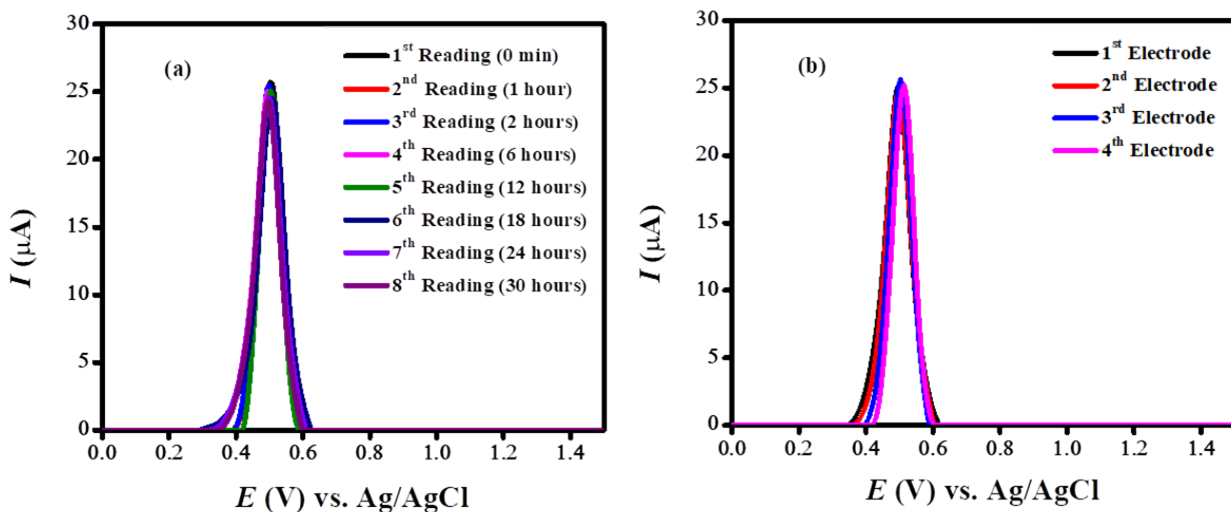
**Figure S1:** (a) Plot of peak current vs. scan rate; (b) Plot of peak current vs. square root of scan rate.



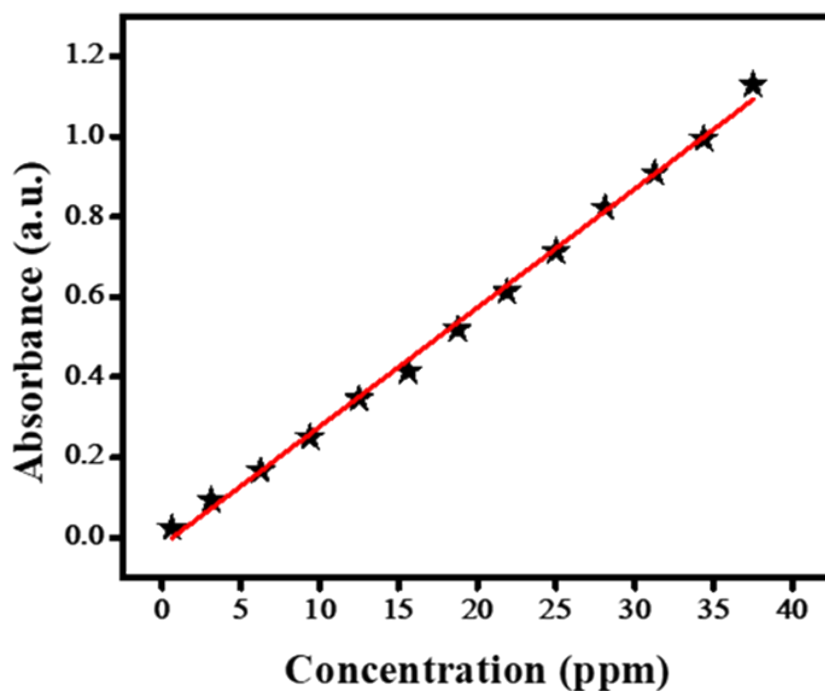
**Figure S2:** (a) Impact of supporting electrolytes on the anodic peak current of 10  $\mu\text{M}$  bromothymol blue using  $\text{NH}_2$ -fMWCNTs/ $\text{TiO}_2$  modified GCE; (b) Bar graph showing maximum peak current of bromothymol blue in different supporting electrolytes.



**Figure S3:** (a) Impact of deposition time on the peak current of 10  $\mu\text{M}$  bromothymol blue obtained at  $\text{NH}_2\text{-fMWCNTs/TiO}_2\text{/GCE}$  in PBS of pH 7.0 at a deposition potential of 0 V; (b) Plot of  $I_p$  of bromothymol blue vs. deposition time; (c) Impact of deposition potential on the peak current intensity of 10  $\mu\text{M}$  bromothymol blue in PBS having pH 7.0; (d) Plot of  $I_p$  of bromothymol blue vs. deposition potential.



**Figure S4:** (a) SWVs of bromothymol blue using modified GCE at different time intervals showing repeatability of the designed sensor; (b) SWVs of bromothymol blue using different modified GCEs in phosphate buffer saline of pH 7.0.



**Figure S5:** Calibration curve between concentration of bromothymol blue dye and corresponding absorbance.