

Supplementary Information

Detection and Degradation Studies of Nile Blue Sulphate Using Electrochemical and UV-Vis Spectroscopic Techniques

Muhammad Nadir Saleem ¹, Afzal Shah ^{1,*}, Naimat Ullah ¹, Jan Nisar ² and Faiza Jan Iftikhar ³

¹ Department of Chemistry, Quaid-i-Azam University, Islamabad 45320, Pakistan

² National Centre of Excellence in Physical Chemistry, University of Peshawar, Peshawar 25120, Pakistan

³ NUTECH School of Applied Science & Humanities, National University of Technology, Islamabad 44000, Pakistan

* Correspondence: afzals_qau@yahoo.com or afzalshah@qau.edu.pk

Table S1. Parameters evaluated from EIS experiments conducted on various electrodes.

Electrode	R_s (Ω)	R_{ct} (Ω)	CPE (μF)	n	k (cm s^{-1})
Bare GCE	117	9279	111	0.84	3.02×10^{-4}
MWCNTs/GCE	110	4277	94.8	0.81	3.11×10^{-4}
COOH-f/MWCNTs/GCE	112	2118	1.81	0.73	3.26×10^{-4}

Table S2. Electroactive surface areas of bare and modified electrodes.

Working electrode	Electroactive surface area (cm^2)
Bare GCE	0.02
MWCNTs/GCE	0.04
COOH-f/MWCNTs/GCE	0.08

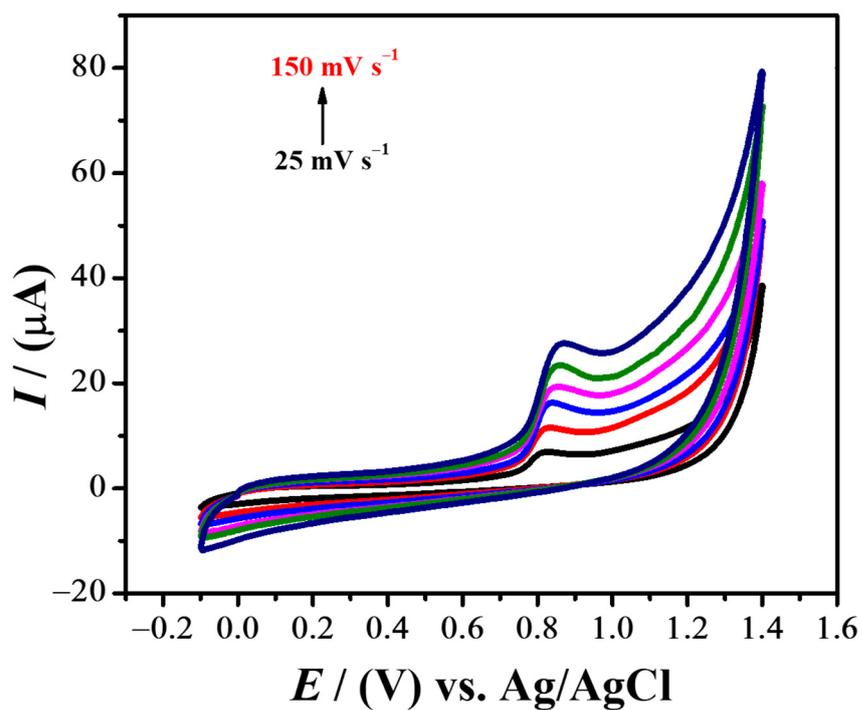


Figure S1. Influence of scan rate on the anodic peak current of the NBS in supporting electrolyte of PBS of pH 6.0.

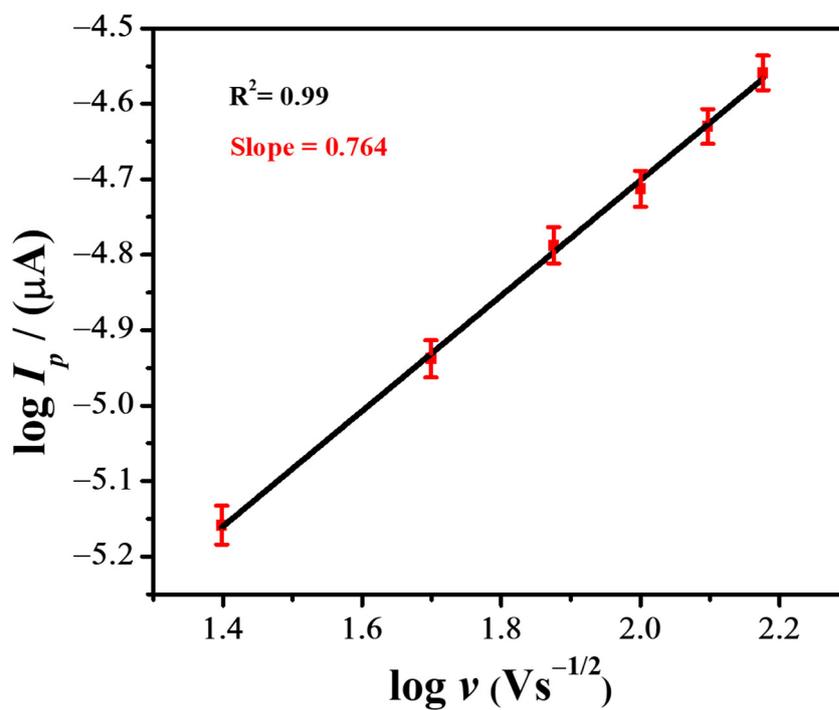


Figure S2. Calibration plot between the log peak current vs. log scan rate of NBS oxidation.

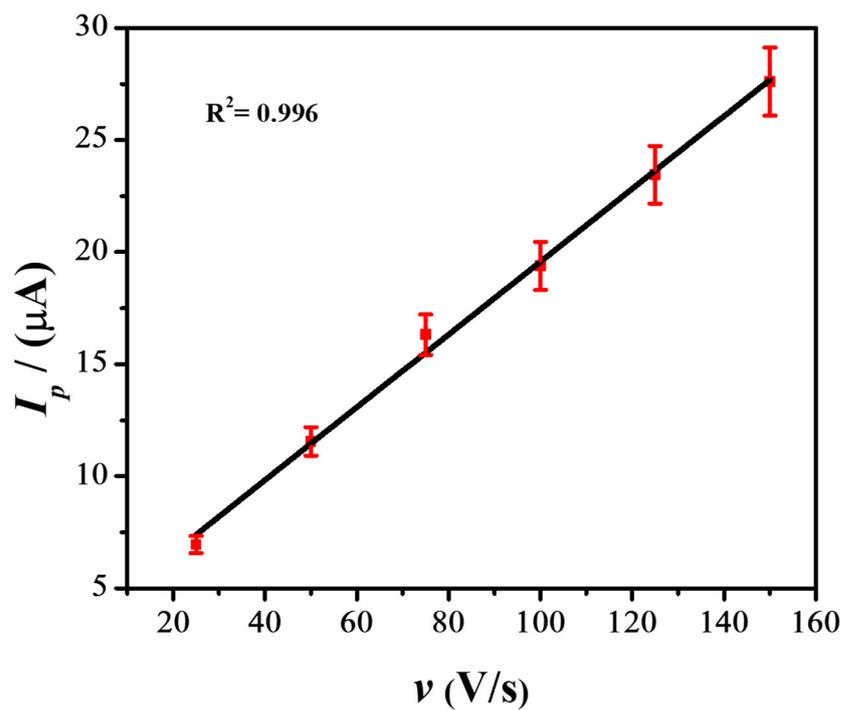


Figure S3. A plot of I_p vs. v of NBS oxidation.

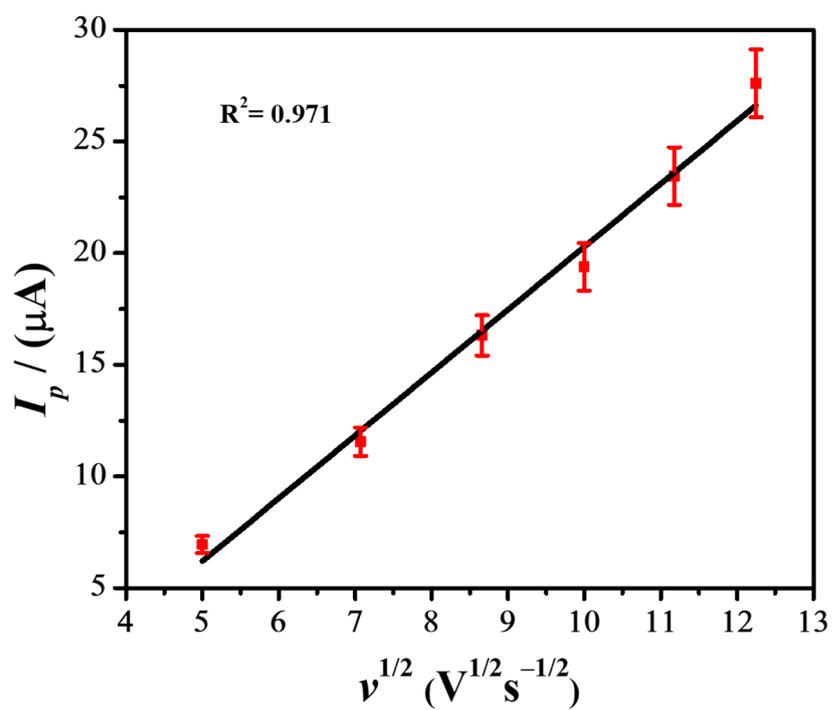


Figure S4. A plot of I_p vs. $v^{1/2}$ of NBS oxidation.

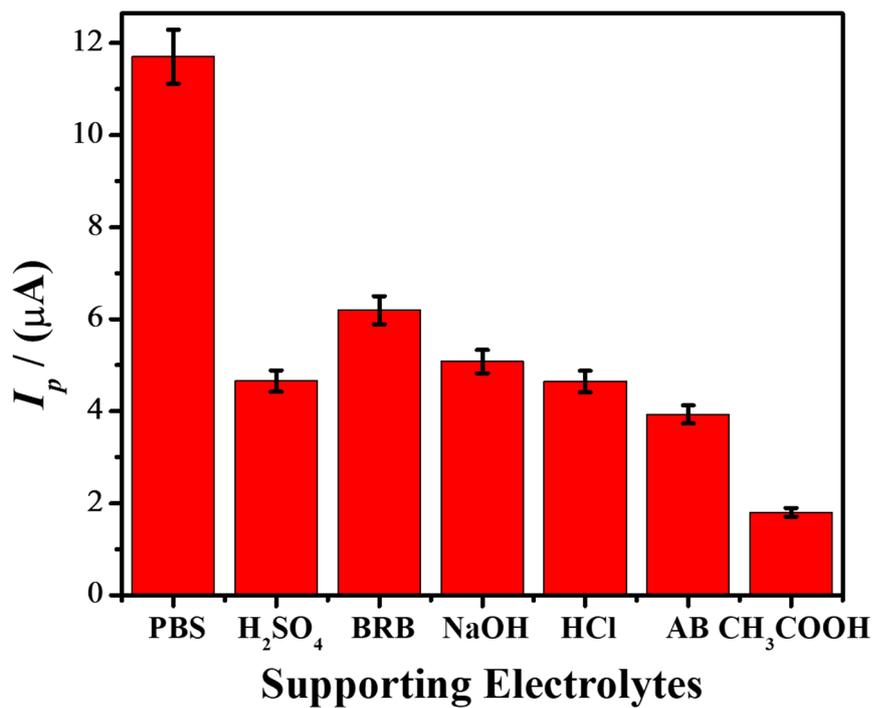


Figure S5. Bar graph of the oxidation peak current of NBS vs. various supporting electrolytes.

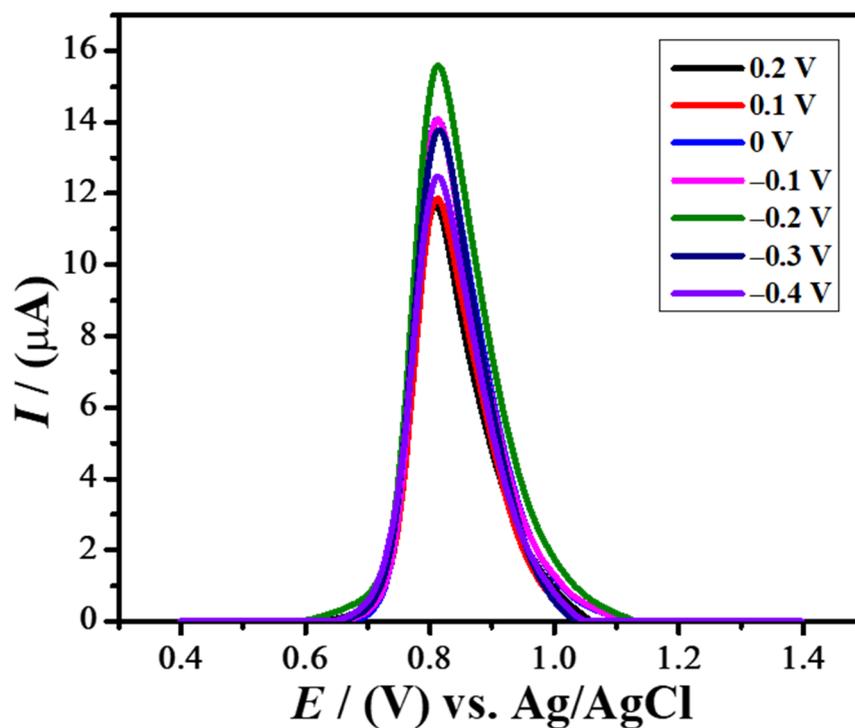


Figure S6. Effect of accumulation potential on the peak current of 10 μM NBS in PBS of pH 6.0 using COOH-/MWCNTs/GCE.

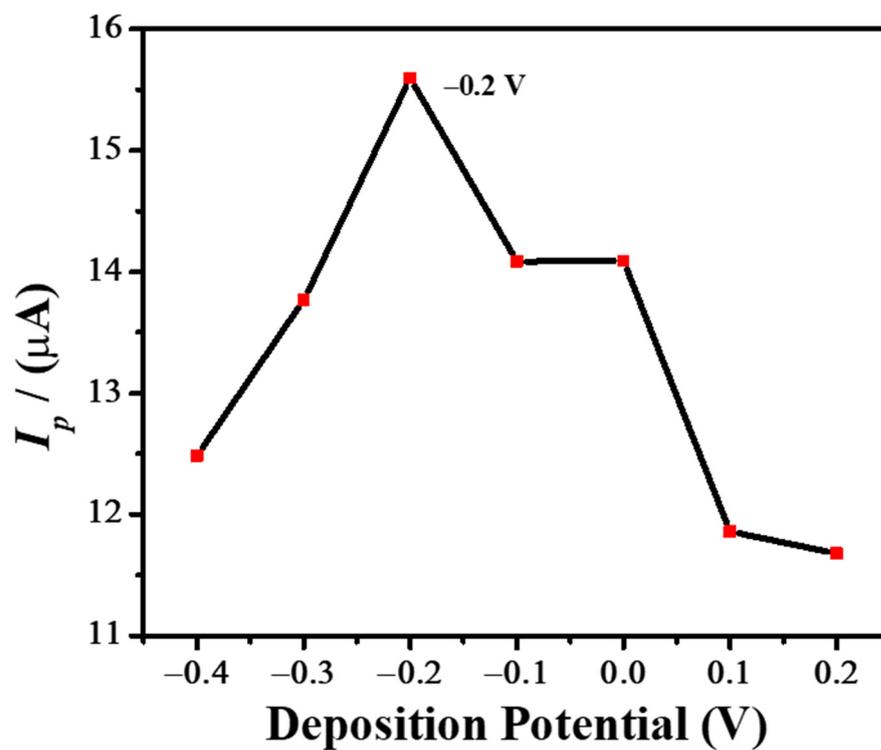


Figure S7. A plot of I_p vs. deposition potential.

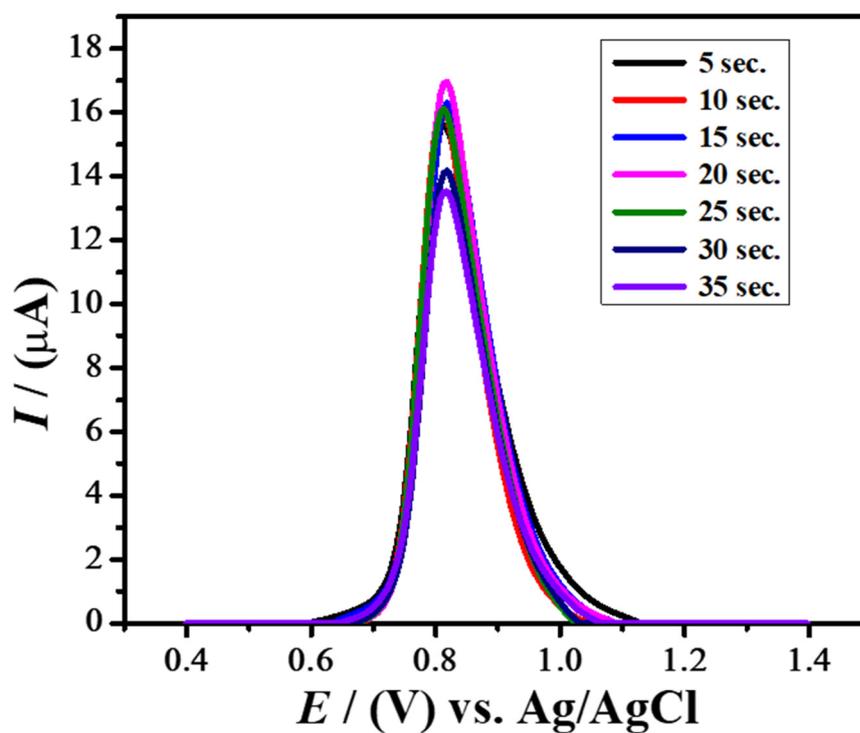


Figure S8. Peak current response of 10 μM NBS at different deposition times.

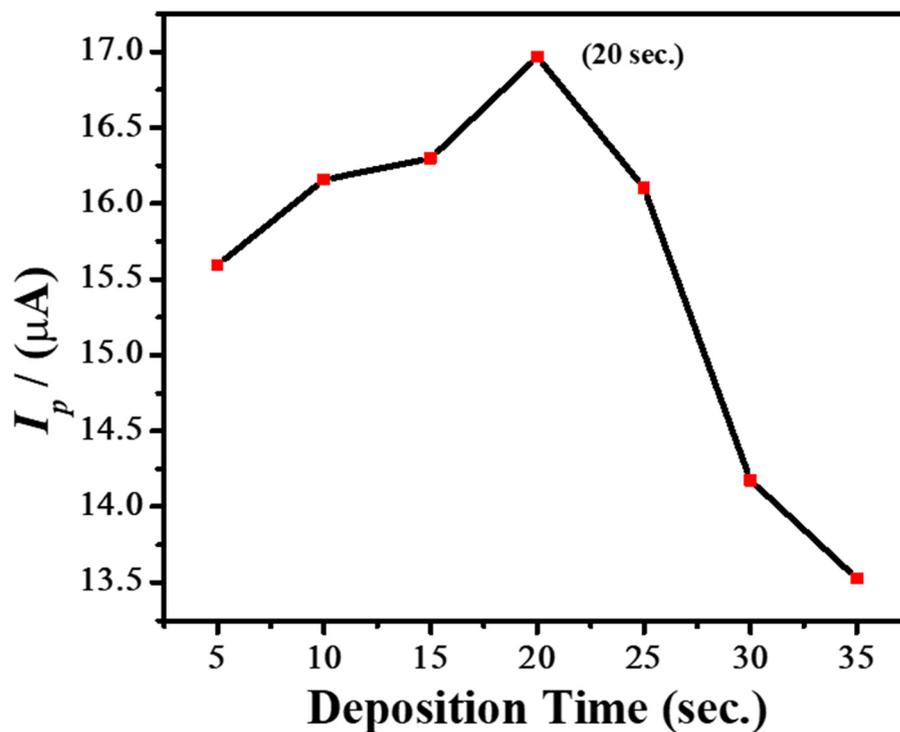


Figure S9. Plot between peak current vs. deposition time of NBS oxidation.

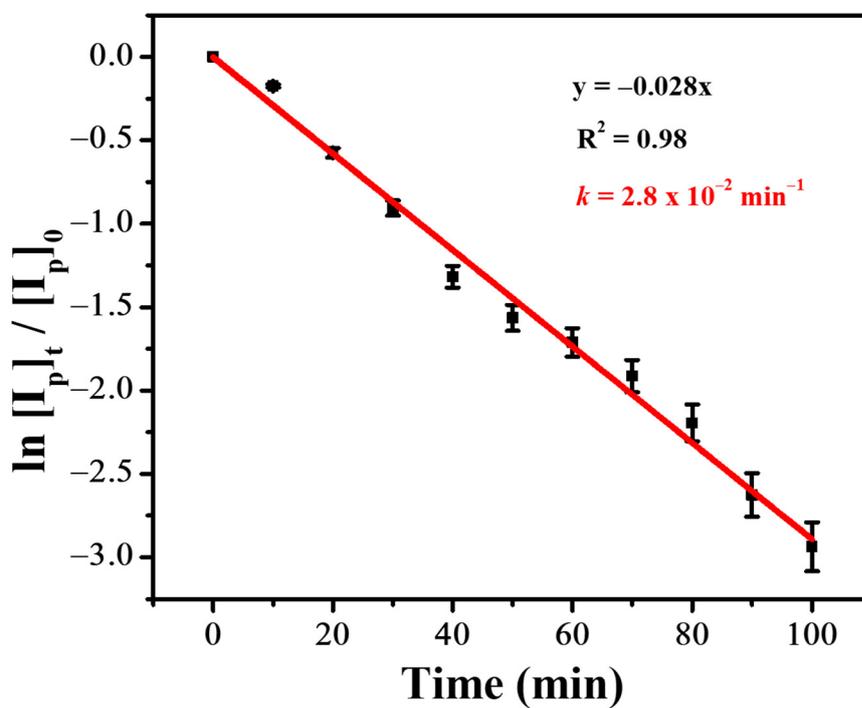


Figure S10. Kinetic study of NBS photocatalytic degradation using SWV data.

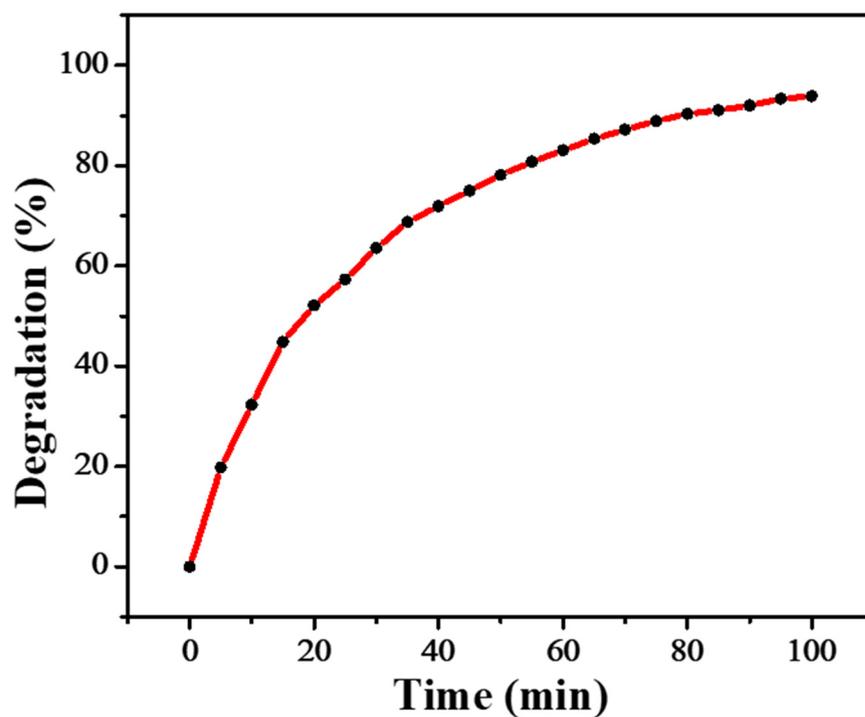


Figure S11. Percentage degradation of NBS using UV-visible Spectroscopic data.

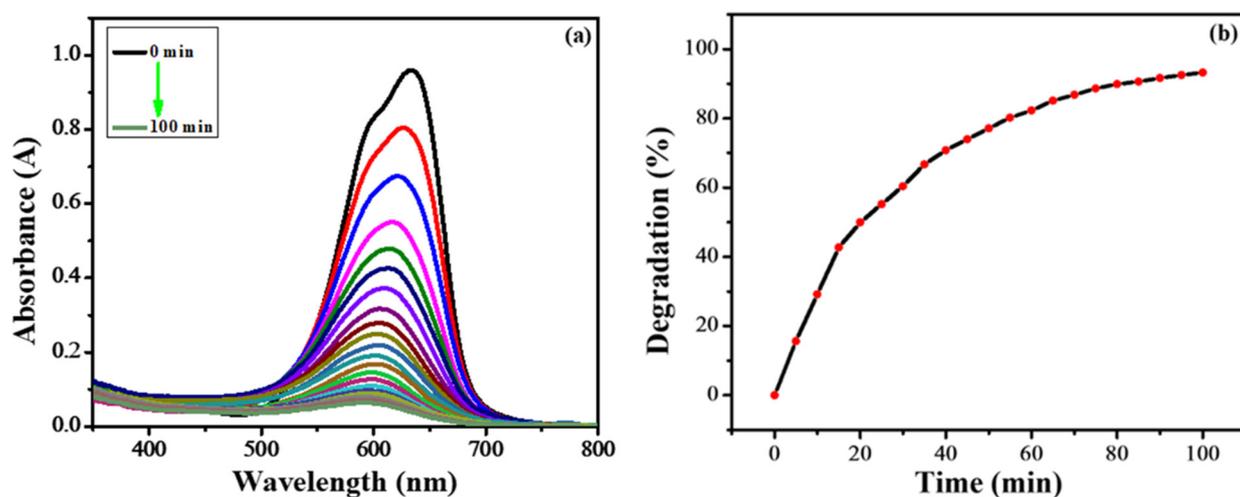


Figure S12: (a) UV-Vis spectra of the photodegradation of NBS at different time intervals after recovery of photocatalyst for the first time. (b) %age degradation of NBS at different time intervals after recovery of photocatalyst for the first time.

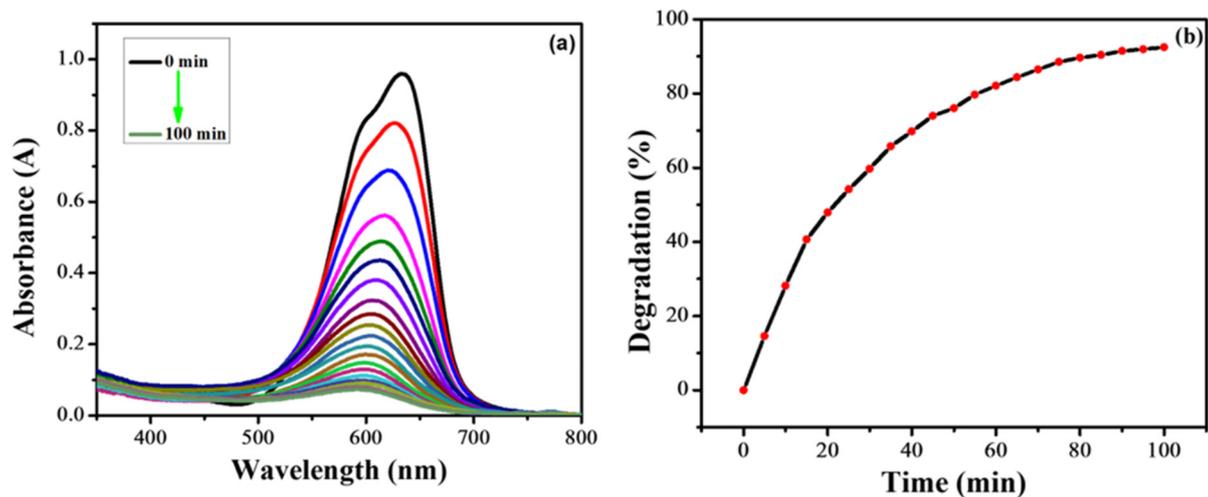


Figure S13: (a) UV-Vis spectra of the photodegradation of NBS at different time intervals after recovery of photocatalyst for the second time. (b) %age degradation of NBS at different time intervals after recovery of photocatalyst for the second time