

Supporting Information

Green Synthesis of Biphasic TiO₂-Reduced Graphene Oxide Nanocomposites with Highly Enhanced Photocatalytic Activity

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Supporting Information 1

Crystallite size calculation: From Raman spectra crystallite size, L_a , of graphitic sp^2 lattice can be calculated applying the following equation¹

$$L_a = 2.4 \times 10^{-10} \times \lambda^4 \times I_G/I_D$$

where, λ is the wavelength of the excitation laser in nm, here 514.5 nm. Following the above equation the values of L_a for GO, RGO, TiO₂-2wt% RGO and TiO₂-2wt% RGO after use were determined to be 17.0, 15.6, 15.3 and 14.6, respectively.

(1) Giovanni, M.; Poh, H. L.; Ambrosi, A.; Zhao, G.; Sofer, Z.; Sanek, F.; Khezri, B.; Webster, R. D.; Pumera, M. *Nanoscale* DOI: 10.1039/c2nr31077e.

Supporting Information 2

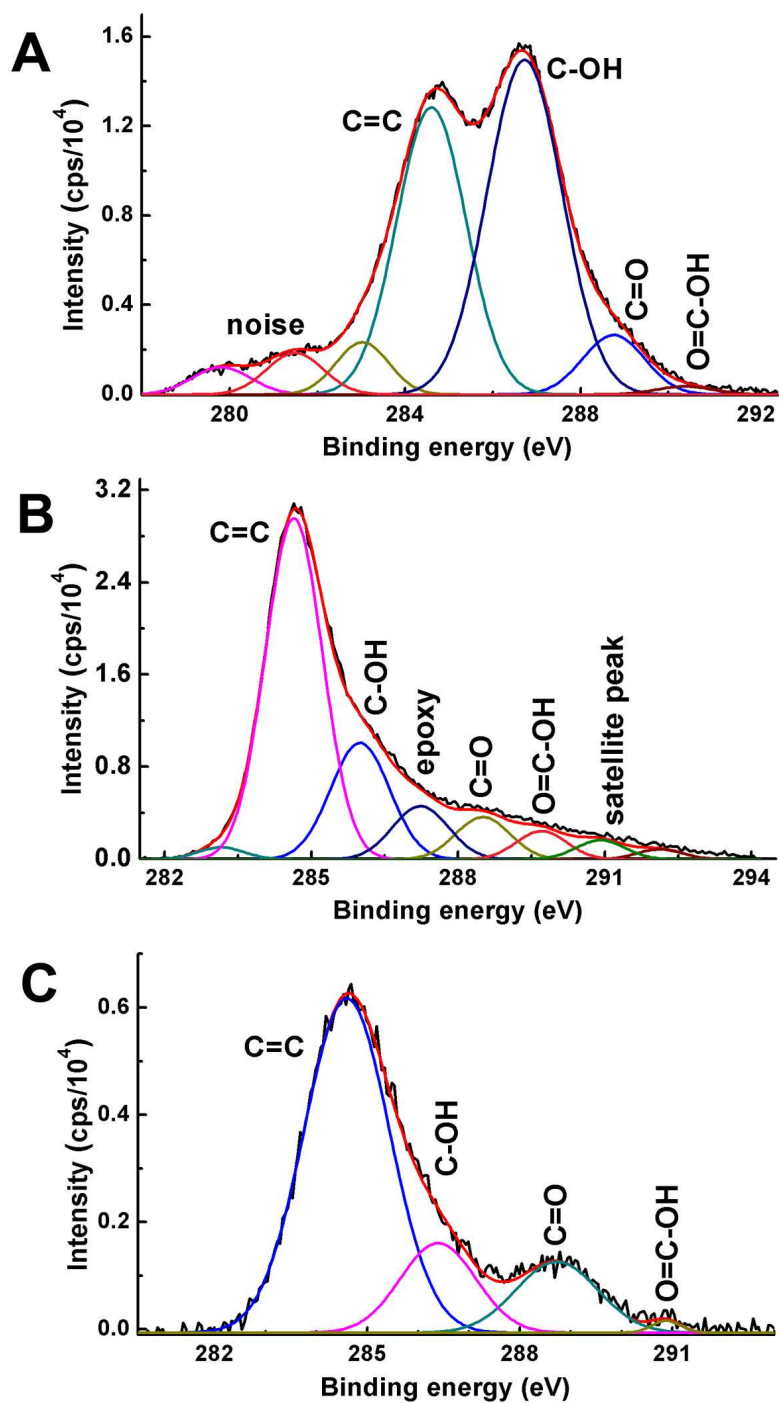


Figure S1. Core-level C 1s XPS spectra of (A) GO, (B) RGO and (C) TiO₂-2wt% RGO after use.

Supporting Information 3

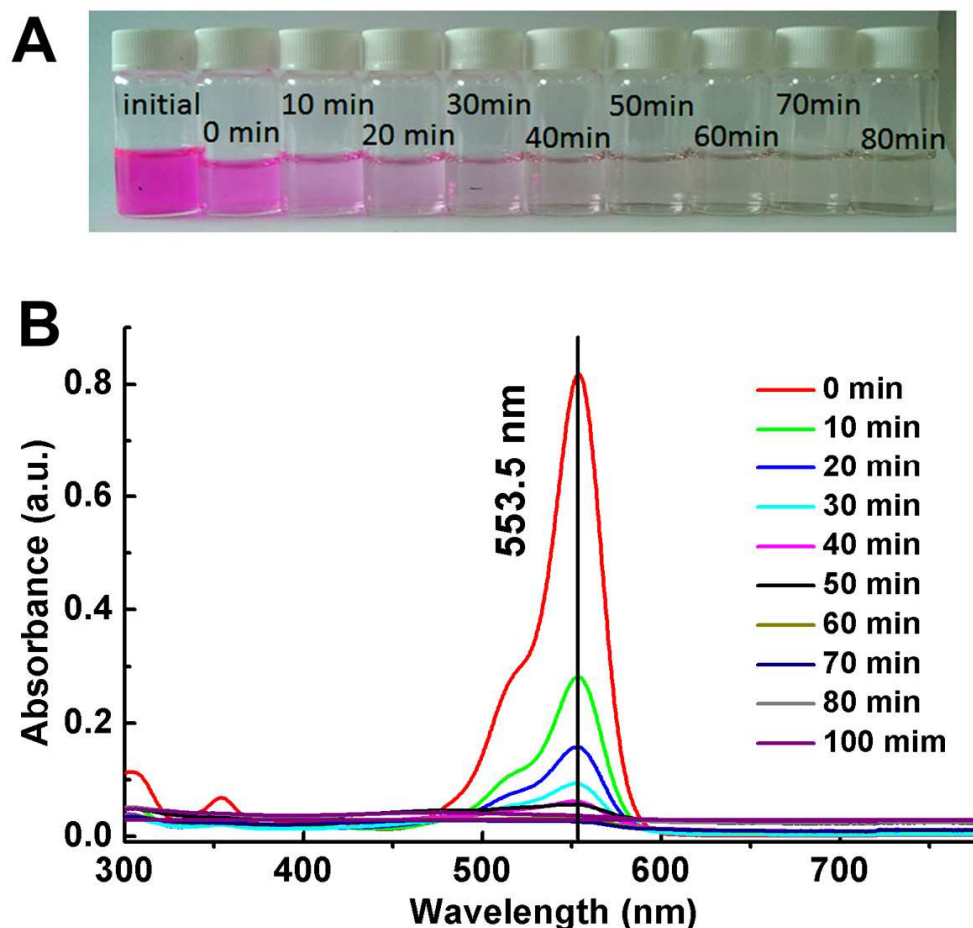


Figure S2. (A) Optical images of the reaction mixture at different time intervals during the dye degradation experiment. (B) Corresponding UV-visible absorbance spectra.

Figure S2A shows the optical images of the reaction mixtures and S2B is their UV-visible spectra at different time intervals during the dye degradation experiment with the catalyst TiO_2 -2 wt% RGO. It shows that after 80 min reaction the spectrum virtually becomes flat. Further process shows that the spectra after 100 min reaction time to be flat and therefore not shown in the main text. It is notable in this figure that the peak position (λ_{max} , 553.5 nm) does not change during the dye degradation process.

Supporting Information 4

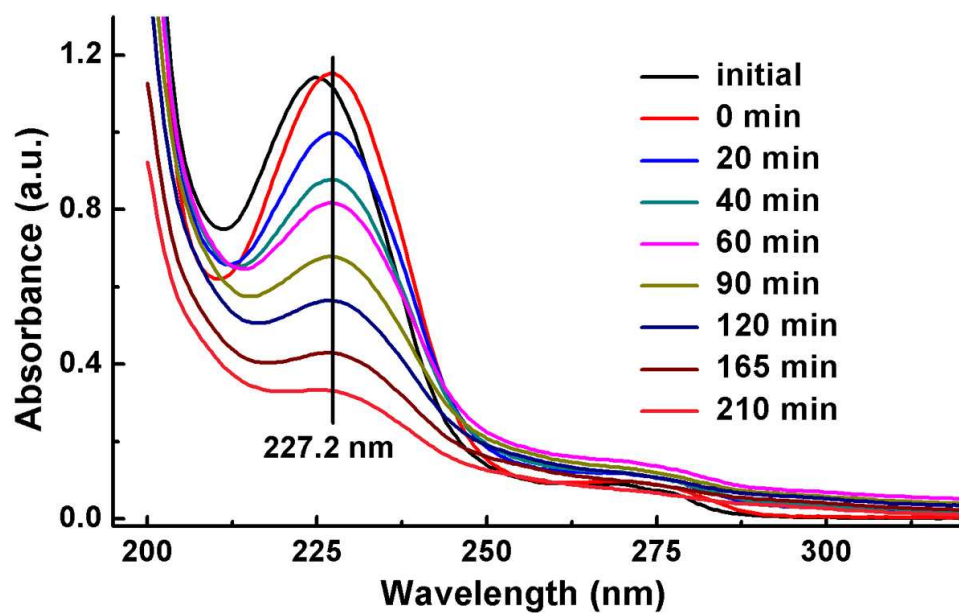


Figure S3. Photodegradation of benzoic acid by the catalyst of TiO_2 -5 wt% RGO under visible light with varying irradiation time.