

Supporting Information:

Preparation of Graphene Oxide (GO):

1gm of graphite powder and 0.5gm sodium nitrate (NaNO_3) were added into 30ml of cooled Concentrated sulfuric acid (conc. H_2SO_4) with constant stirring and stir it for 30 min at 3-5°C. 3 gm Potassium permanganate was added slowly to the above solution with constant stirring in 10 min with cooling and temperature of mixture was maintained below 20°C for 2h. The purple-green color mixture was formed. After that the ice bath was removed, the mixture was stirred at 35°C for 1h as grey –brown vapors evolved from suspension and the mixture gradually thickened with diminishing in effervescence. The paste was brownish grey in color. At the end of 1h slowly add 46 ml distilled water with constant stirring into the paste, causing violent effervescence and increase in temperature to 98°C and the mixture was maintained at that temperature for 20 min. Remove it from hot plate. The reaction was terminated by addition of warm 140ml distilled water followed by 15ml 50% hydrogen peroxide (H_2O_2) aqueous solution to reduce the residual permanganate and manganese sulfate and the suspension turn bright yellow. Centrifuge it we get yellow brown cake. Wash it with 5% HCl until sulfate anion could not be detected by BaCl_2 and then with warm distilled water till pH is neutral. The resultant solid was dried at 60°C for 12h in oven to obtain GO.

Supporting S1:

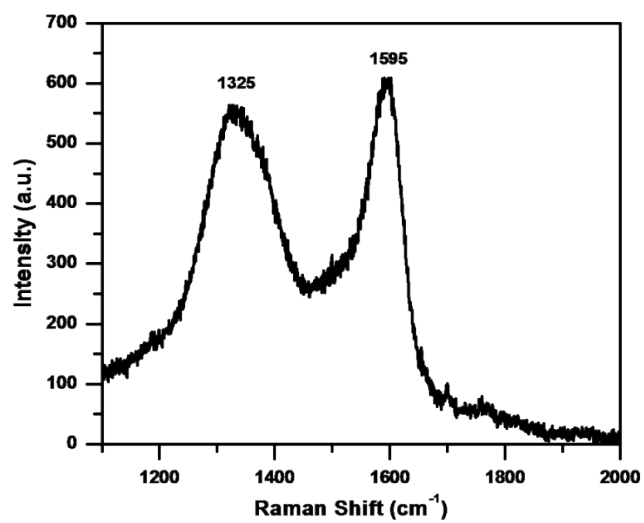


Fig.S1 Raman spectrum of GO

Supporting S2:

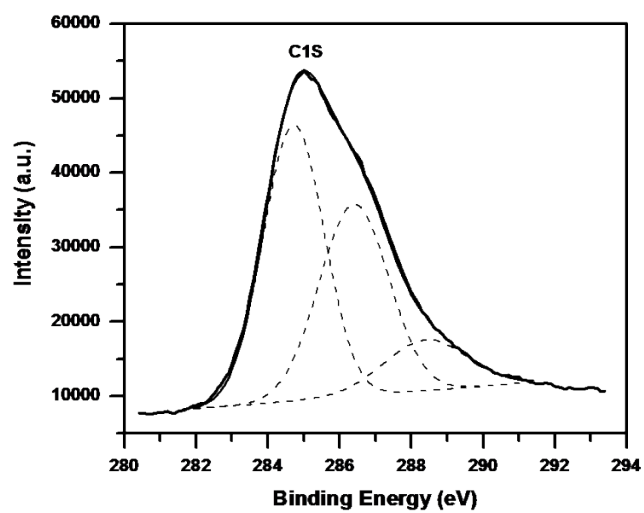


Fig. S2 XPS patterns of GO for C1S

Supporting S3:

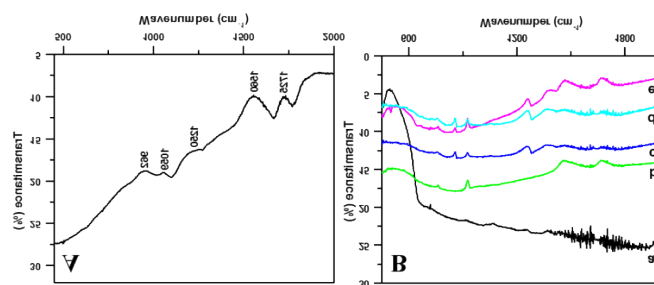


Fig. S3(A, B) FTIR spectra of samples (A) GO, (B) (a) undoped ZnO (Z1) treated at 800°C for 3h (b) ZnO/Gr composite with 0.3% loading which treated at 500°C for 3h (Z3) and N-ZnO/Gr composites treated at 500°C for 3h with different GO loading (c) 0.3% (Z4), (d) 0.6% (Z5) and (e) 0.8% (Z6).

Supporting S4:

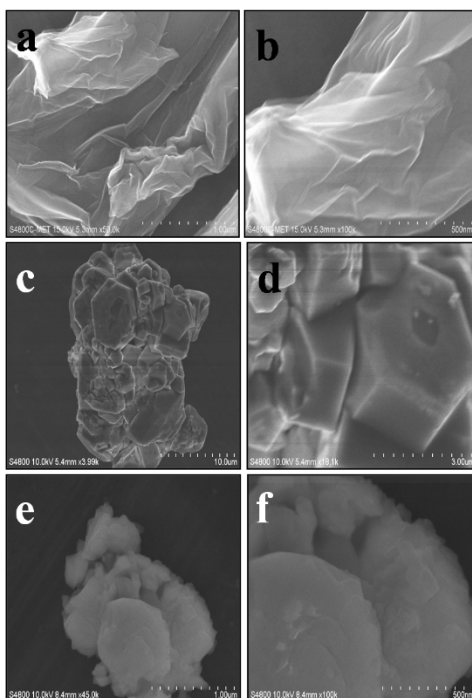


Fig. S4 FESEM of samples (a,b) GO (c,d) undoped ZnO treated at 800°C for 3h (Z1), (e,f) N-ZnO treated at 500°C for 3h (Z2).

Supporting S5:

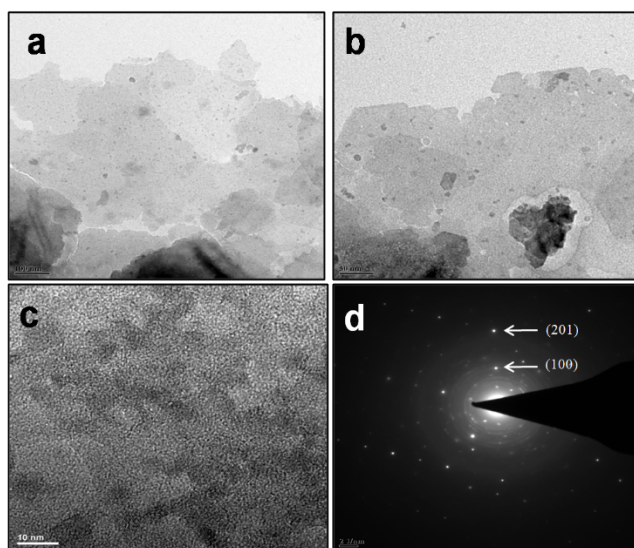


Fig.S5 TEM of samples ZnO/Gr (Z3)

Supporting S6:

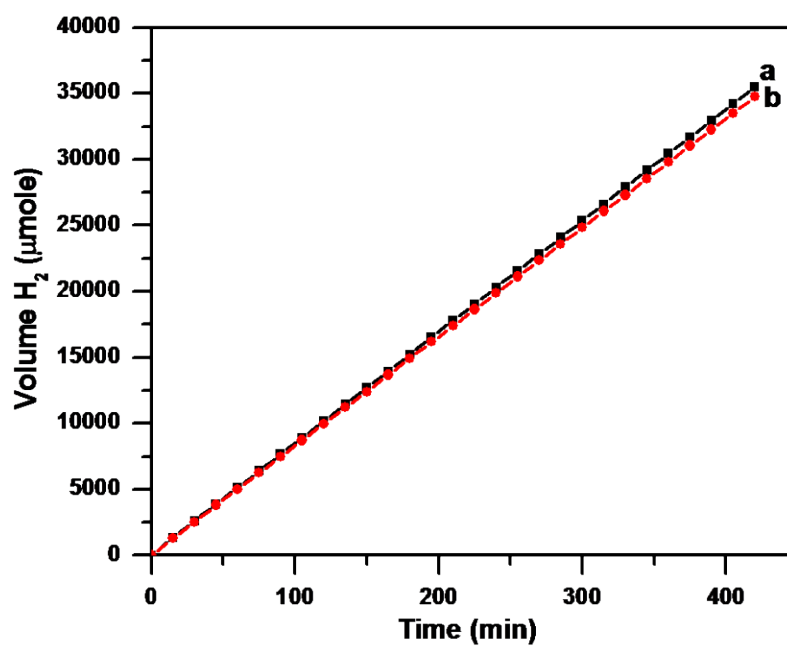


Fig. S6 Time verses volume of H₂ (μmole) evolution of recycled sample (Z4).

Supporting S7:

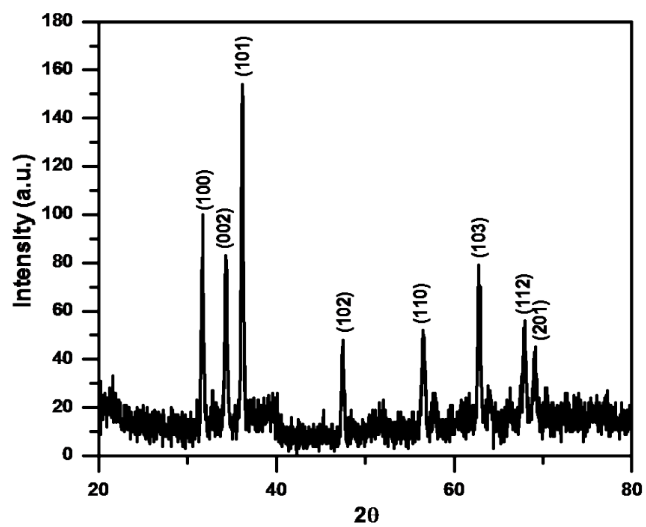


Fig. S7 XRD spectrum of samples (Z4) after three cycles of photocatalytic study

Supporting S8:

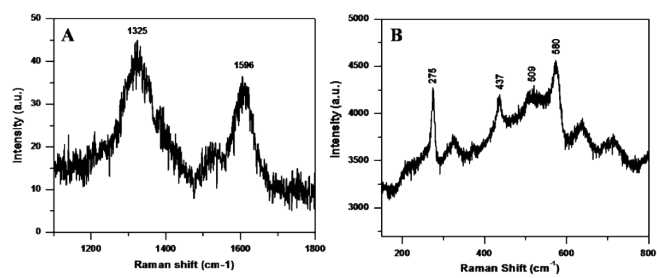


Fig. S8(A, B) Raman spectrum of sample Z4 after three cycles of photocatalytic study

Supporting S9:

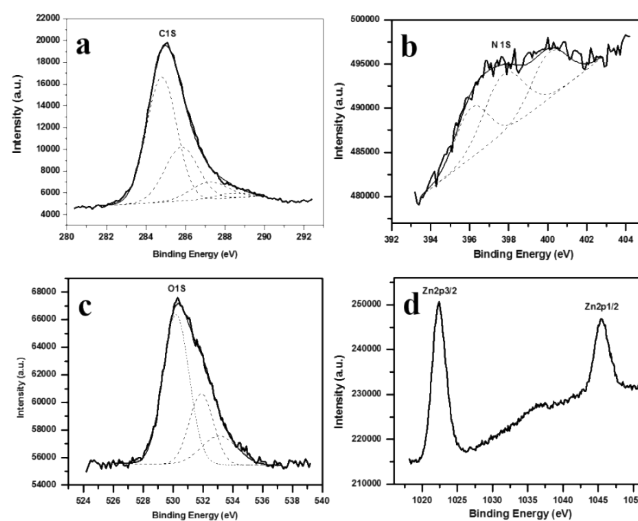


Fig. S9 XPS patterns of N-ZnO/Gr composite with 0.3% GO loading synthesized at 500°C for 3h (Z4) after three cycles of photocatalytic study (a) C1S, (b) N1S, (c) O1S, (d) Zn2p.

Supporting S10:

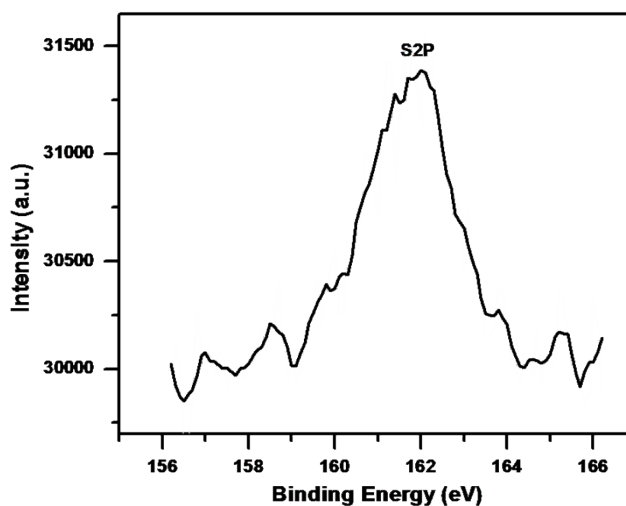


Fig. S10 XPS patterns of N-ZnO/Gr composite with 0.3% GO loading synthesized at 500°C for 3h (Z4) after three cycles of photocatalytic study S (2p)