Electronic Supplementary Material (ESI) for RSC Advances.

Electronic supplementary information

Mesoporous Iron Oxide Nanowires: Synthesis, Magnetic and Photocatalytic Properties

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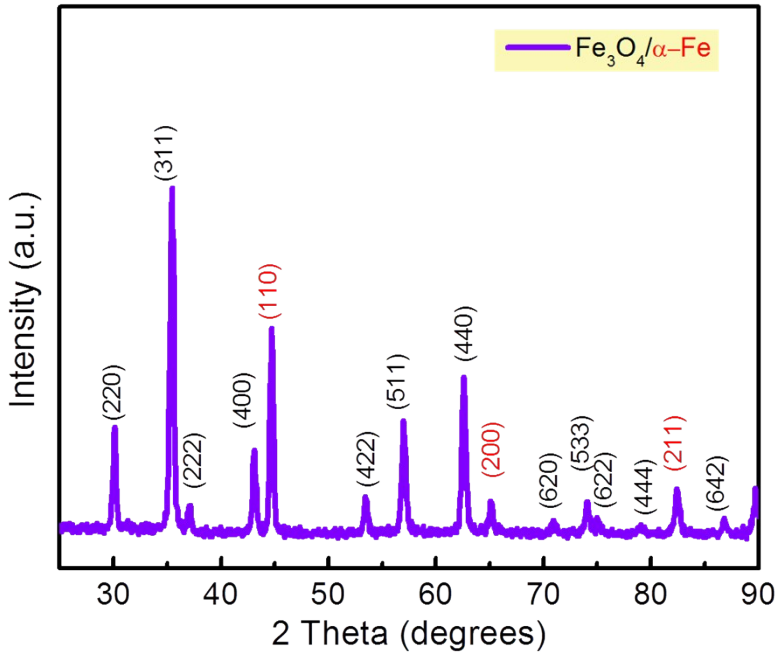

Fig. S1: XRD pattern of NWs samples produced by annealing FeOOH NWs at 400 °C. A mixture of Fe_3O_4 and Fe phases is confirmed.

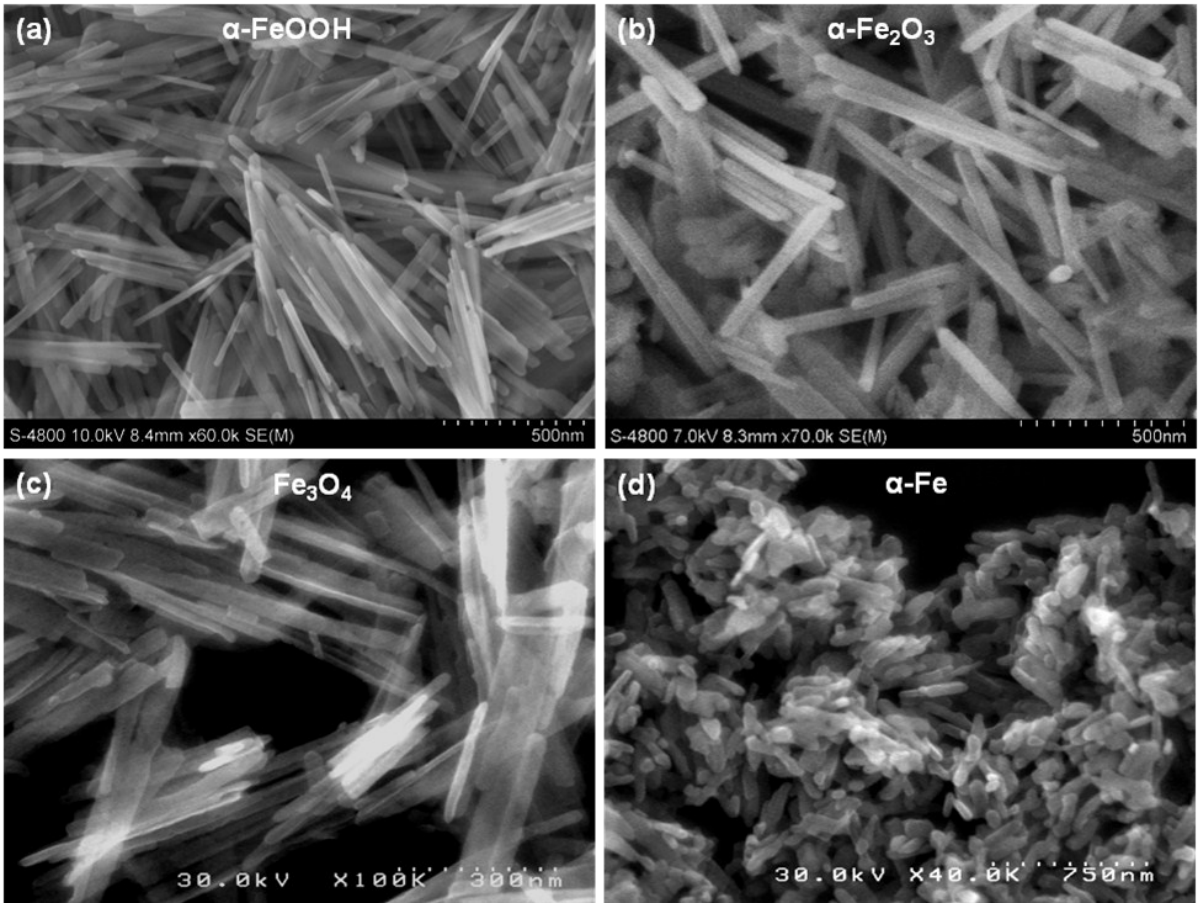

Fig. S2: HRSEM images of as-prepared (a) FeOOH NWs, (b) α-Fe_2O_3 NWs, (c) Fe_3O_4 NWs, and (d) α-Fe NWs.

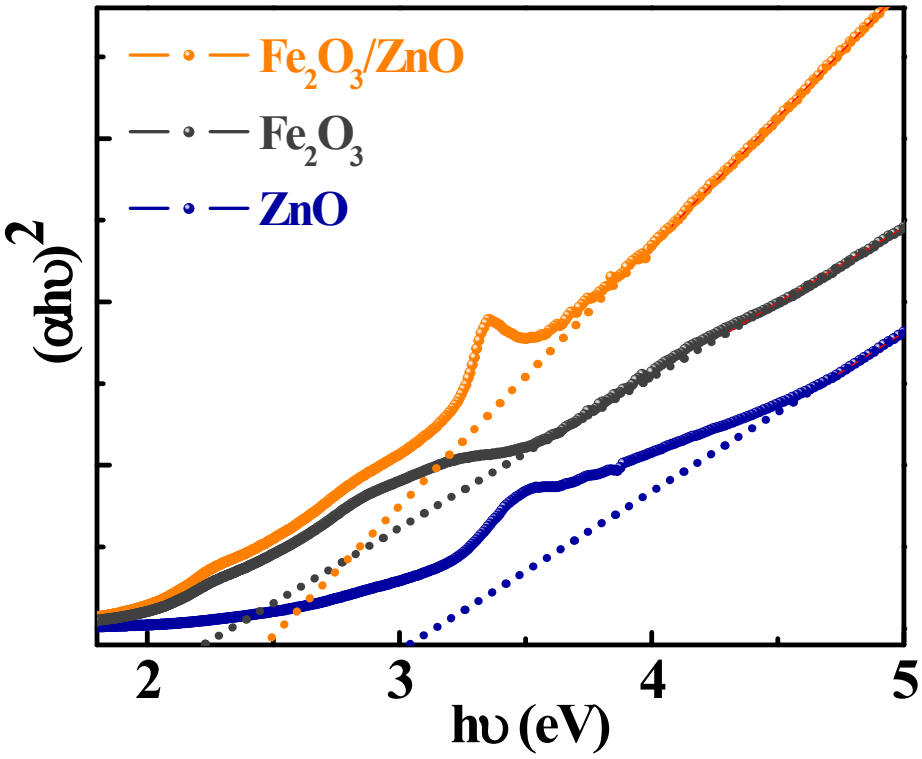

Fig. S3: Calculation of the band gap from the UV-visible absorption spectra. The band gap energies estimated from the intercept of the tangents to the plots were 3.1, 2.2 and 2.5 eV for the ZnO nanoparticles, α-Fe_2O_3 NWs and α-Fe_2O_3/ZnO NNHs respectively.

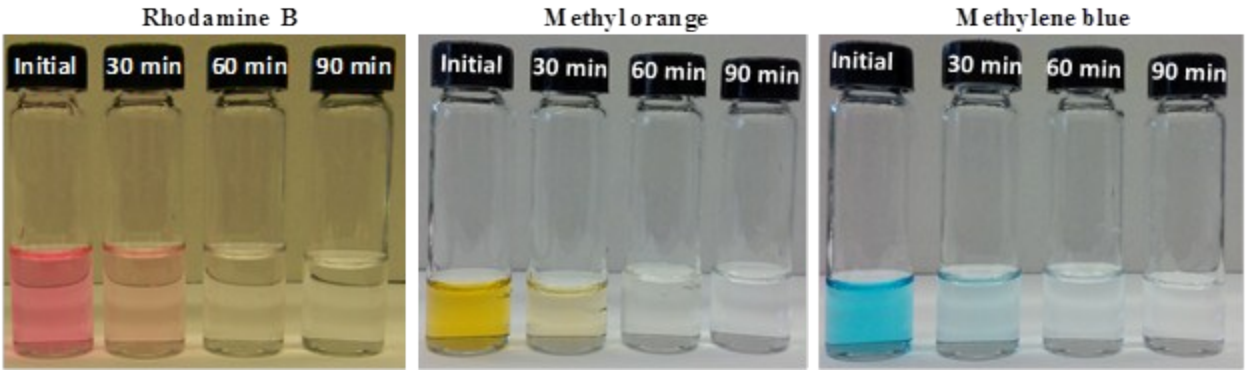

Fig. S4: Photographs showing complete decolorization of (a) Rhodamine B, (b) methyl orange and (c) methylene blue under visible light for 90 min. The initial concentration/loading of the dye and photocatalyst (α-Fe_2O_3/ZnO NNHs) were 20 µM and 40 mg, respectively.

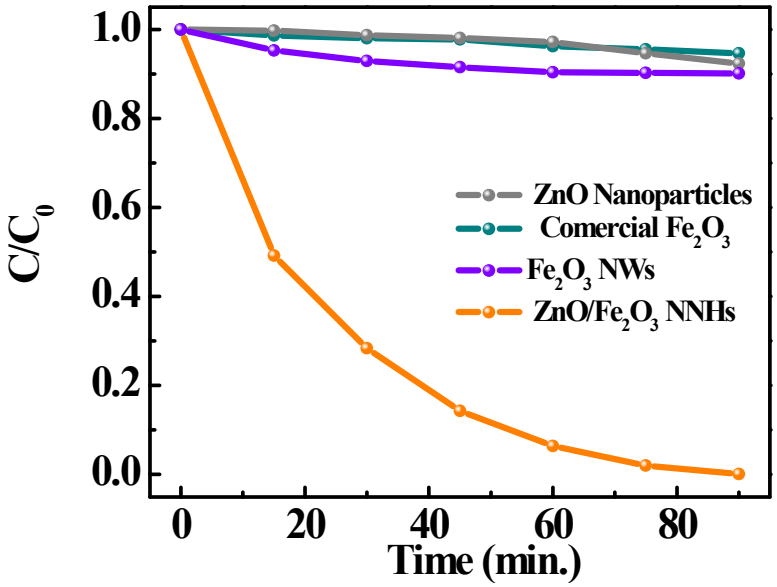

Fig S5: Comparison of photocatalytic activity of α-Fe_2O_3/ZnO NNHs with pristine ZnO nanoparticles, commercial α-Fe_2O_3, α-Fe_2O_3 NWs. The photocatalytic activity measurement was performed under identical conditions (equivalent catalyst concentration, temperature and oxygen flow)

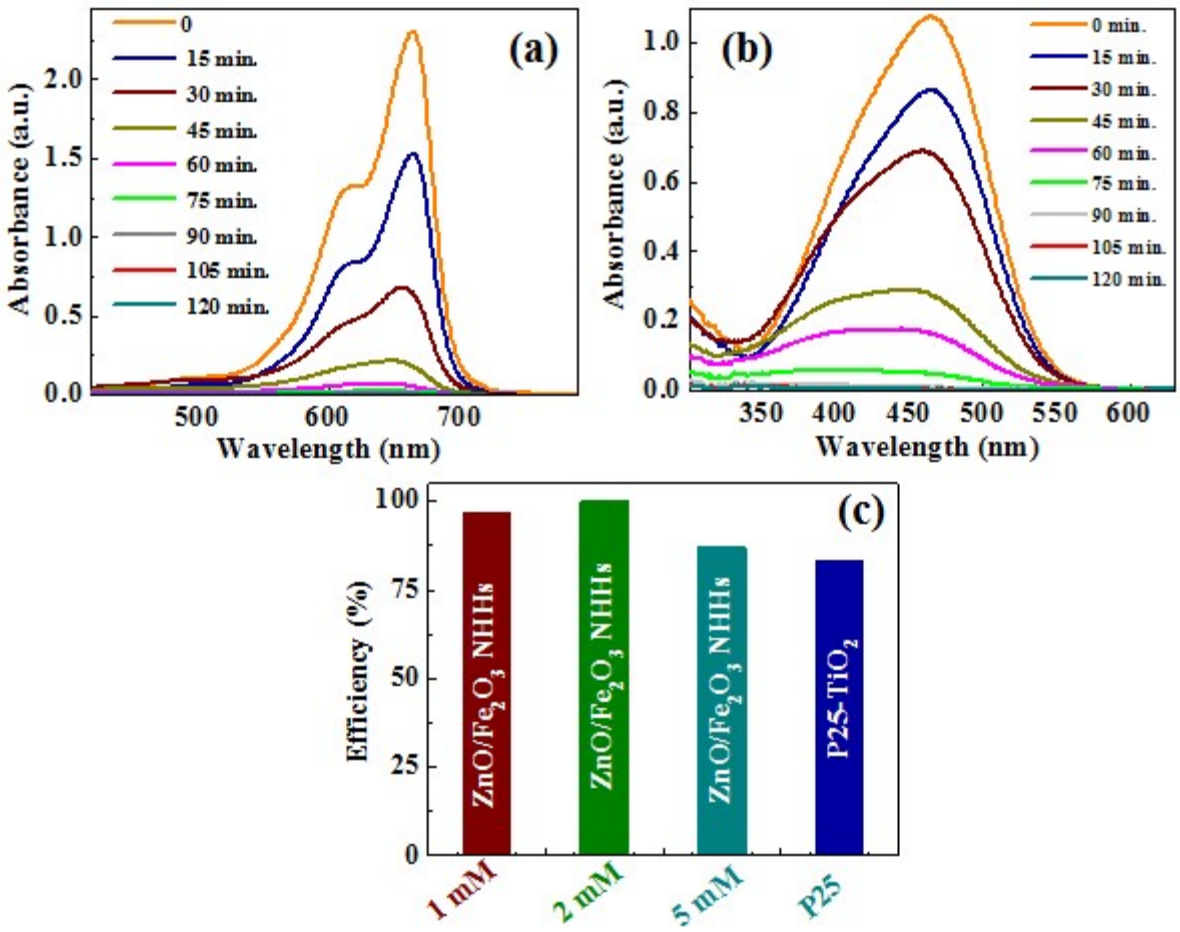

Fig. S6: Absorption spectra for (a) MB and (b) MO dyes as a function of irradiation time of simulated solar light in the presence of α-Fe_2O_3/ZnO NNHs (40 mg). The initial concentration of dye used for the photodegradation experiment was 20 μM. (c) Degradation efficiency of α-Fe_2O_3/ZnO NNHs with different ZnO nanoparticles loading and commercial P-25 TiO_2.

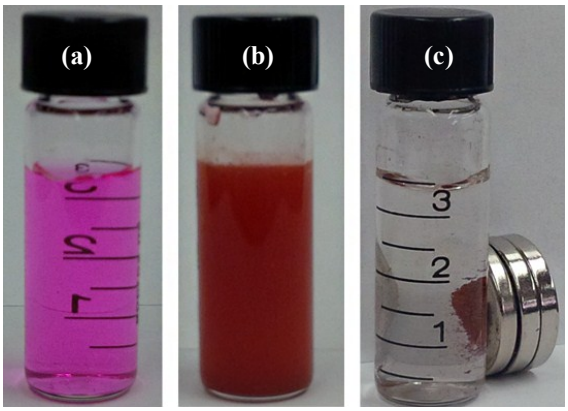

Fig S7: Separation of magnetic α-Fe_2O_3/ZnO NNHs from the solution after photocatalytic degradation of RhB dye. (a) Initial dye solution 20 μM/ml, (b) α-Fe_2O_3/ZnO NNHs dispersed in RhB dye solution and (c) after photocatalytic dye degradation, the α-Fe_2O_3/ZnO NNHs were separated from the cleaned water by applying a magnetic field.

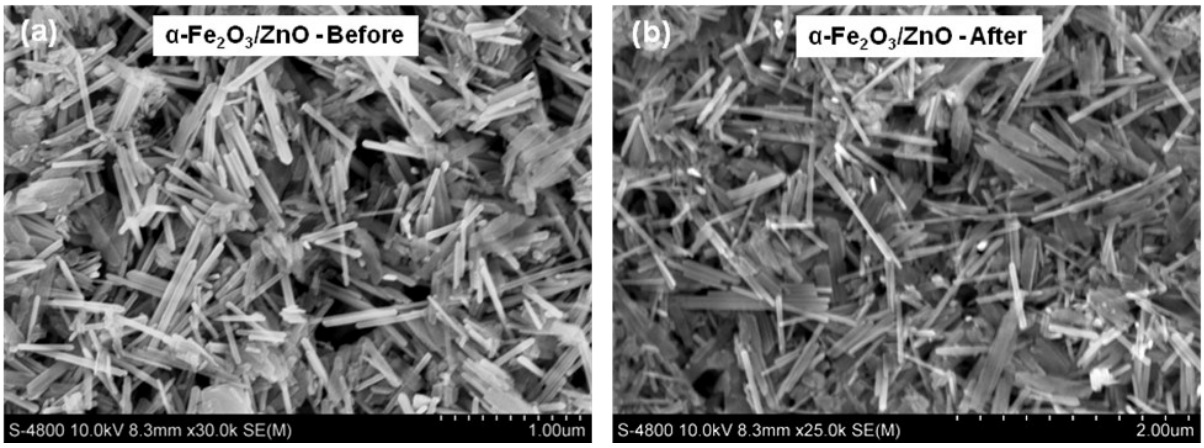

Fig S8: SEM images of α-Fe_2O_3/ZnO NNHs (a) before, and (b) after photocatalytic dye degradation.