Electronic Supplementary Material (ESI) for Nanoscale.

Magnetic Photocatalyst with p-n Junction: Fe_3O_4 Nanoparticle and $FeWO_4$ Nanowire Heterostructure

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The band gaps of the $Fe_3O_4/FeWO_4$ and pure $FeWO_4$ were calculated by $\alpha h\upsilon = (h\upsilon - E_g)^n$. α is the absorbance, h is the Planck constant, υ is the phono frequency, E_g is the energy gap, and n is the pure numbers associated with the different types of electronic transitions. For n = 1/2, 2, 3/2, and 3, the transitions are the direct allowed, indirect allowed, direct forbidden, and indirect forbidden, respectively. The value of n for $FeWO_4$ equals to 1/2 and the band gap was estimated (α = 0) to be 3.0 eV.

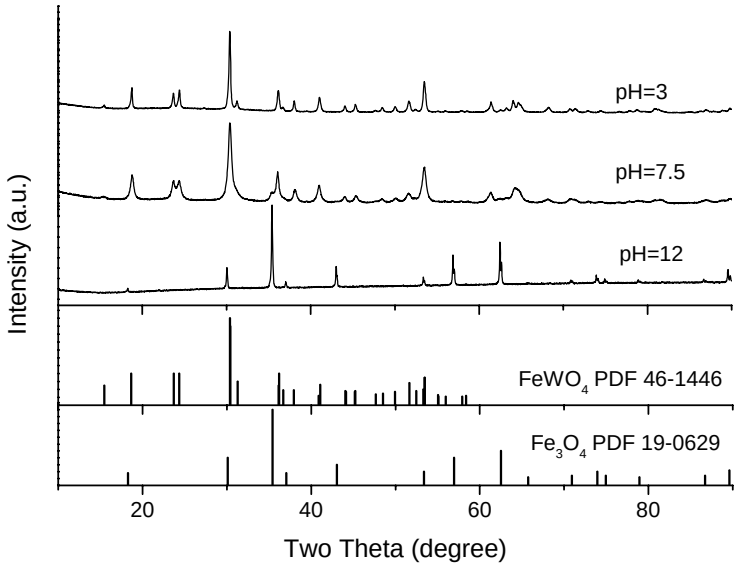

Fig. S1. As-prepared products with various pH value of the solution. Pure $FeWO_4$ nanowires (pH=3), $Fe_3O_4/FeWO_4$ heterojunction (pH=7), pure Fe_3O_4 (pH=12).

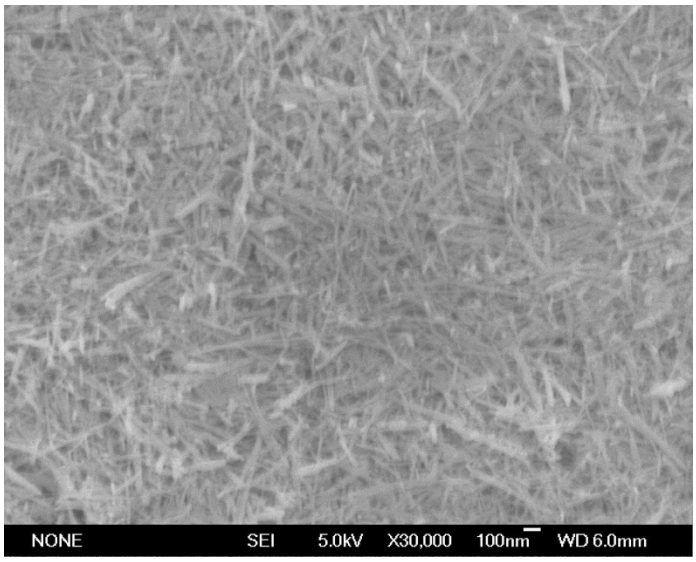

Fig. S2. SEM image of $Fe_3O_4/FeWO_4$ composite nanowires. (pH=7.5)

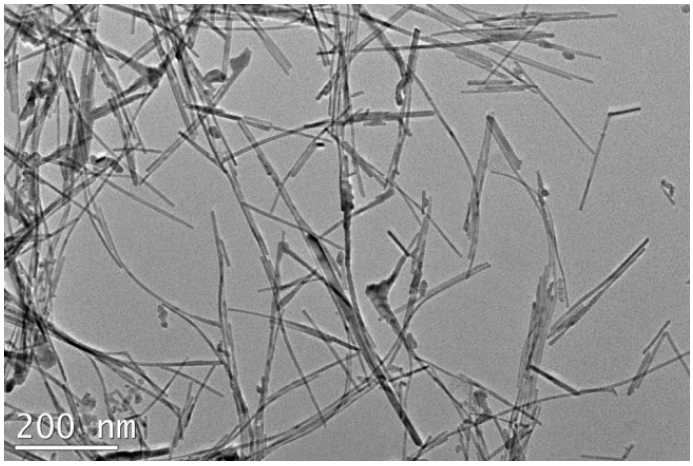

Fig. S3. TEM image of $FeWO_4$ nanowires. (pH=3)