Supplementary Material (ESI) for Journal of Materials Chemistry

Electronic Supplementary Information

Inducing Nanolayers-assembly of FePtDy 1D Superstructures and Its Induced Visible light Photocatalysis Effect for TiO_2

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1. Synthesis of TiO_2 nanoparticles

Preparation of TiO_2 nanoparticles was carried out as following:[2b] a parental solution of 5 drops of concentrated HNO_3 and 60ml deionized water was prepared. Then, 10 mL acetic acid was added to 10 mL tetra-*n*-butyl titanate ($Ti(OC_4H_9)_4$) and the resulting solution was added drop wise into the above solution under vigorous magnetic stirring. The reaction was carried out at room temperature for 12h. The semitransparent mixture was sealed in a 100 mL Teflon-lined stainless steel autoclave after filtration, which was filled up to 80% of its total volume, then were calcined in a muffle furnace in air at 160 for 24 h. TiO_2 nanoparticles can be obtained finally after grinding.

2. SEM images of as-obtained FePtDy nanoalloys morphologies

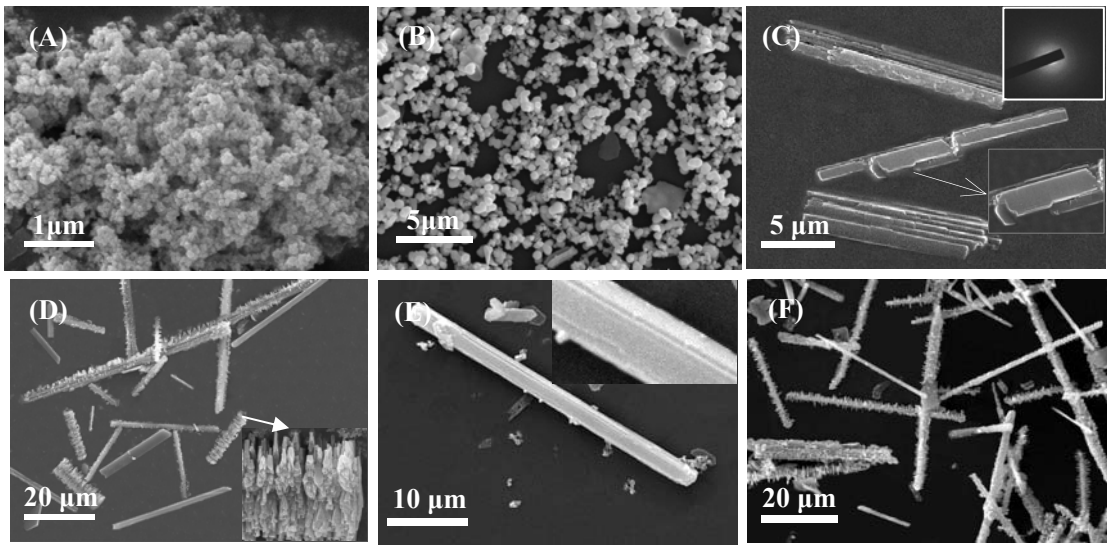

Figure S1. SEM images of FePtDy nanoalloys: A) $Fe_{40}Pt_{60}$ nanoparticles; B) $Fe_{40}Pt_{58}Dy_2$ nanoparticles; C,D) nanolayers-assemblied $Fe_{38}Pt_{58}Dy_4$ 1D superstructures; E,F) nanolayers-assemblied $Fe_{39}Pt_{53}Dy_8$ 1D superstructures.

3. Enhanced effect on photocatalytic activity of TiO_2 by simply mixing with as-designed FePtDy nanoalloys.

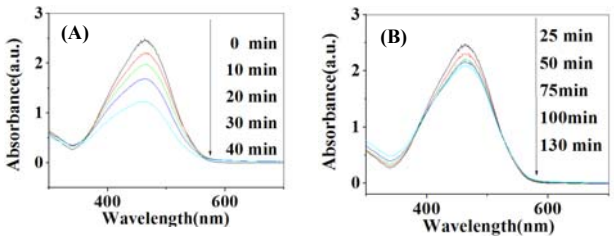

Figure S2 UV-vis absorption spectra for solution separated from p-25 TiO_2 nanoparticles suspensions under solar-light (A) and UV-filter visible-light (B) irradiated for various periods.

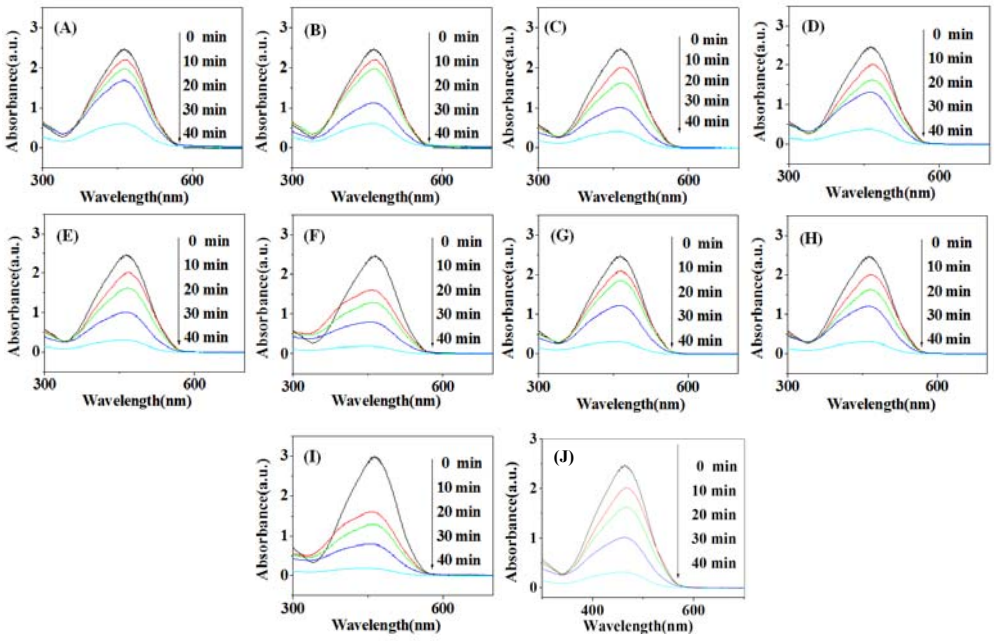

Figure S3. UV-vis absorption spectra for solution separated from TiO_2 + FePtDy nanoparticles suspensions irradiated for various periods under solar light irradiation: A) TiO_2+$Fe_{40}Pt_{60}$ nanoparticles; B) TiO_2+$Fe_{40}Pt_{58}Dy_2$ nanoparticles; C) TiO_2+$Fe_{41}Pt_{56}Dy_3$ nanoparticles; D) TiO_2+$Fe_{38}Pt_{58}Dy_4$ nanoparticles; E) TiO_2+$Fe_{40}Pt_{49}Dy_{11}$ nanoparticles; F) TiO_2+$Fe_{39}Pt_{53}Dy_8$ nanoparticles; G) TiO_2+$Fe_{38}Pt_{58}Dy_4$ 1D superstructures; H) TiO_2+$Fe_{40}Pt_{49}Dy_{11}$1D superstructures; I) TiO_2+$Fe_{39}Pt_{53}Dy_8$ 1D superstructures; J) TiO_2+Pt nanoparticles

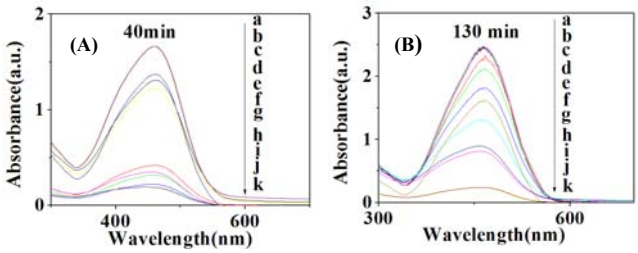

Figure S4. UV-vis absorption spectra under solar-light (A) and UV-filter visible-light irradiation (B): a) $Fe_{38}Pt_{58}Dy_4$ nanoparticles; b) p-25 TiO_2 nanoparticles; c) TiO_2 nanoparticles; d)TiO_2+$Fe_{40}Pt_{60}$ nanoparticles; e) TiO_2+$Fe_{40}Pt_{58}Dy_2$ nanoparticles; f) TiO_2+$Fe_{41}Pt_{56}Dy_3$ nanoparticles; g) TiO_2+$Fe_{38}Pt_{58}Dy_4$ nanoparticles; h) TiO_2+$Fe_{38}Pt_{58}Dy_4$ 1D superstructures; i) TiO_2+ $Fe_{40}Pt_{49}Dy_{11}$ 1D superstructures; j) TiO_2+$Fe_{39}Pt_{53}Dy_8$ 1D superstructures; k) TiO_2+Pt nanoparticles.

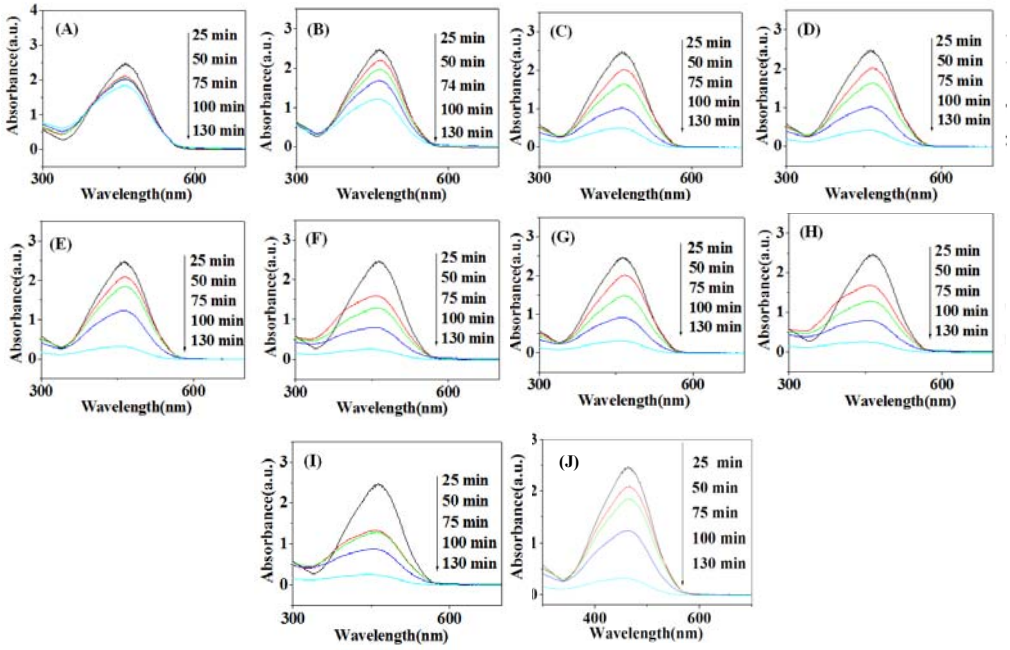

Figure S5. UV-vis absorption spectra for solution separated from TiO_2+FePtDy nanoparticles suspensions irradiated for various periods under UV-filter visible-light irradiation: A) TiO_2+$Fe_{40}Pt_{60}$ nanoparticles; B) TiO_2+$Fe_{40}Pt_{58}Dy_2$ nanoparticles; C) TiO_2+$Fe_{41}Pt_{56}Dy_3$ nanoparticles; D) TiO_2+$Fe_{38}Pt_{58}Dy_4$ nanoparticles; E) TiO_2+$Fe_{40}Pt_{49}Dy_{11}$ nanoparticles; F) TiO_2+$Fe_{39}Pt_{53}Dy_8$ nanoparticles; G) TiO_2+$Fe_{38}Pt_{58}Dy_4$ 1D superstructures; H) TiO_2+$Fe_{40}Pt_{49}Dy_{11}$ 1D superstructures; I) TiO_2+$Fe_{39}Pt_{53}Dy_8$ 1D superstructures; J) TiO_2+Pt nanoparticles