Supporting Information available for

Reversible Photo-switching of Ferromagnetic FePt Nanoparticles at Room Temperature

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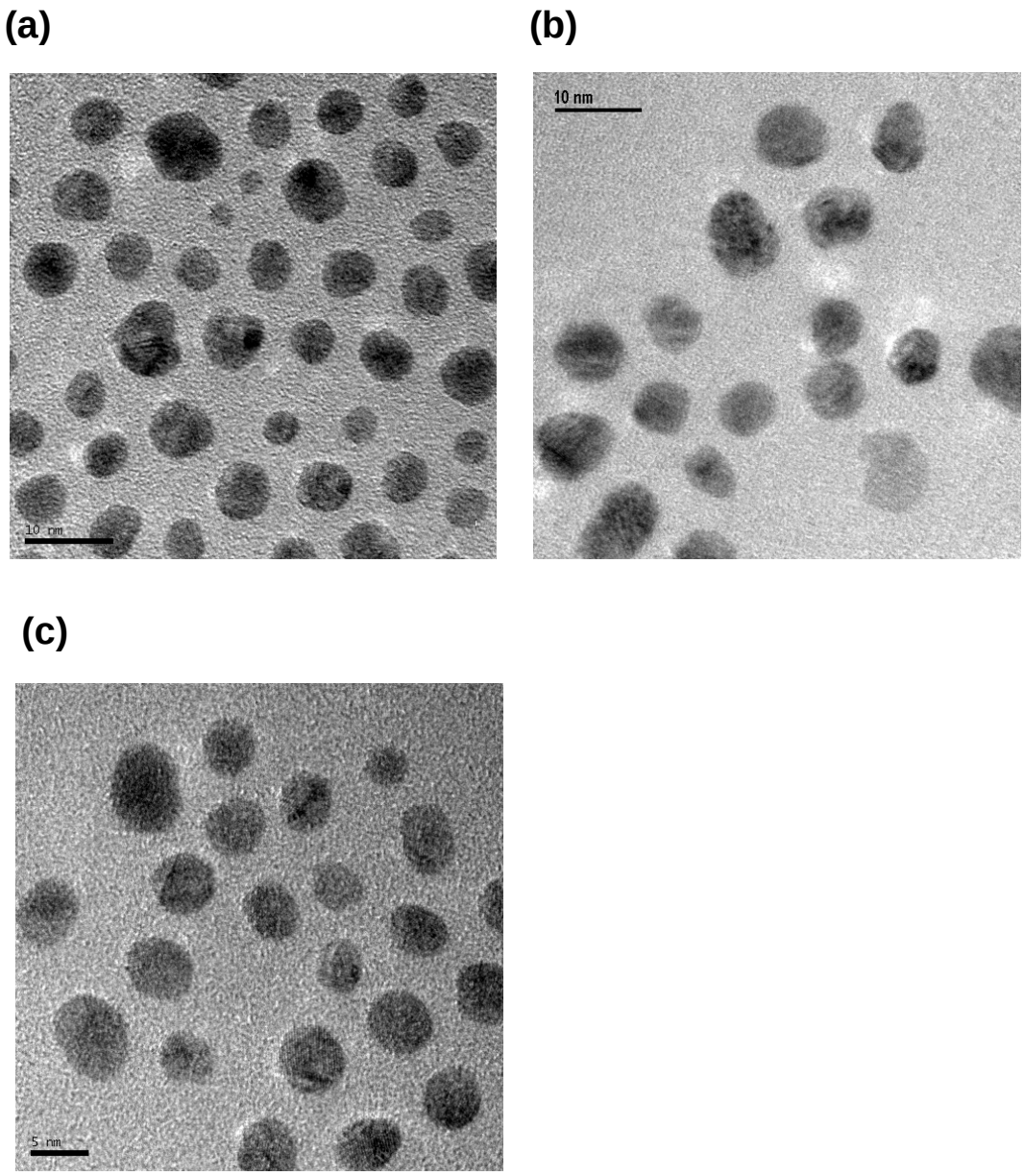

Figure S1. TEM micrograph of the reference FePt nanoparticles.

(a) TEM micrograph of the composite FePt nanoparticles coated with Azo-ligands **3** and octylamine ; scale bar = 10 nm. (b) TEM micrograph of the composite FePt nanoparticles coated with Azo-ligands **1** and **2** ; scale bar = 10 nm. (c) TEM micrograph of the composite FePt nanoparticles coated with non-Azo ligands (oleylamine and oleic acid).

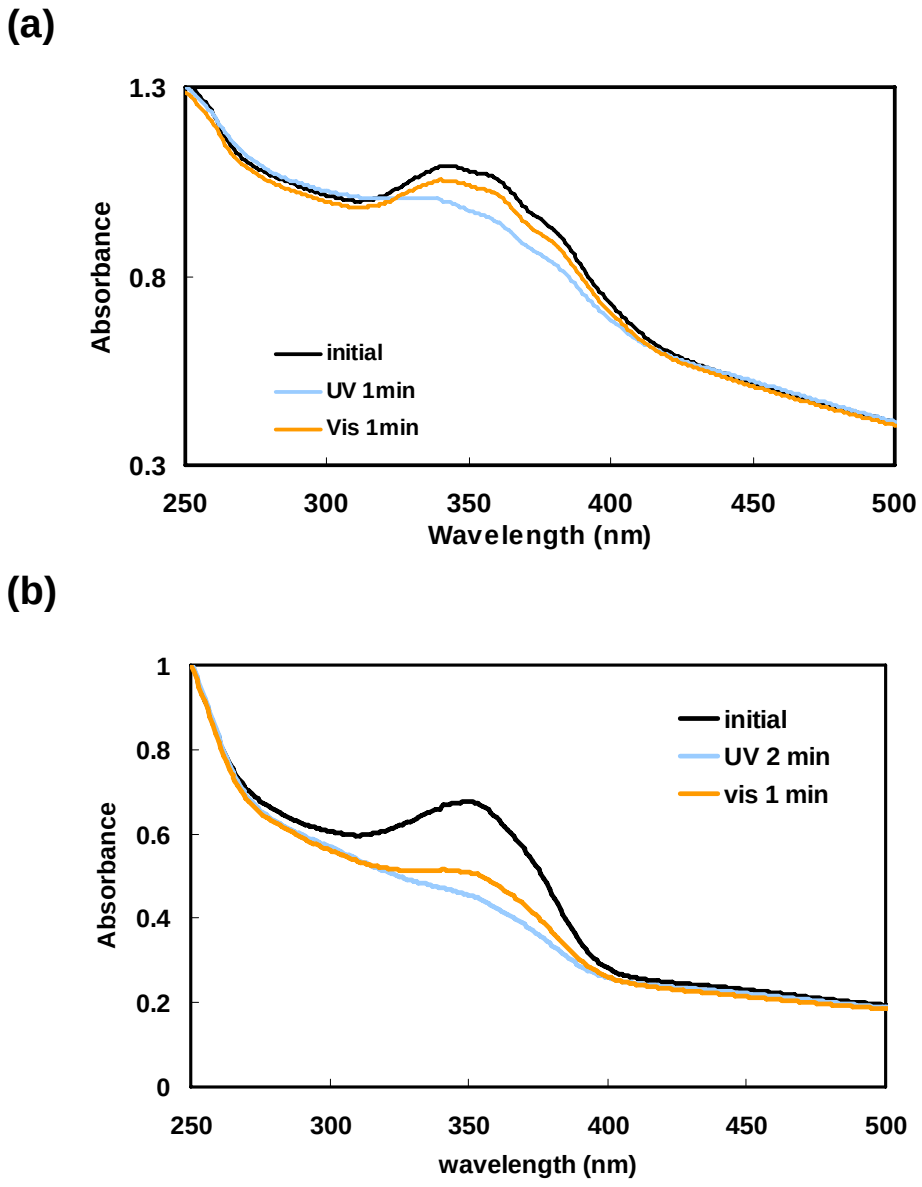

Figure S2. Changes in the optical adsorption spectra for the reference FePt nanoparticles due to the photoisomerization.

(a) Optical adsorption spectra for the composite FePt nanoparticles coated with Azo-ligands **3** and octylamine ; The initial trans-state (black line) was first illuminated with UV light for 1 min (blue line). It was then illuminated with visible light for 1 min (orange line).

(b) Optical adsorption spectra for the composite FePt nanoparticles coated with Azo-ligands **1** and **2** ; The initial trans-state (black line) was first illuminated with UV light for 1 min (blue line). It was then illuminated with visible light for 1 min (orange line).

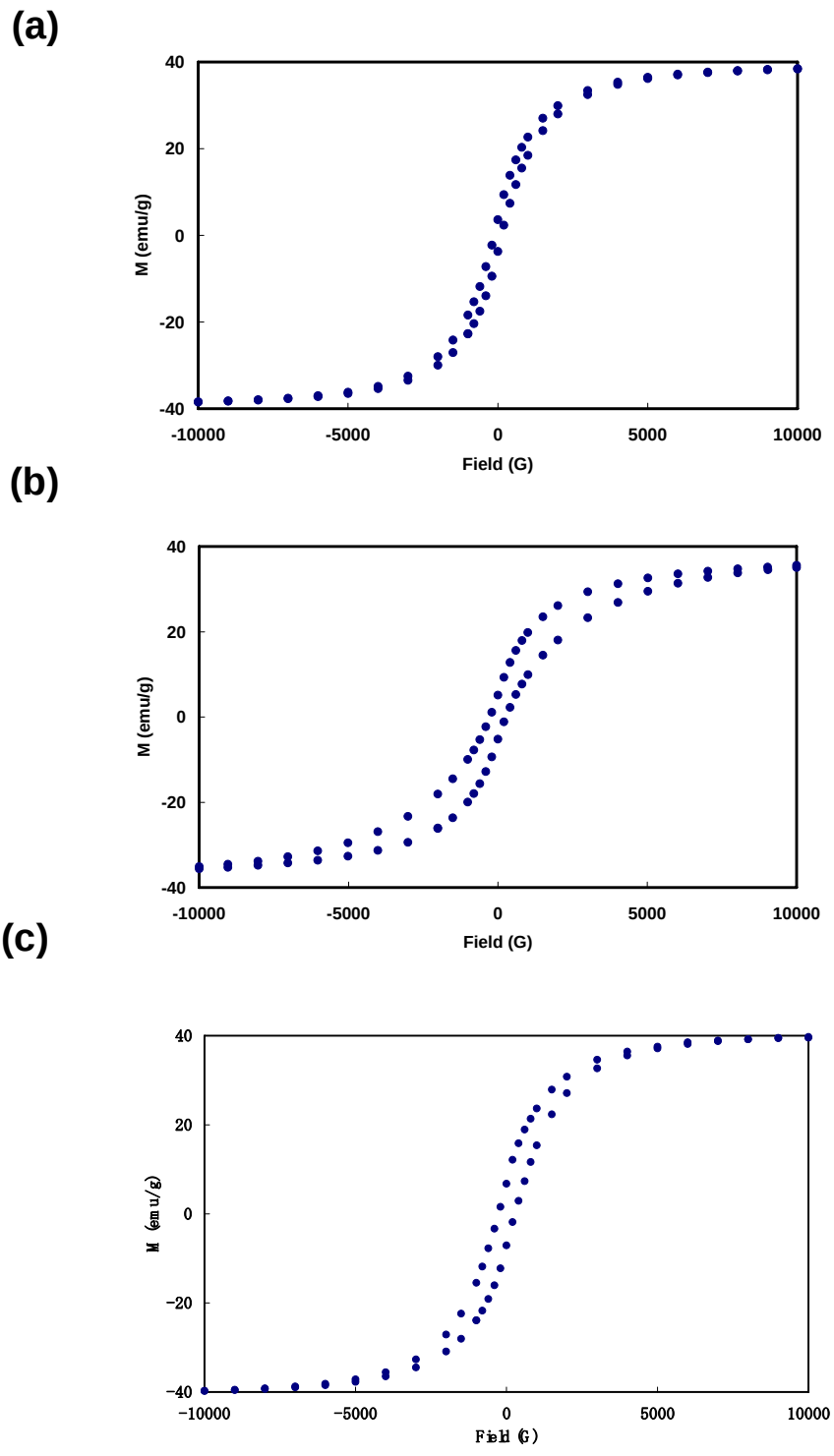

Figure S3. Magnetization curves of the reference FePt nanoparticles at 300 K.
(a) Magnetization curves of the composite FePt nanoparticles coated with Azo-ligands **3**

and octylamine ; Typical hysteresis loop with coercivity of 250 G was observed. (b) Magnetization curves of the composite FePt nanoparticles coated with Azo-ligands **1** and **2** ; Typical hysteresis loop with coercivity of 150 G was observed. (c) Magnetization curves of the composite FePt nanoparticles coated with non-Azo ligands (oleylamine and oleic acid) ; Typical hysteresis loop with coercivity of 250 G was observed.

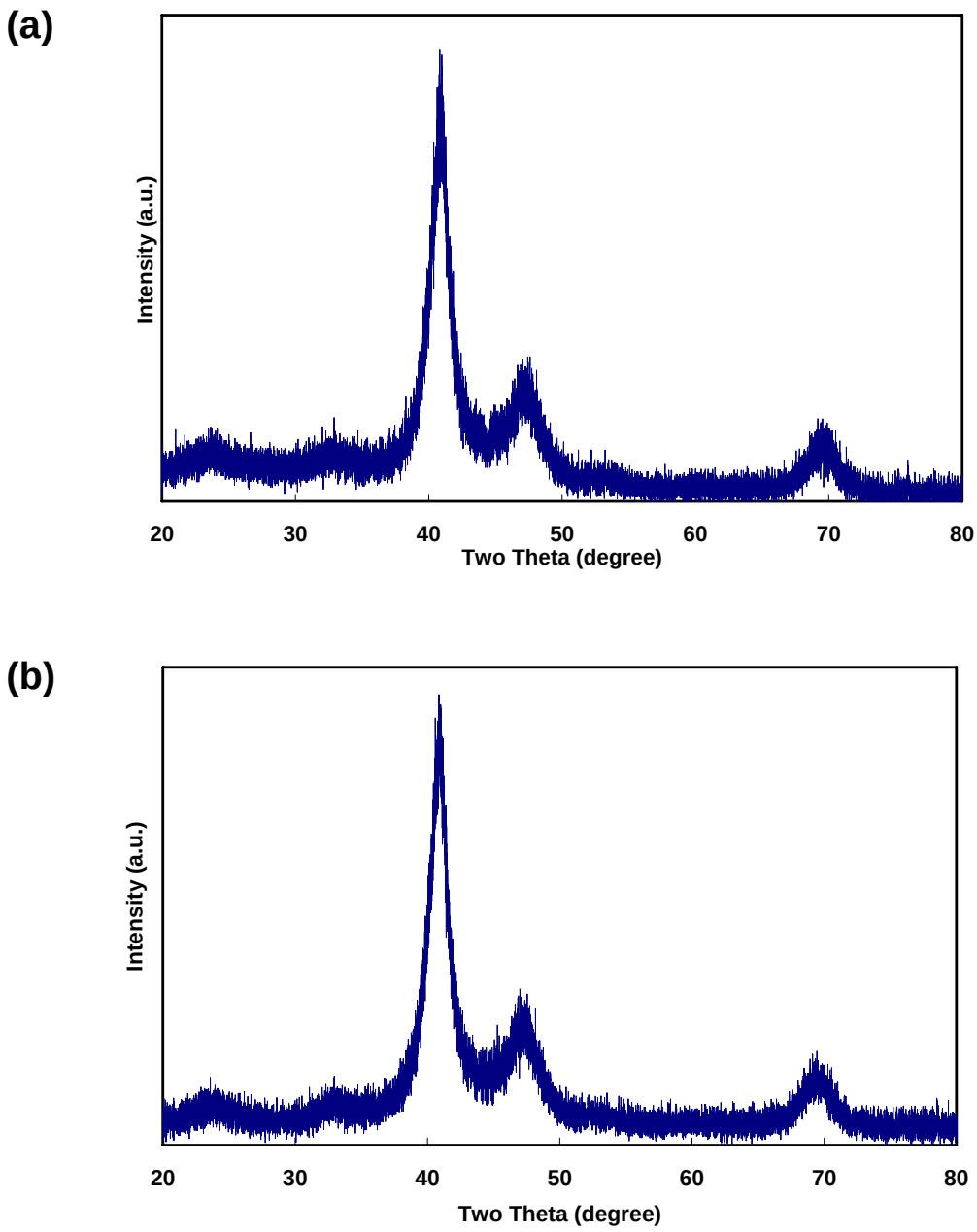

Figure S4. Powder XRD pattern of the reference FePt nanoparticles.

(a) Powder XRD pattern of the composite FePt nanoparticles coated with Azo-ligands **3** and octylamine ; Typical superlattice reflections that indicate the existence of the partially-ordered $L1_0$ phase were observed. (b) Powder XRD pattern of the composite FePt nanoparticles coated with non-Azo ligands (oleylamine and oleic acid) ; Typical superlattice reflections that indicate the existence of the partially-ordered $L1_0$ phase were observed.

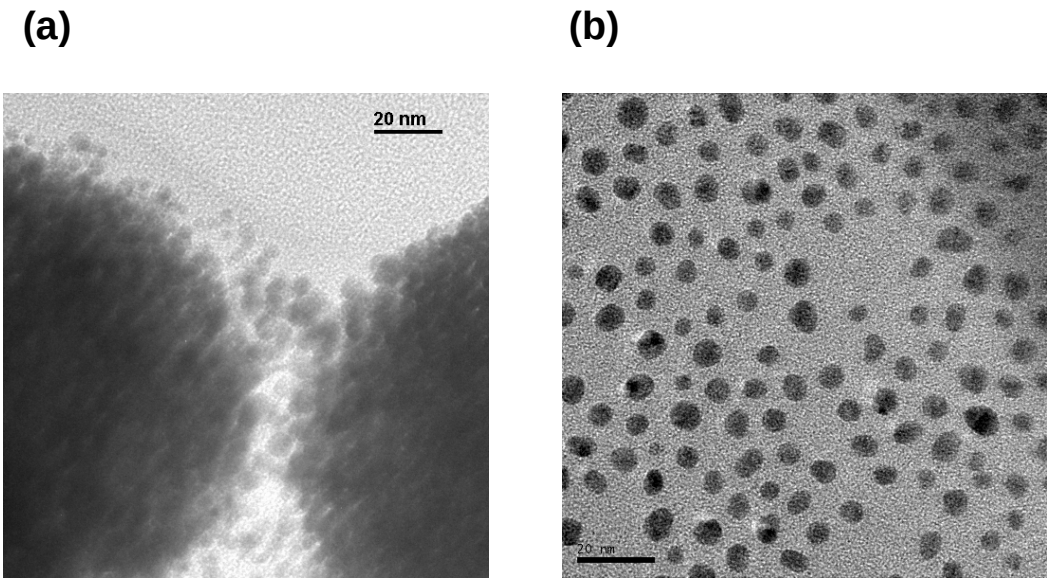

Figure S5. TEM micrograph of the as-prepared and composite FePt nanoparticles with low magnification.

(a) TEM micrograph of the as-prepared FePt nanoparticles ; scale bar = 10 nm. (b) TEM micrograph of the composite FePt nanoparticles coated with Azo-ligands **1** and **2** ; scale bar = 20 nm. (c) TEM micrograph of the composite FePt ; scale bar = 20 nm.

Preparation procedure of the diluted sample

The diluted sample in PMMA matrix was prepared as follows; purchased PMMA, poly (methyl methacrylate), was dissolved in dichloromethane and then, small amount of the composite nanoparticles (coated with Azo-ligands 1 and octylamine) dispersed in dichloromethane was added dropwise. After several minutes with stirring, the mixture was casted on the substrates and dichloromethane was slowly evaporated. The substrates were the Cu TEM grid for TEM observation, the quartz slide for the optical absorption spectra measurement. For the magnetic measurements, the mixture was once casted on the glass substrates and the freestanding sample was used by taking the diluted sample off from the glass substrate after evaporation of dichloromethane.

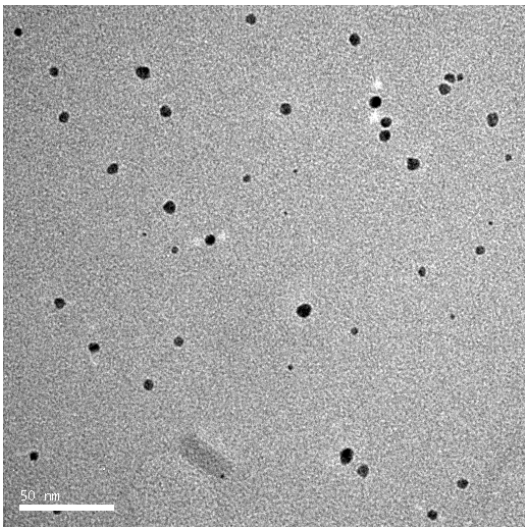

Figure S6. TEM micrograph of the diluted samples.
TEM micrograph of the composite FePt nanoparticles coated with Azo-ligands **3** and octylamine diluted in PMMA matrix ; scale bar = 50 nm.

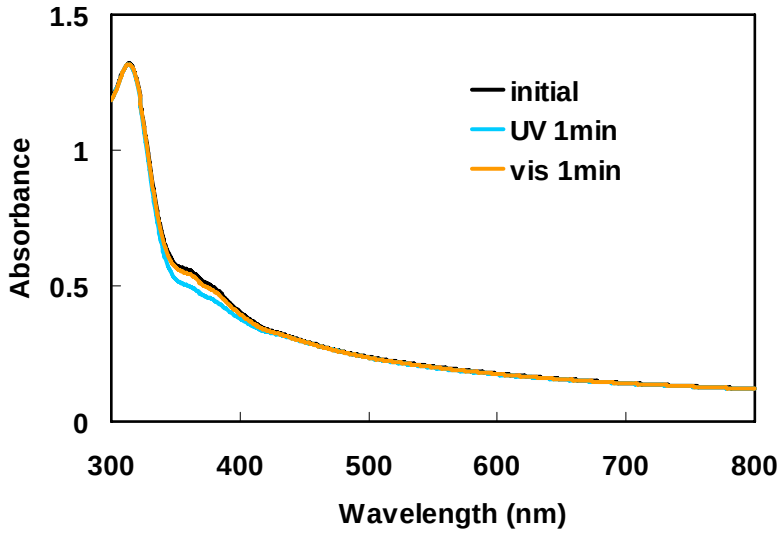

Figure S7. Changes in the optical adsorption spectra for the diluted sample due to the photoisomerization.

Optical adsorption spectra for the composite FePt nanoparticles coated with Azo-ligands **3** and octylamine diluted in PMMA matrix; The initial trans-state (black line) was first illuminated with UV light for 1 min (blue line). It was then illuminated with visible light for 1 min (orange line).

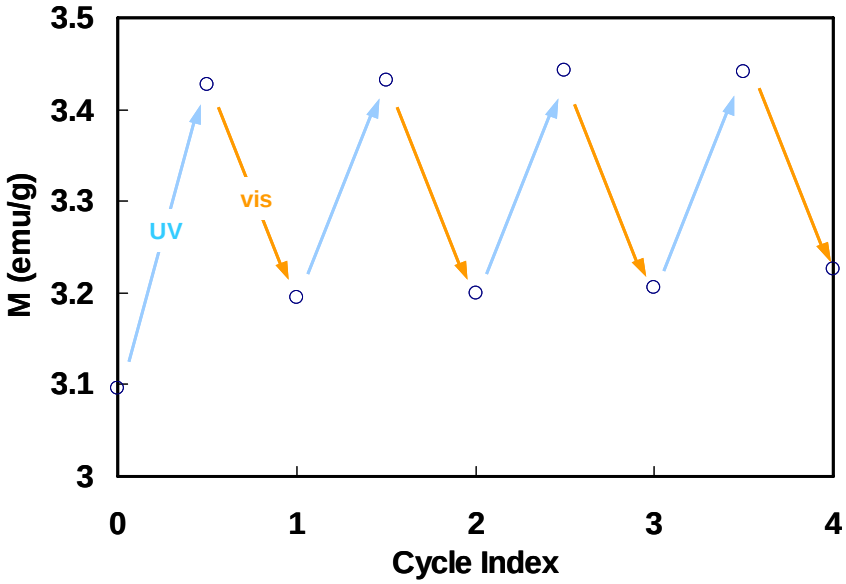

Figure S8. Photoinduced changes in the magnetic properties of the diluted sample. Changes in the magnetization of the composite FePt nanoparticles coated with Azo-ligands **3** and octylamine diluted in PMMA matrix; The composite nanoparticles were alternately illuminated with UV and visible light for 5 min each at 300 K with an external magnetic field of 10 G.