Supporting information for:

Hierarchical Magnetic Core-Shell Nanoarchitectures: Non-linker Reagent Synthetic Route and Applications in a Biomolecule Separation System

Zhen Liu,[a,b] Meng Li,[a,b] Fang Pu,[a] Jinsong Ren,*[,a] Xinjian Yang,[a,b] and Xiaogang Qu[a]

[a] Laboratory of Chemical Biology and State Key laboratory of Rare Earth Resources Utilization , Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun, 130022 (P. R. China).

[b] Graduate School of the Chinese Academy of Sciences, Beijing 100039 (P. R. China).

Fax: (+86) 0431-85262625; Tel: (+86) 0431-85262625

E-mail: jren@ciac.jl.cn; xqu@ciac.jl.cn

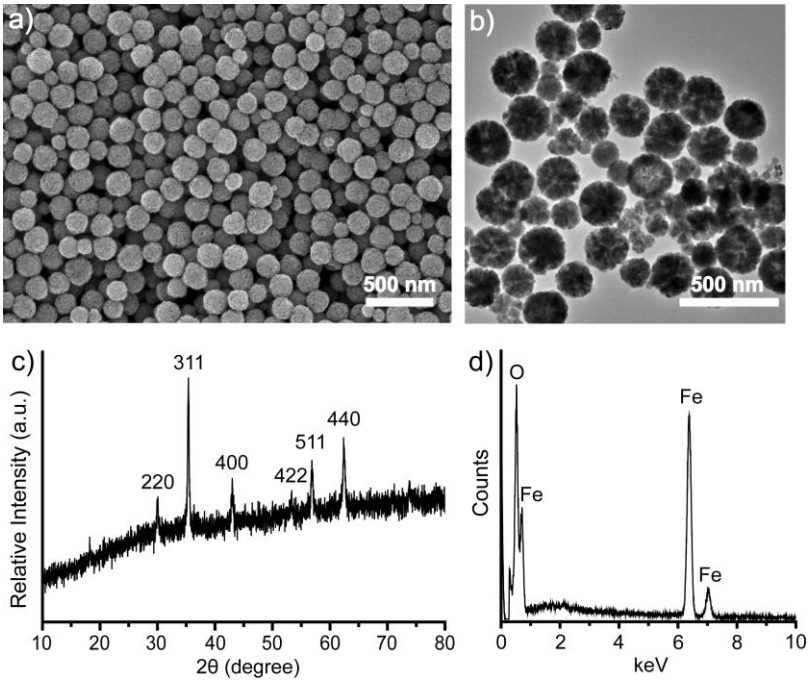

Figure S1. SEM image (a), TEM image (b), wide-angle XRD pattern (c) and EDS spectrum (d) of magnetic Fe_3O_4 nanoparticles.

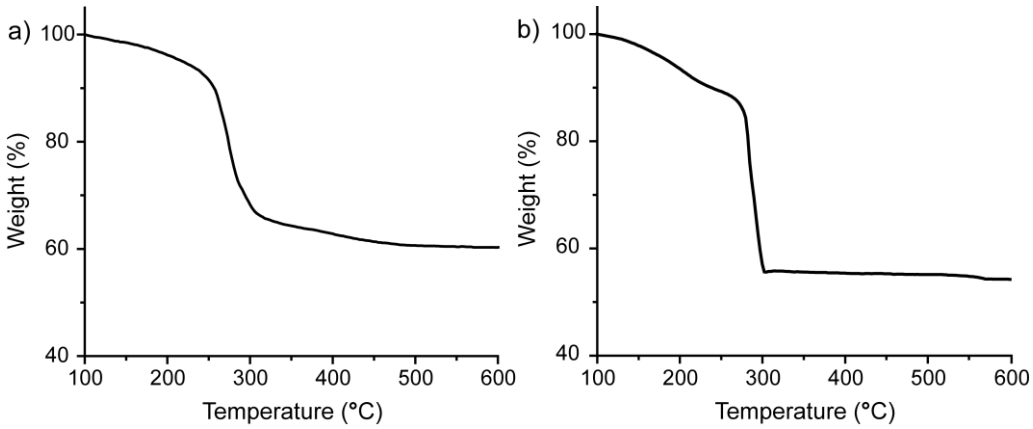

Figure S2. TGA curves of α-$Ni(OH)_2$ (a) and amorphous $Co(OH)_2$ (b) synthesized through the same solvothermal method. The results present above were applied to confirm the calcining temperature and duration.

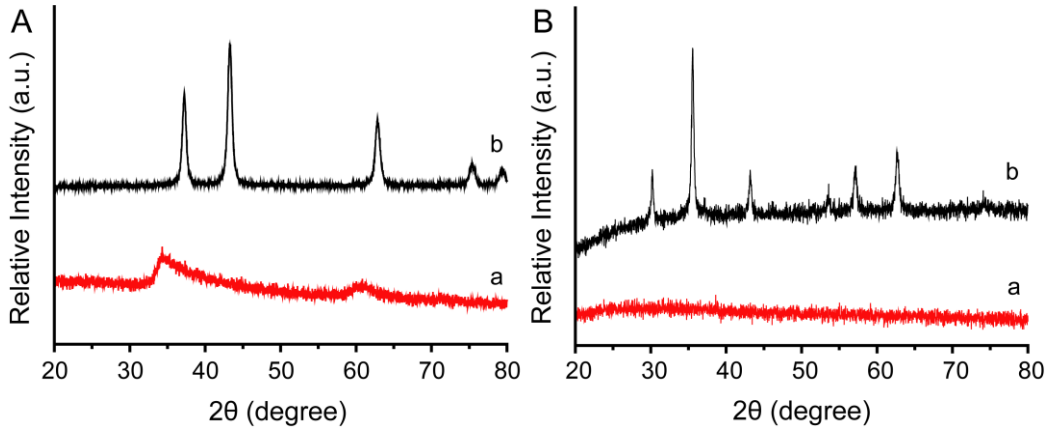

Figure S3. A: Wide-angle XRD patterns of α-$Ni(OH)_2$ composite (a) and NiO coating materials(b). B: Wide-angle XRD patterns of amorphous $Co(OH)_2$ composite (a) and Co_3O_4 coating materials (b). Control experiments were carried out to evidence the detailed components of the coating shells.

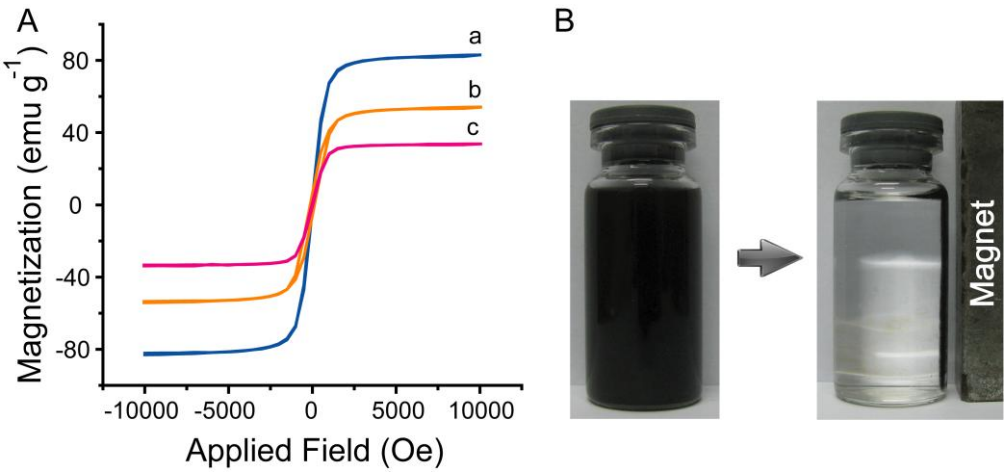

Figure S4. A: Room-temperature field-dependent magnetization curves of a) Fe_3O_4, b) Fe_3O_4@NiO, and c) Fe_3O_4@Co_3O_4. B: photograph shows the strong attraction of the as-prepared Fe_3O_4@NiO heteronanostructures suspended in water toward an assistant magnet.

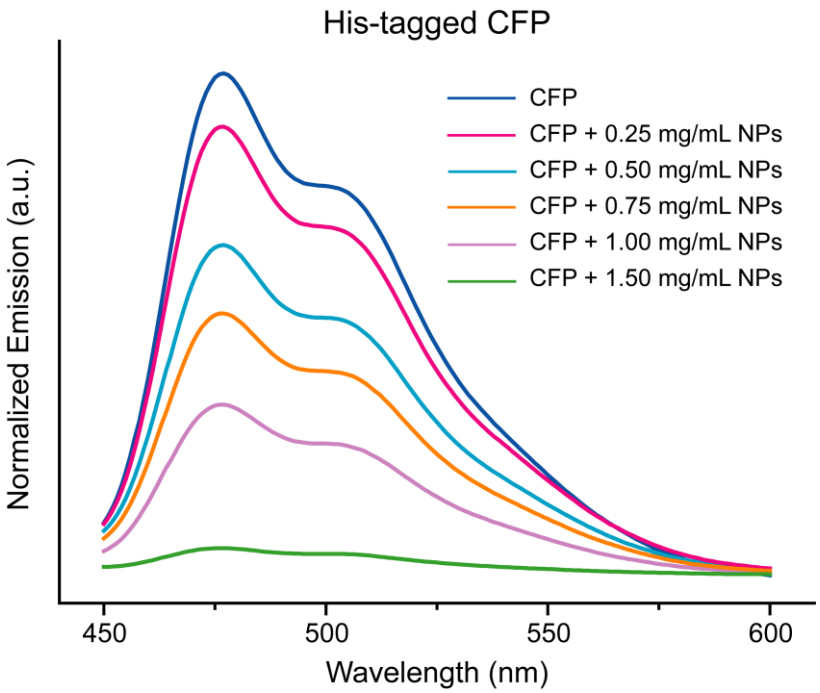

Figure S5. The fluorescence spectra corresponding to the change of emission intensity during the His-tagged CFP capturing experiments incubated with different concentrations of Fe_3O_4@NiO microspheres.

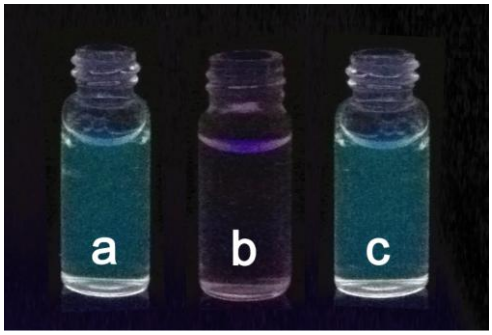

Figure S6. Fluorescent images from the solutions of His-tagged CFP (a) before and (b) after treatment with Fe_3O_4@NiO microspheres and (c) after treating protein-bound Fe_3O_4@NiO with imidazole solution (irradiation upon UV light).

Cycle	Practical Fluorescent Percentage (%)	Normalized Fluorescent Percentage (%)
1	91.39	100
2	90.93	99.50
3	90.28	98.79
4	89.11	97.50
5	89.59	98.03

Table S1. Detailed magnetic purification and recycling efficiency of Fe_3O_4@NiO microspheres for selective separation of His-tagged CFP from cell lysate. Normalized fluorescent percentages are calculated form practical fluorescent percentage by recognizing the value of the first cycle as 100%.