Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.

Supporting information

Tuning the hierarrchical nanostructure of hematite mesocrystals by collagen-templated biomineralization

Manman He, Yuping Zhang, Jean Claude Munyemana, Ting Wu, Zhangfu Yang, Haijun Chen, Wanpeng Qu, Jianxi Xiao

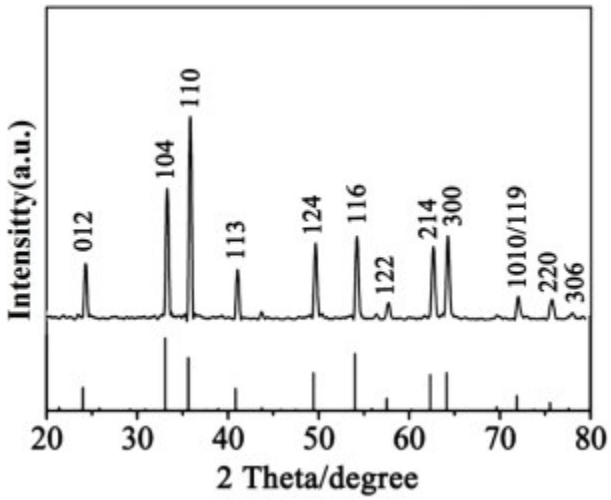

Figure S1. XRD pattern of the as-prepared hematite samples (olive-like mesocrystal) obtained after 10 hrs via collagen-templated biomineralization ([CLCL] = 0.005 wt%, Fe(III) = 0.06 mol/L). The standard XRD pattern (hematite, JCPDS No. 33-0664) is shown beneath the plot.

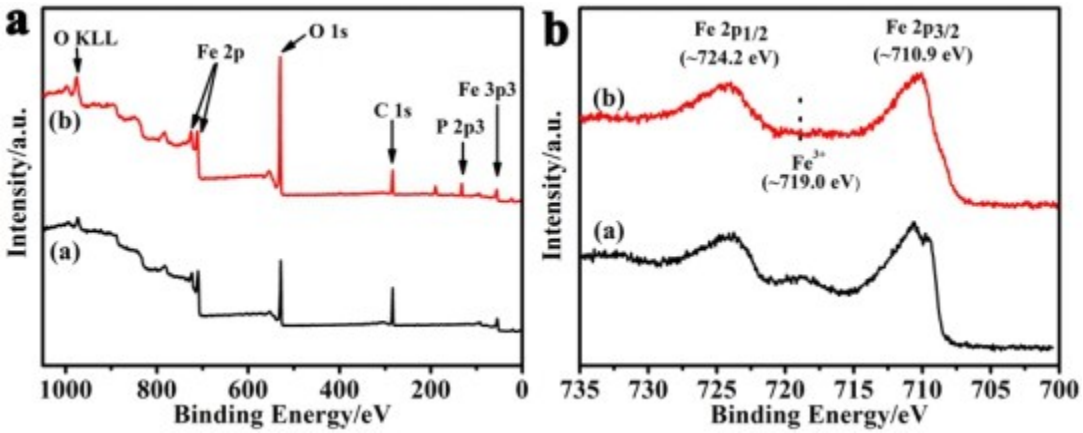

Figure S2. XPS spectra of the as-prepared hematite samples obtained after 10 hrs via collagen-templated biomineralization (black: [CLCL] = 0.005 wt %, Fe(III) = 0.06 mol/L;

red: [CL-CL] = 0.5 wt %, Fe(III) = 0.06 mol/L). (a). survey spectrum; (b). high-resolution Fe 2p spectrum.

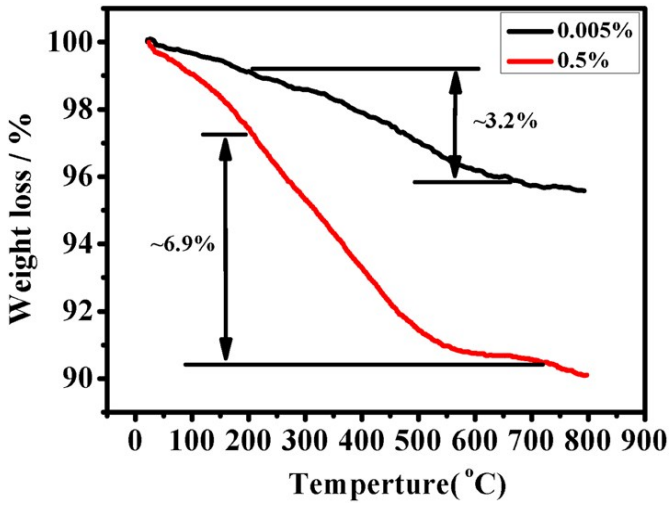

Figure S3. TGA curves of the as-prepared hematite samples obtained after 10 hrs via collagen-templated biomineralization (black: [CLCL] = 0.005 wt %, Fe(III) = 0.06 mol/L; red: [CL-CL] = 0.5 wt %, Fe(III) = 0.06 mol/L).

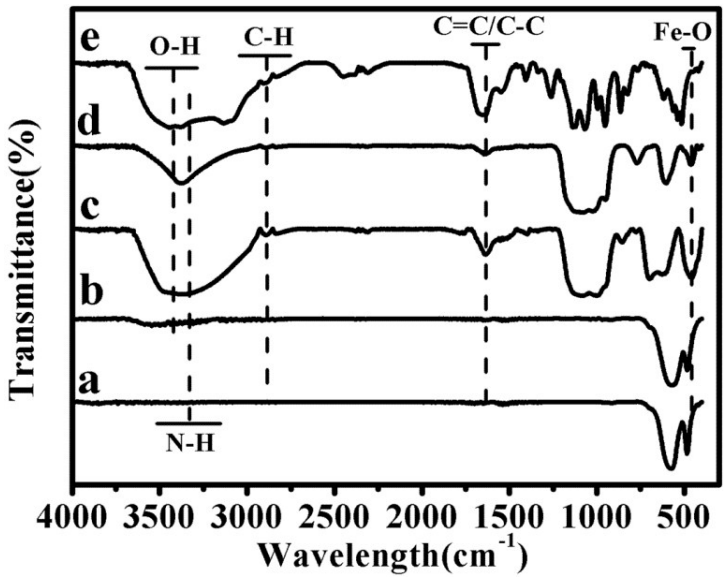

Figure S4. FT-IR spectra of hematite mesocrystals obtained after 10 hrs via CLCL-templated biomineralization with a constant concentration of Fe(III) (0.06 mol/L) and various concentrations of CLCL: (a) 0, (b) 0.005, (c) 0.1, (d) 0.5 wt %; and (e) FT-IR spectrum of pure CLCL.

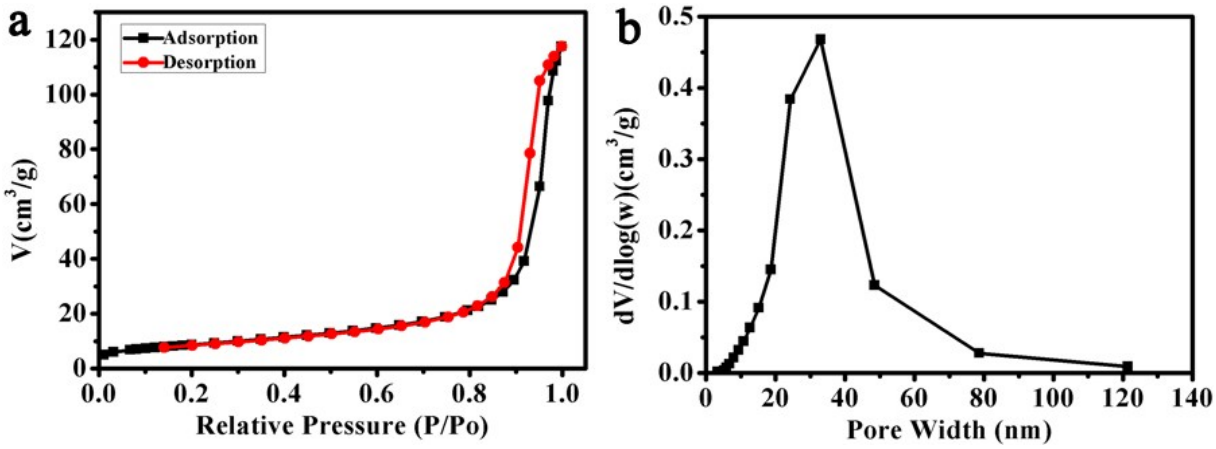

Figure S5. Nitrogen adsorption/desorption isotherms of the olive-like hematite mesocrystal obtained after 2 hrs in the CLCL biomineralization system ([CLCL] = 0.005 wt %, [Fe(III)] = 0.06 mol/L) (a) and the corresponding BJH pore size distribution plot (b).

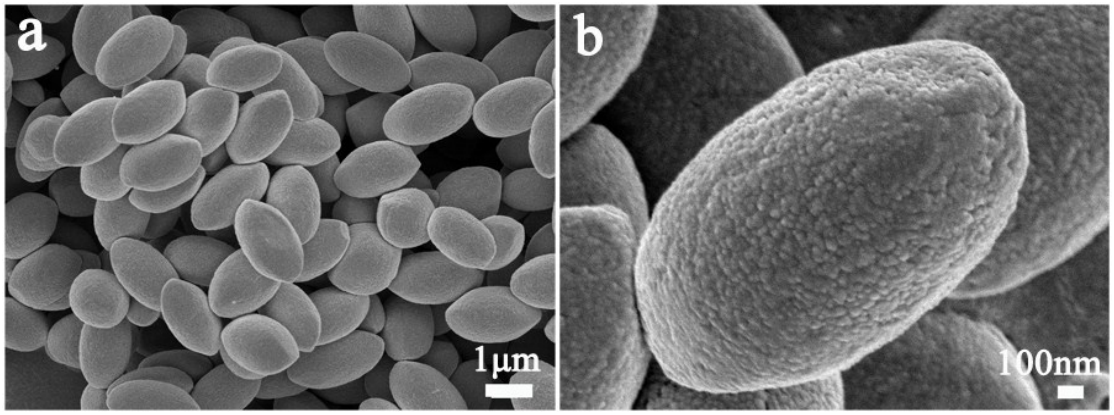

Figure S6. FESEM images of hematite mesocrystals obtained after 2 hrs via CLCL-templated biomineralization with 0.06 mol/L Fe(III) and 0.005 wt % CLCL.

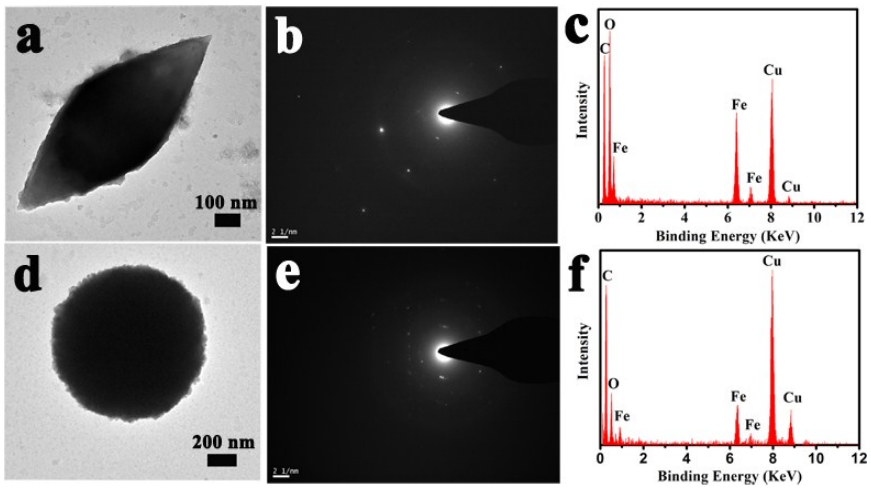

Figure S7. TEM image (a), the SAED pattern (b), and EDX spectrum (c) of the diamond-like hematite mesocrystal obtained after 10 hrs via collagen-templated biomineralization ([CLCL] = 0.1 wt %, [Fe(III)] = 0.06 mol/L). TEM image (d), the SAED pattern (e), and EDX spectrum (f) of the sphere-like hematite mesocrystal obtained after 10 hrs via collagen-templated biomineralization ([CLCL] = 0.5 wt %, [Fe(III)] = 0.06 mol/L). The signals of C and Cu in the EDX spectra are generated from the Cu grids and carbon support film, respectively.