Supporting Information for

Controlled Synthesis of Ultrathin Lamellar Eu_2O_3 Nanocrystals: Self-Assembly from 1D Nanowires to 2D Nanosheets

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Experimental section

Materials. 1, 5-pentanediol, $EuCl_3$ and Eu_2O_3 were purchased from Alfa Asea and used as received. $NaHCO_3$ were purchased from Beijing Chemicals Corp., China, and used as received without further purification.

Experimental. In a typical synthesis of nanowires, 0.1 g $EuCl_3$ and 0.25 g $NaHCO_3$ were added to 18 ml 1, 5-pentanediol and stirred at room temperature for 30 min. The homogeneous solution was transferred into a 25 ml Teflon-lined autoclave. Then the autoclave was sealed and maintained at 90 °C for 10 h, and allowed to cool to room temperature naturally. The resulting product was repeatedly washed with ethanol, then dried at 60 °C for 3 h. 0.1 g as-synthesized nanowires sample was immersed into 10 ml deionized water for 10 min, 1 h and 24 h, and nanosheets with different lateral size in Figure S2 can be obtained.

Characterization. SEM images were taken with a field emission scanning electron microscope (FESEM, JSM-4300, JEOL, Japan). TEM images, HRTEM images, selected-area electron diffraction (SAED),

and an energy-dispersive X-ray (EDX) spectrum were taken with a high-resolution transmission electron microscope (HRTEM, JSM-2010, JEOL, Japan) operating at 200 kV and a transmission electron microscope (JSM-1011, JEOL, Japan) operating at 100 kV. X-ray diffraction (XRD) patterns were recorded on a Philips XPert PRO MPD X-ray diffractometer operated at 35 kV and 45 mA with Cu-Kα radiation. Chemical bonding information was studied with FT-IR using Bruker EQUINOX55 with a potassium bromide (KBr) pellet technique. Each spectrum was collected after 32 scans at a resolution of 4 cm^{-1} from 400 to 4000 cm^{-1}. The TGA curves were obtained on a TG/DTA6300 thermoanalyzer. Room-temperature fluorescence spectra were recorded on a Hitachi F-7000 FL spectrophotometer. UV-Vis diffuse reflection spectra were taken on a Hitachi U-3010 spectrophotometer. Atomic force microscopy (AFM) studies were done with a BRUKE Veeco MultiMode 8 scanning probe microscope at tapping mode.

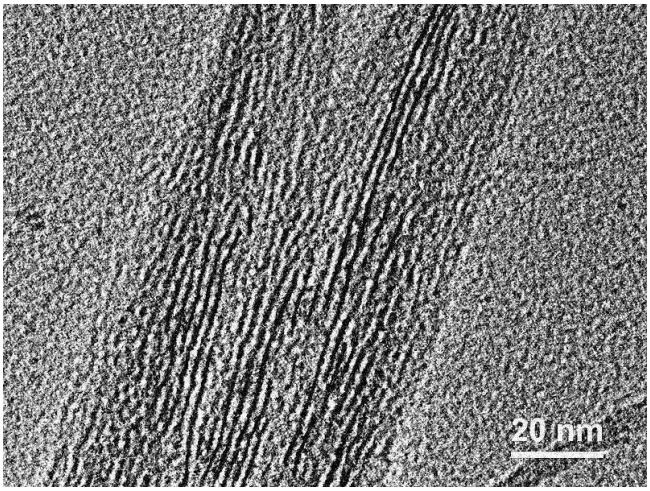

Figure S1. HRTEM image of Eu_2O_3 nanowire bundles.

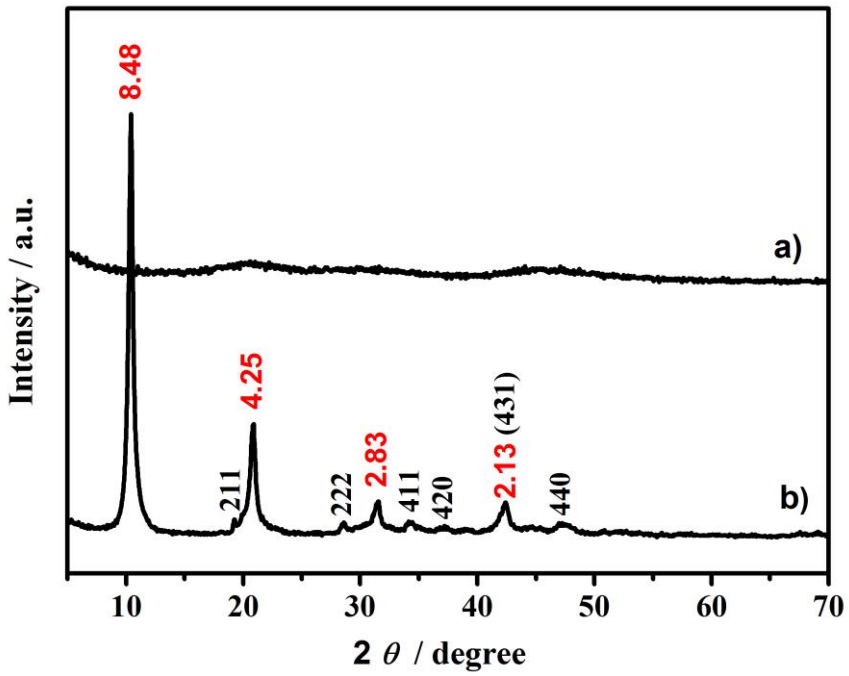

Figure S2. XRD patterns of the as-synthesized Eu_2O_3 nanowires (a) and nanosheets (b).

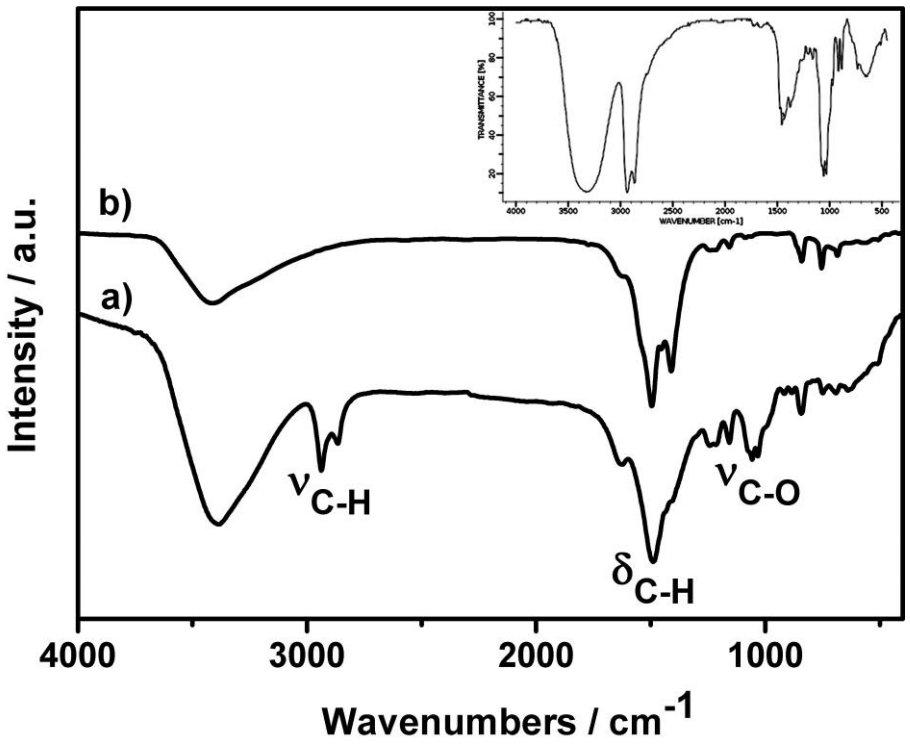

Figure S3. FT-IR spectra of the as-synthesized Eu_2O_3 nanowires (a) and nanosheets (b). The inset shows IR spectrum of pure 1, 5-pentanediol.

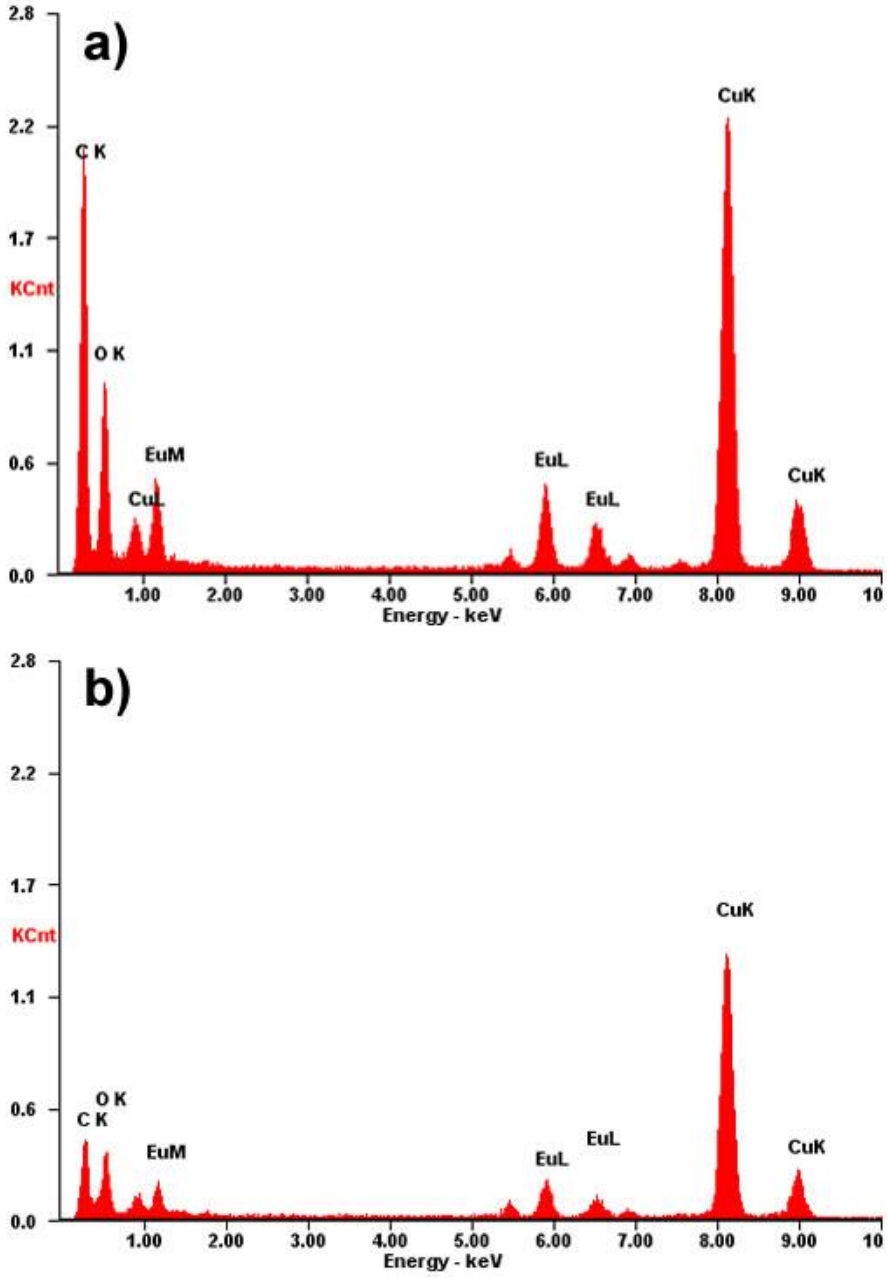

Figure S4. EDX spectra of the as-synthesized Eu_2O_3 nanowires (a) and nanosheets (b).

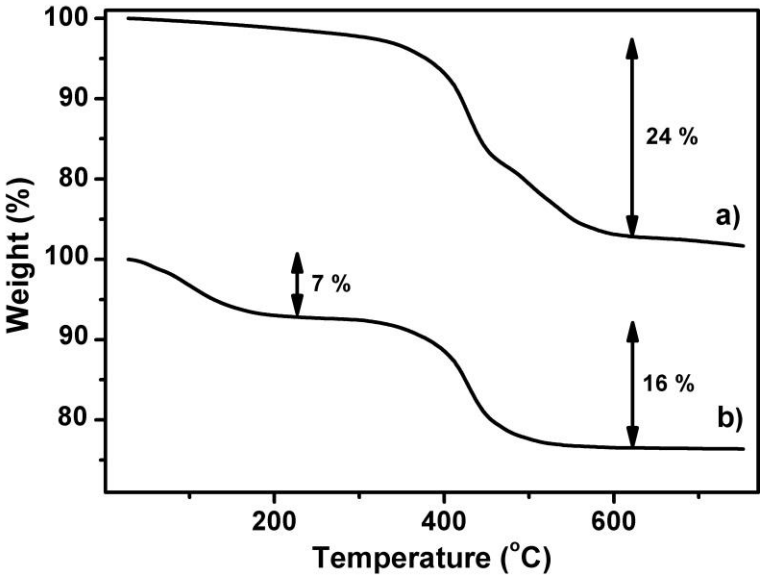

Figure S5. TGA curves of the as-synthesized Eu_2O_3 nanowires (a) and nanosheets (b).

There is only one major zone of mass loss for Eu_2O_3 nanowires in the range from 350 °C to 550 °C, which is attributed to the decomposition of pentanediol. While two major zones of mass loss can be observed in TGA curve of Eu_2O_3 nanosheets. In addition to mass loss step similar to that of the nanowires, 7% mass loss ranging from room temperature to 150 °C is attributed to dehydration.

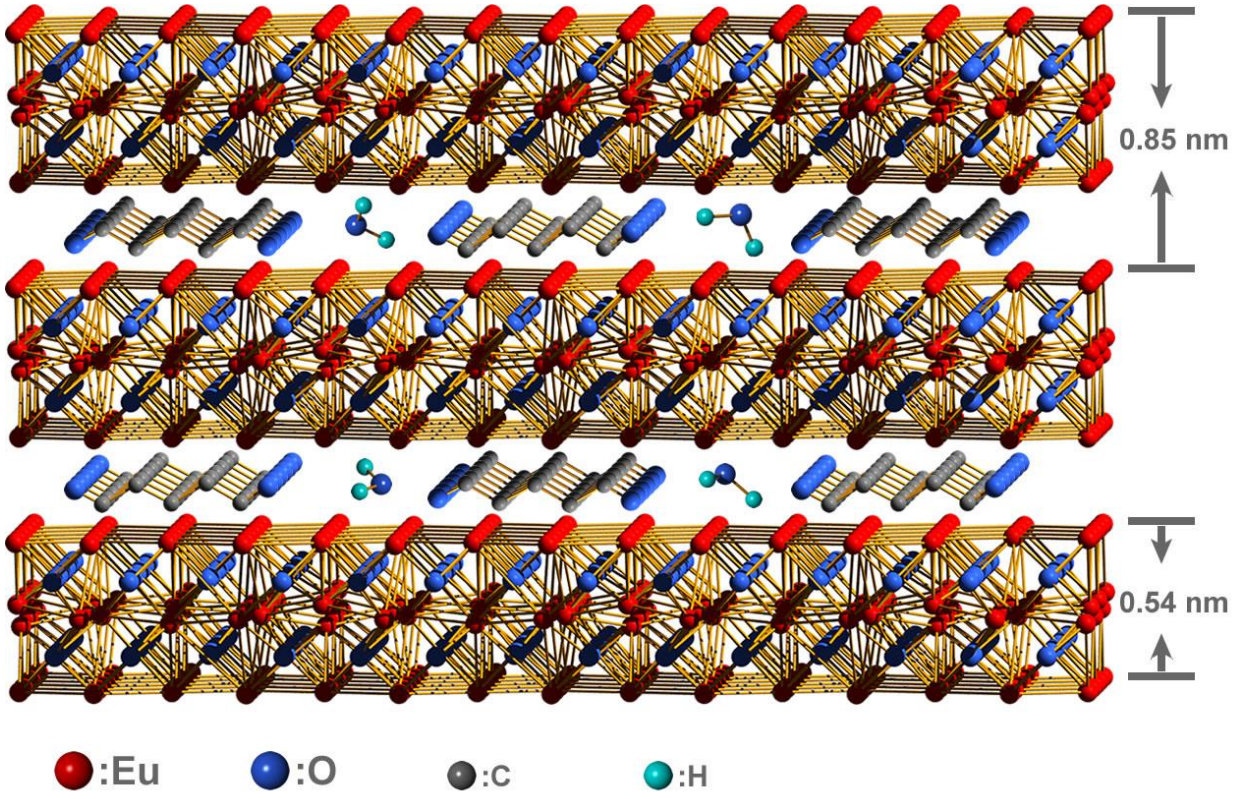

Figure S6. Schematic illustration of the Eu_2O_3 nanosheet viewed along [001] zone axis. Red, blue, gray and green balls correspond to Eu, O, C, and H atoms, respectively. Hydrogen atoms in 1, 5-pentanediol are omitted for clarity.

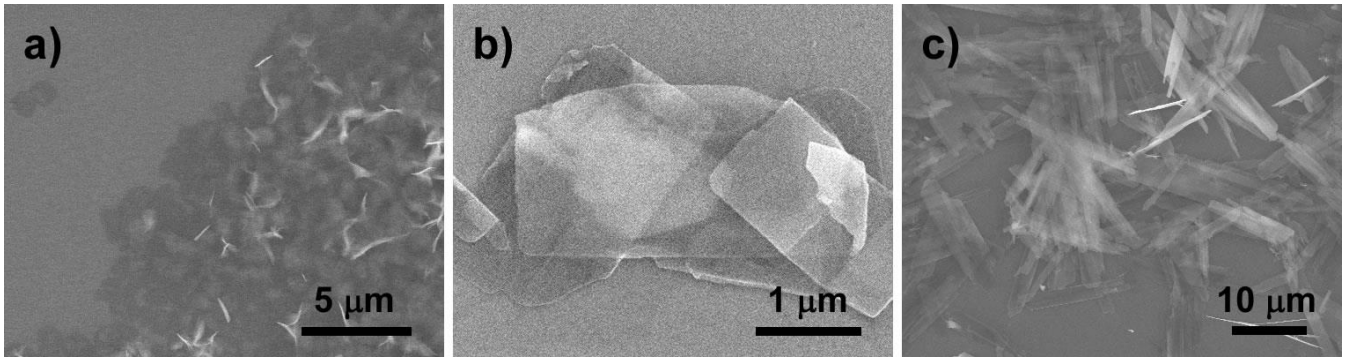

Figure S7. SEM images of Eu_2O_3 nanosheets obtained from different soaking time: 10 min (a), 1 h (b), 24 h (c).

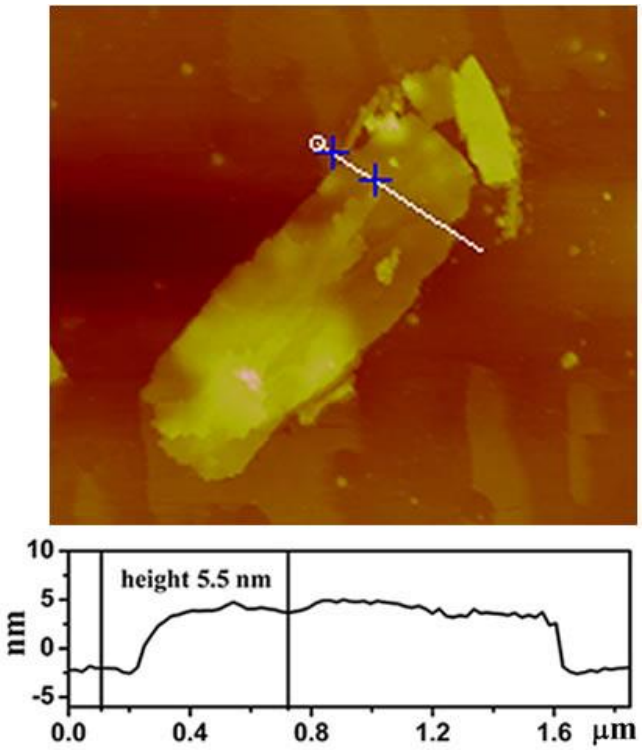

Figure S8. AFM image of Eu_2O_3 nanosheets obtained from 24 h soaking in water.