

Supporting Information

Green Light-Emitting LaPO₄:Ce³⁺:Tb³⁺ Koosh Nanoballs Assembled by *p*-sulfonato-Calix[6]arene Coated Superparamagnetic Fe₃O₄

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Experimental

Materials and Methods: All chemicals utilized in the synthesis were purchased from Sigma-Aldrich without further purification. SC[6] was synthesized according to the literature.¹

In a typical synthesis, 0.25 mmol FeCl₃·6H₂O and 0.125 mmol FeCl₂·4H₂O was added to 10 mL degassed MilliQ water under a N₂ atmosphere and constant stirring. Following which 9 mg SC[6] was added to the mixture. 1.1 mL 1M NaOH was added dropwise through a funnel. After constant stirring for about 2 hours, the pH of the solution was adjusted to about neutral. 1.125 mmol LaCl₃·7H₂O and 0.125 mmol EuCl₃·6H₂O was added, and the solution was allowed to stir for another 2 hours. Finally, 1.4 mL 1M NaH₂PO₄ was added dropwise. And the mixture was allowed to age for 2 hours.

Fe₃O₄@SC[6]-LaPO₄:Ce³⁺:Tb³⁺ was prepared in a similar way except 0.5 mmol LaCl₃·7H₂O, 0.56 mmol CeCl₃·7H₂O and 0.19 mmol TbCl₃·6H₂O was added.

Products was separated with a magnet and purified by several washes using deionised water and re-dispersed in degassed water.

Characterisation: Transmission electron microscopy images were obtained using TEM Jeol 3000F operated at 300 kV. So were high-resolution transmission electron microscopy (HRTEM) images, energy filtered transmission electron microscopy (EFTEM) images and electron energy loss spectrum (EELS). Selected area electron diffraction patterns (SAED) were obtained using TEM Jeol 2100 operated at 200 kV.

The FTIR and fluorescence spectra were measured on FTIR-Perkin Elmer and Varian Spectrofluorometer respectively.

Magnetic susceptibility measurements were performed on lyophilized samples using a magnetometer (Quantum Design MPMS-XL-5) equipped with a SQUID sensor.

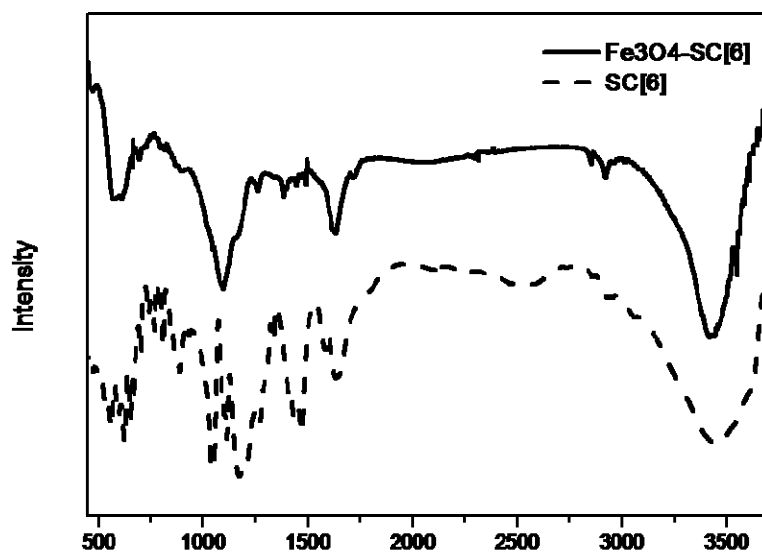


Fig. SI1 FTIR spectra of SC[6] and Fe₃O₄@SC[6]-LaPO₄:Ce³⁺:Tb³⁺

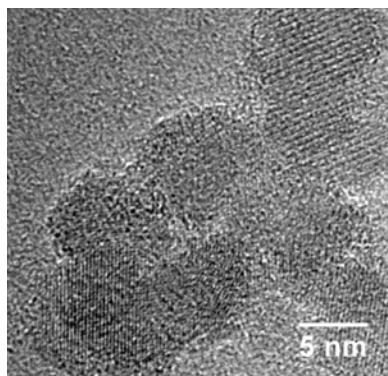


Fig. SI2 High resolution TEM image of Fe₃O₄@SC[6]

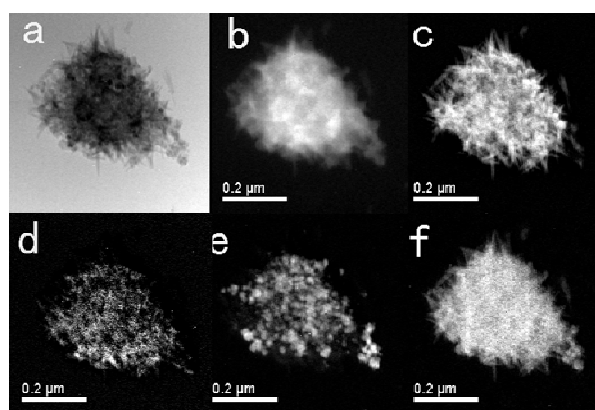


Fig. SI3 EFTEM images of a Fe₃O₄@SC[6]-LaPO₄:Eu³⁺ nanocomposite, (a): unfiltered image, (b): thickness map, (c): lanthanum map, (d): europium map (e): oxygen map and (f): iron map.

S. Shinkai, S. Mori, H. Koreishi, T. Tsubaki, O. Manabe, *J. Am. Chem. Soc.* 1986, **108**, 2409-2416.