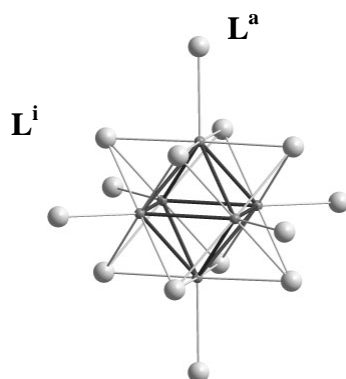
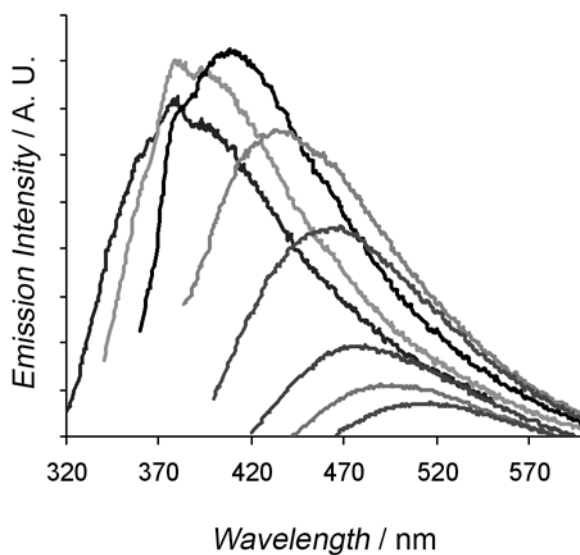


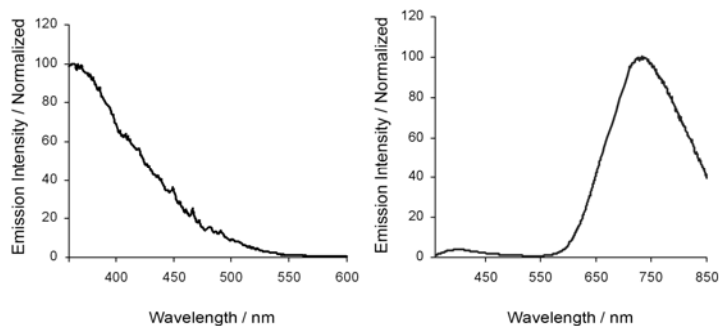
## Supplementary Information



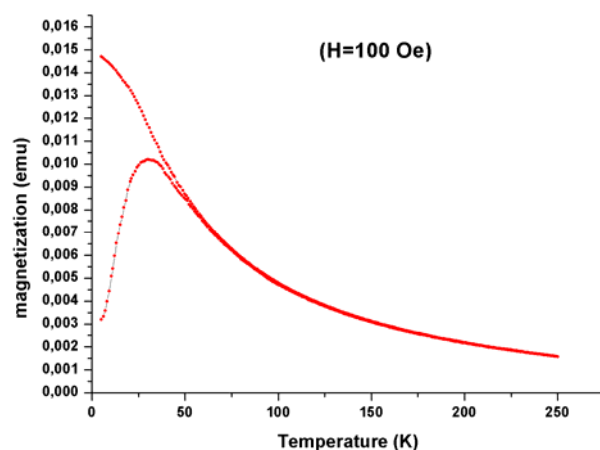
**S1:** Representation of the  $\text{Mo}_6\text{L}_8\text{L}^{\text{a}}_6$  units.



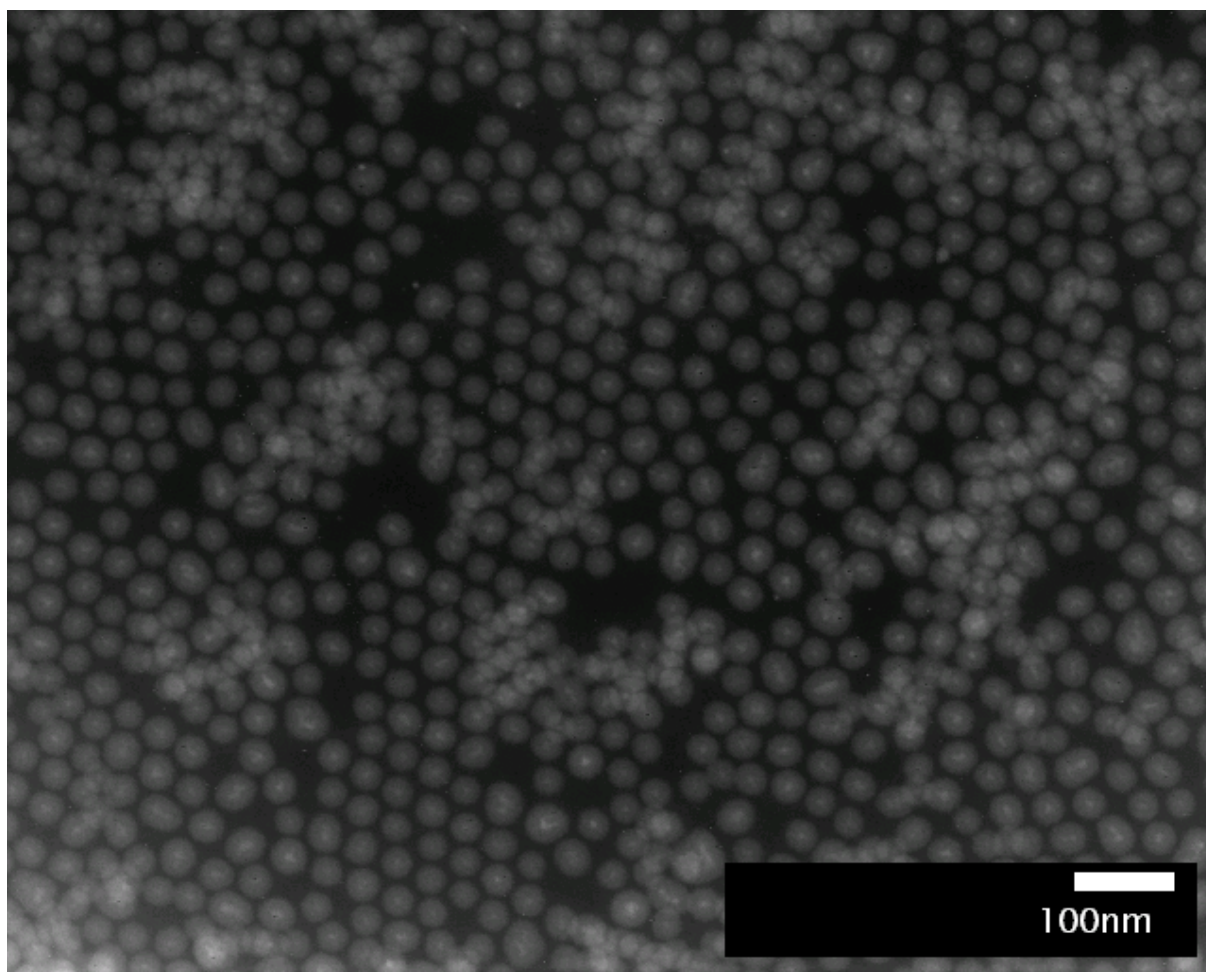
**S2:** Luminescence spectra of hollow silica nanoparticles. From left to right:  $\lambda_{\text{exc}} = 300$  nm, 320 nm, 340 nm, 360 nm, 380 nm, 400 nm, 420 nm, 440 nm.



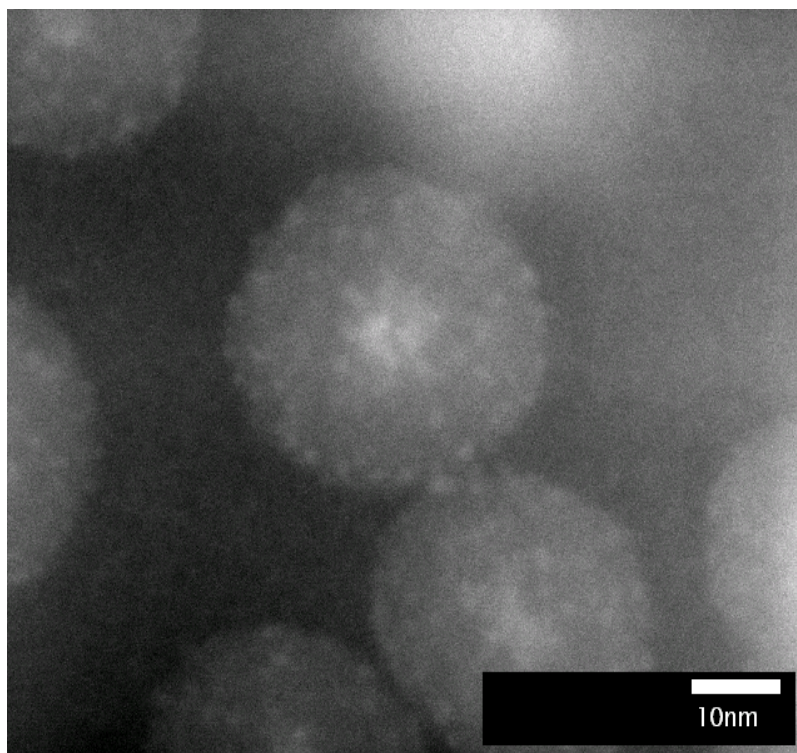
**S3:** Solid state excitation spectrum (a) ( $\lambda_{\text{obs}} = 680$  nm) and emission spectrum (b) ( $\lambda_{\text{exc}} = 340$  nm) of  $\text{Cs}_2\text{Mo}_6\text{Br}_{14} \cdot \gamma\text{Fe}_2\text{O}_3 @ \text{SiO}_2$ .



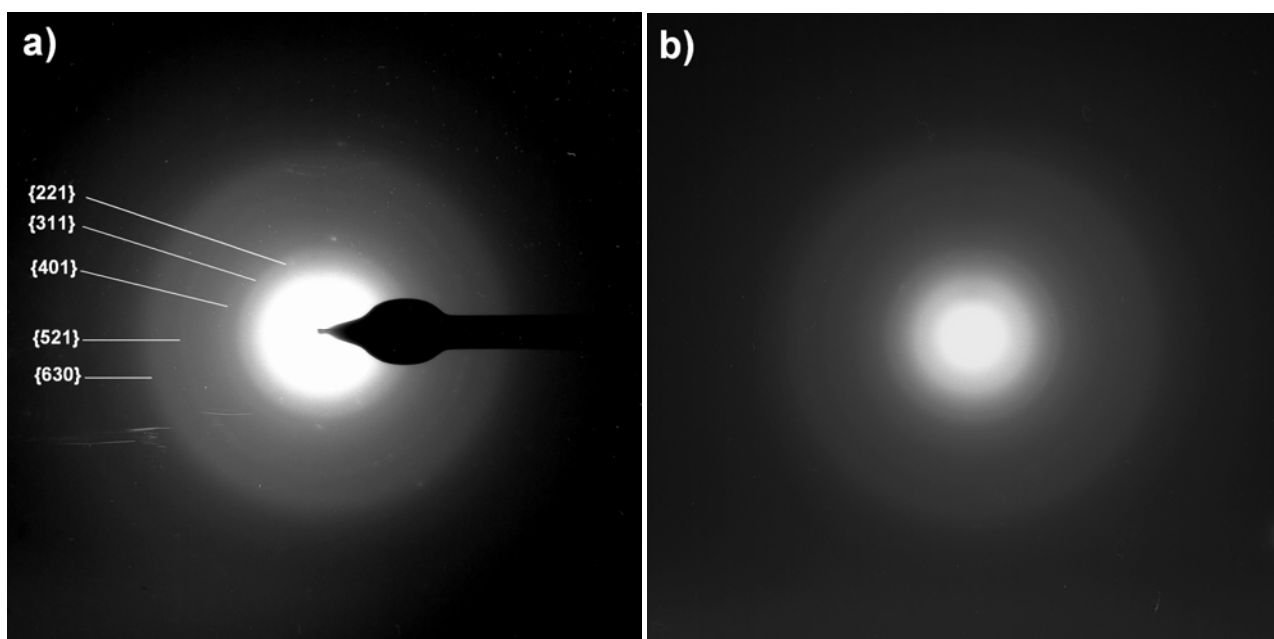
**S4:** Magnetization curves of  $\gamma\text{-Fe}_2\text{O}_3\text{-Cs}_2\text{Mo}_6\text{Br}_{14}@\text{SiO}_2$ . Magnetic characterization was performed using a superconducting quantum interference device (SQUID). Zero-field-cooled (ZFC) and field-cooled (FC) magnetization curves were obtained under an applied field of 100 Oe from 5 K to 250 K.



**S5:** Figure 2a at a larger scale.



**S5:** Figure 2b at a larger scale.



**S6:** Electron diffraction patterns with two different illumination conditions in order to visualize outer diffraction rings (a) and inner diffraction rings (b). Indexation is in agreement with  $\gamma\text{-Fe}_2\text{O}_3$  structure.