Supporting information

Synthesis and magnetic properties of samarium hydroxide nanocrystals

Xusheng Zheng,[a] Li Song,[a] Shoujie Liu,[a] Tiandou Hu,[b] Jiafu Chen,[c] Xing Chen,[a] Augusto Marcelli,[a,d] Muhammad Farooq Saleem,[a] Wangsheng Chu,[*a,b] and Ziyu Wu[*a,b]

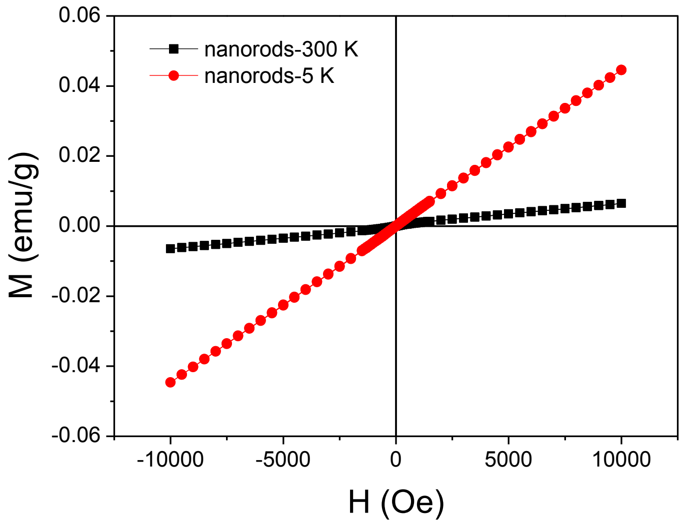
[a]*National Synchrotron Radiation Laboratory, University of Science and Technology of China, Hefei, 230029, China.*

E-mail: chuws@ustc.edu.cn; wuzy@ustc.edu.cn; Fax: +86 5513602017; Tel: +86 5513602017

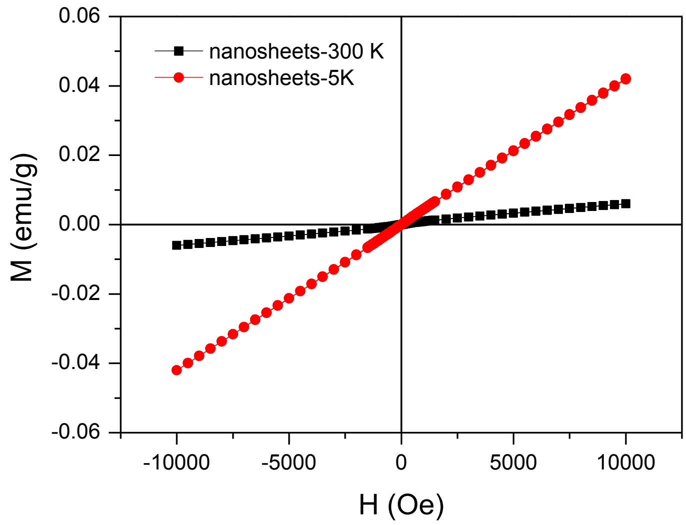
[b]*Beijing Synchrotron Radiation Facility, Institute of High Energy Physics, Beijing, 100049, China*

[c]*Hefei National Laboratory for Physical Science at the Microscale, University of Science and Technology of China, Hefei, 230026, China*

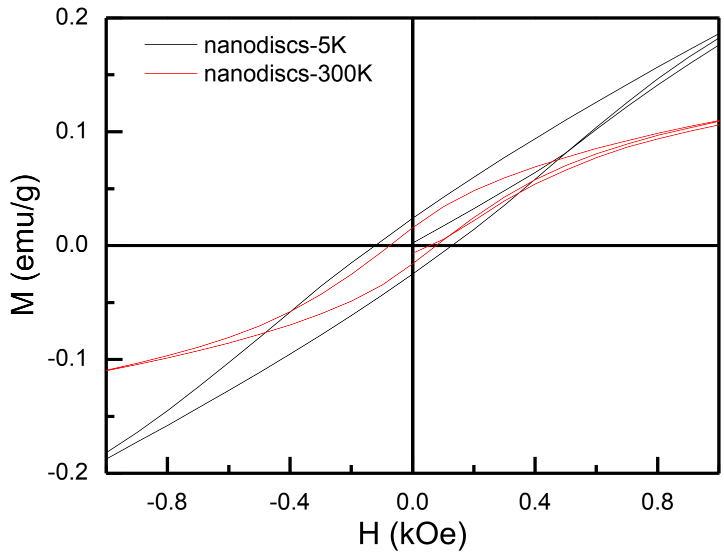
[d]*Istituto Nazionale di Fisica Nucleare, Laboratori Nazionali di Frascati, P.O. Box 13, 00044, Frascati, Italy*



Supplementary Figure 1. Field dependent magnetization of $Sm(OH)_3$ nanorods



Supplementary Figure 2. Field dependent magnetization of $Sm(OH)_3$ nanosheets



Supplementary Figure 3. Magnified magnetization curve of $Sm(OH)_3$ nanodiscs near zero field

Subtraction method of the paramagnetic contribution:

The magnetization curve contains two contributions: the paramagnetic and the ferromagnetic. Paramagnetic characteristic is linearly proportional to the external magnetic field, while the ferromagnetic contribution saturates at high field. The signal at high field mainly shows a paramagnetic character. In order to obtain the ferromagnetic contribution, we first fit the linear signal at high field. Then we shifted the fitted line to pass through the origin of the axes. The shifted line is the paramagnetic signal of the sample. Removing the paramagnetic contribution, the remaining can be considered as ferromagnetic contribution as shown in the insets of fig. 4 and in the fig.s 1 and 2 of the supplementary information.