This journal is (c) The Royal Society of Chemistry 2010

Supporting Information

"Transparent Gd_2O_3:Eu phosphor layer derived from exfoliated layered gadolinium hydroxide nanosheets"

Kyung-Hee Lee, Byung-Il Lee, Ji-Ho You and Song-Ho Byeon*

Department of Applied Chemistry, College of Applied Science, Kyung Hee University, Gyeonggi-do 446-701, Korea.

e-mail: shbyun@khu.ac.kr (S.-H. B.)

Chem. Commun.

Synthesis of $Gd_2(OH)_5NO_3 \cdot nH_2O$ (LGdH-NO_3) and $Gd_{1.90}Eu_{0.10}(OH)_5NO_3 \cdot nH_2O$ (LGdH:Eu)

$Gd_2(OH)_5NO_3 \cdot nH_2O$ and $Gd_{1.90}Eu_{0.10}(OH)_5NO_3 \cdot nH_2O$ were synthesized according to the previous report.[1] Typically, stoichiometric amounts of Gd_2O_3 and Eu_2O_3 was dissolved in a small amount of 10 % HNO_3 solution. After clear solution was formed by uniform stirring, aqueous KOH (10 %) solution was dropwise added until the pH of solution was adjusted to ~ 6.9 at room temperature. The resulting colloidal mixture was put into a Teflon-lined stainless steel autoclave and then maintained at 150 – 170 °C for 12 h. After the reaction was completed, the solid product was collected by filtration, washed with deionized water, and dried at 40 °C for a day. The Eu content in the obtained product was determined to be 0.098 ± 0.003 per formula unit by ICP analysis. Such a value was in agreement with the nominal composition, $Gd_{1.90}Eu_{0.10}(OH)_5NO_3 \cdot H_2O$.

Characterizations

The powder X-ray diffraction patterns were recorded on a rotating anode installed diffractometer (MacScience Model M18XHF). The Cu Kα radiation used was monochromated by a curved-crystal graphite. Field emission scanning electron microscopy (FE-SEM) was carried out with a Carl Zeiss LEO SUPRA 55 electron microscope operating at 30 kV. Transmission electron microscopy (TEM) and selected area electron diffraction (SAED) observations were made with a JEOL JEM-2100F electron microscope operating at 300 kV. Atomic force microscopy (AFM) was carried out by using Pucostation STD. The photoluminescence spectra were measured at room temperature using FP-6600 spectrophotometer (JASCO) with a Xenon flash lamp.

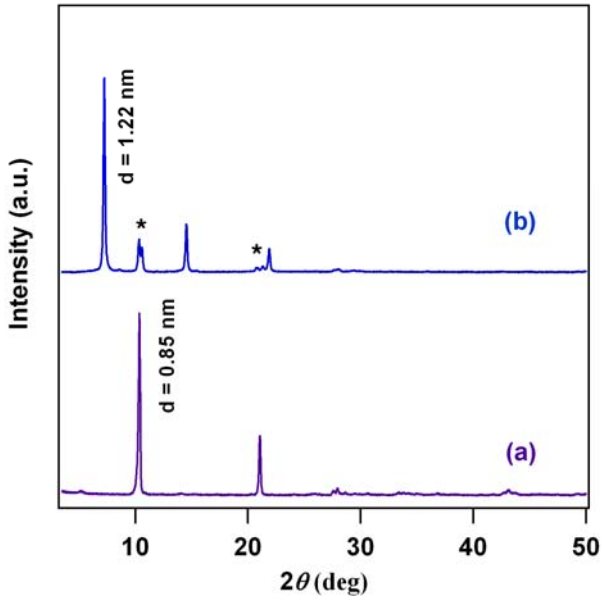

Fig. S1. XRD patterns of (a) pristine $Gd_2(OH)_5NO_3{\cdot}nH_2O$ and (b) formamide intercalated $Gd_2(OH)_5NO_3{\cdot}nH_2O$. The diffraction peaks marked by * correspond to (002) and (004) diffractions of $Gd_2(OH)_5NO_3{\cdot}nH_2O$ host.

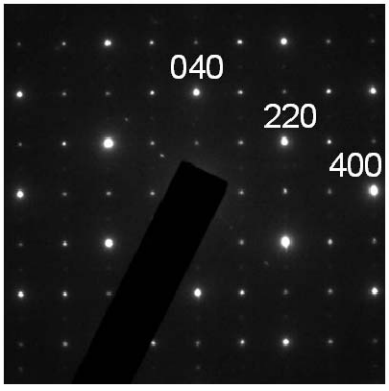

Fig. S2. . SAED patterns of $Gd_2(OH)_5NO_3{\cdot}nH_2O$ before exfoliation.

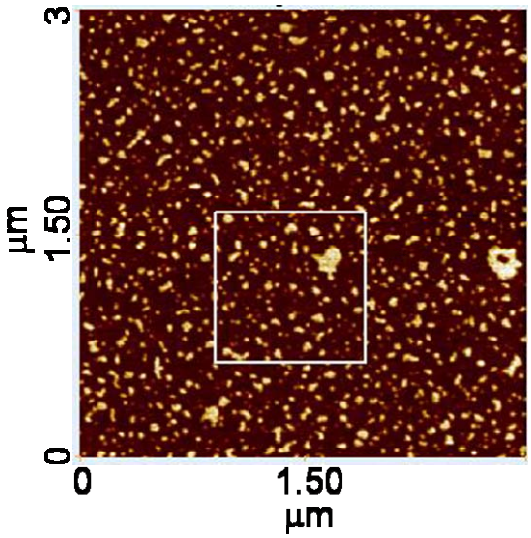

Fig. S3. Large scanning area AFM image of LGdH nanosheets deposited on a mica. The area marked by white square line is enlarged in the text.

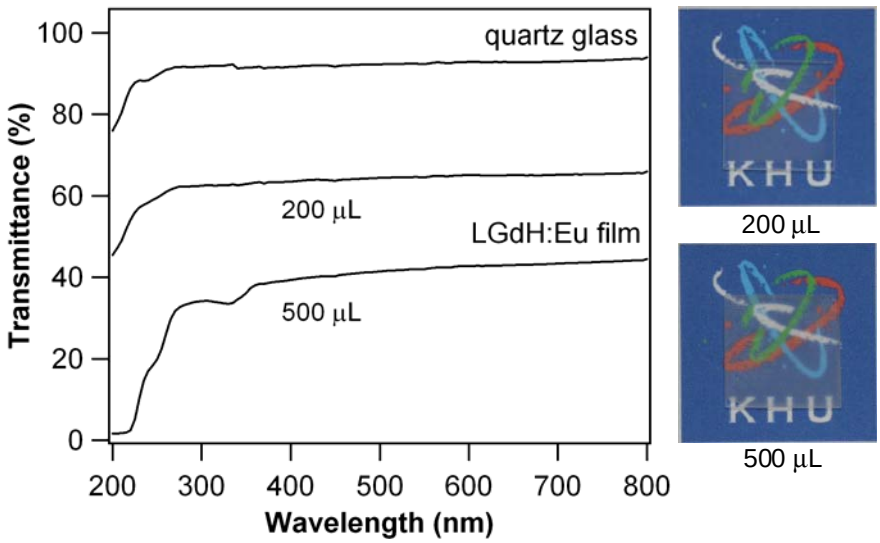

Fig. S4. Transmission spectra and photographs under day light of LGdH films deposited on the quartz glass.

References for Supporting Information

1. K.-H. Lee and S.-H. Byeon, *Eur. J. Inorg. Chem.*, 2009, 929.