Supplementary Material (ESI) for Journal of Materials Chemistry

Supplementary Information for

Nanometer-thin layered hydroxide platelets of $(Y_{0.95}Eu_{0.05})_2(OH)_5NO_3{\cdot}xH_2O$: exfoliation-free synthesis, self-assembly, and the derivation of dense oriented oxide films of high transparency and greatly enhanced luminescence

Qi Zhu,[a,b] Ji-Guang Li,*[a,b] Chunyi Zhi,[c] Renzhi Ma,[c] Takayoshi Sasaki,[c] Jianxun Xu,[c] Canhua Liu,[c] Xiaodong Li,[a] Xudong Sun,[a] and Yoshio Sakka[d]

[a]*Key Laboratory for Anisotropy and Texture of Materials (Ministry of Education), School of Materials and Metallurgy, Northeastern University, Shenyang, Liaoning 110004, China*
[b]*Nano Ceramics Center, National Institute for Materials Science, Namiki 1-1, Tsukuba, Ibaraki 305-0044, Japan*
[c]*World Premier International Center for Materials Nanoarchitectonics (MANA), National Institute for Materials Science, Namiki 1-1, Tsukuba, Ibaraki 305-0044, Japan*
[d]*Nano Ceramics Center, and World Premier International Center for Materials Nanoarchitectonics (MANA),National Institute for Materials Science, Sengen 1-2-1, Tsukuba, Ibaraki 305-0047, Japan*

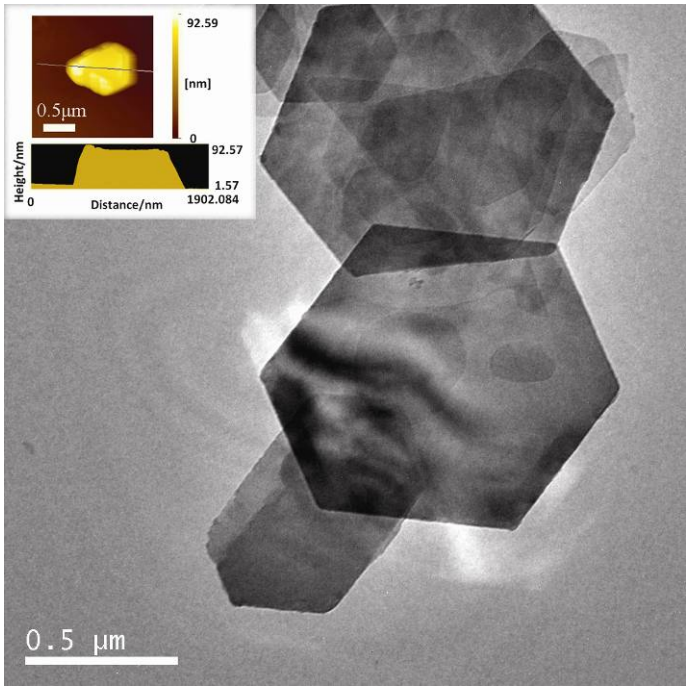

Fig. S1. TEM micrograph showing morphologies of the $(Y_{0.95}Eu_{0.05})_2(OH)_5NO_3{\cdot}xH_2O$ nanoplates synthesized with ammonium hydroxide as the precipitant. Insets are the AFM micrograph and the corresponding height profile. It is clearly seen that, under identical synthetic conditions, the nanoplates precipitated with ammonia water are significantly larger than those synthesized with tetrabutylammonium hydroxide.

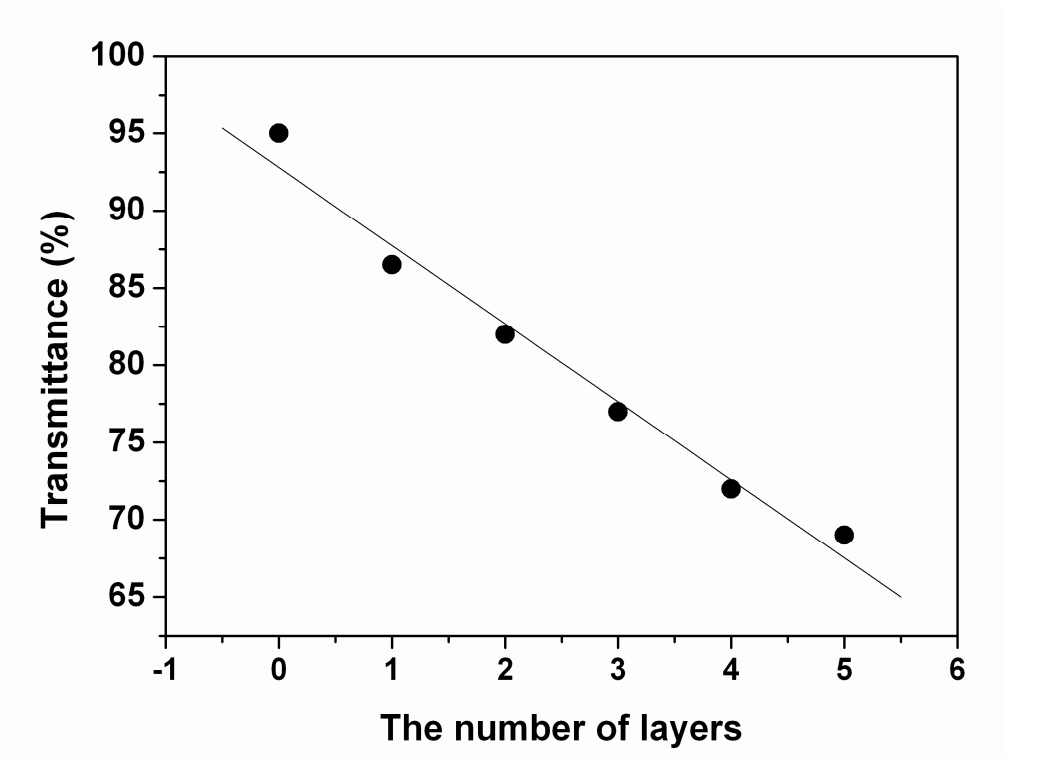

Fig. S2. Correlation of the transmittance of the $(Y_{0.95}Eu_{0.05})_2O_3$ films (calcined at 600 ^oC for 4 h, monitored at 613-nm) with the number of deposited layers.

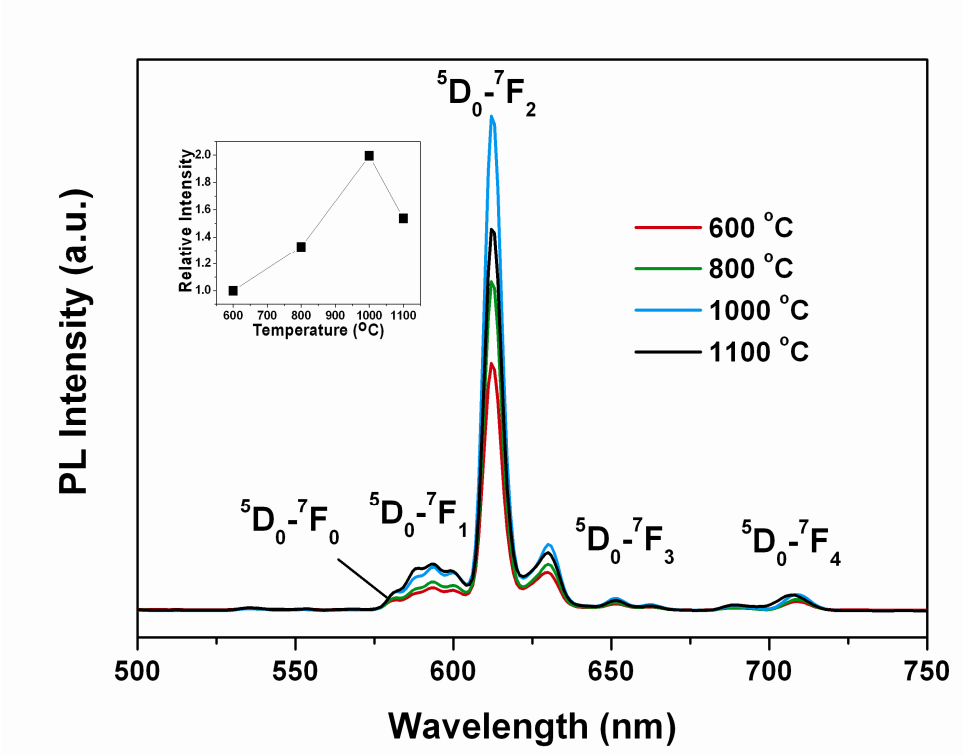

Fig. S3. Photoluminescence (PL) spectra of the five-layer $(Y_{0.95}Eu_{0.05})_2O_3$ film, as a function of the calcination temperature. The PL spectra are measured under 238-nm excitation. Inset is the temperature-dependent relative intensity of the 613-nm emission, where the relative intensities were obtained by normalizing the observed 613-nm PL intensities to that of the sample calcined at 600 ^oC.

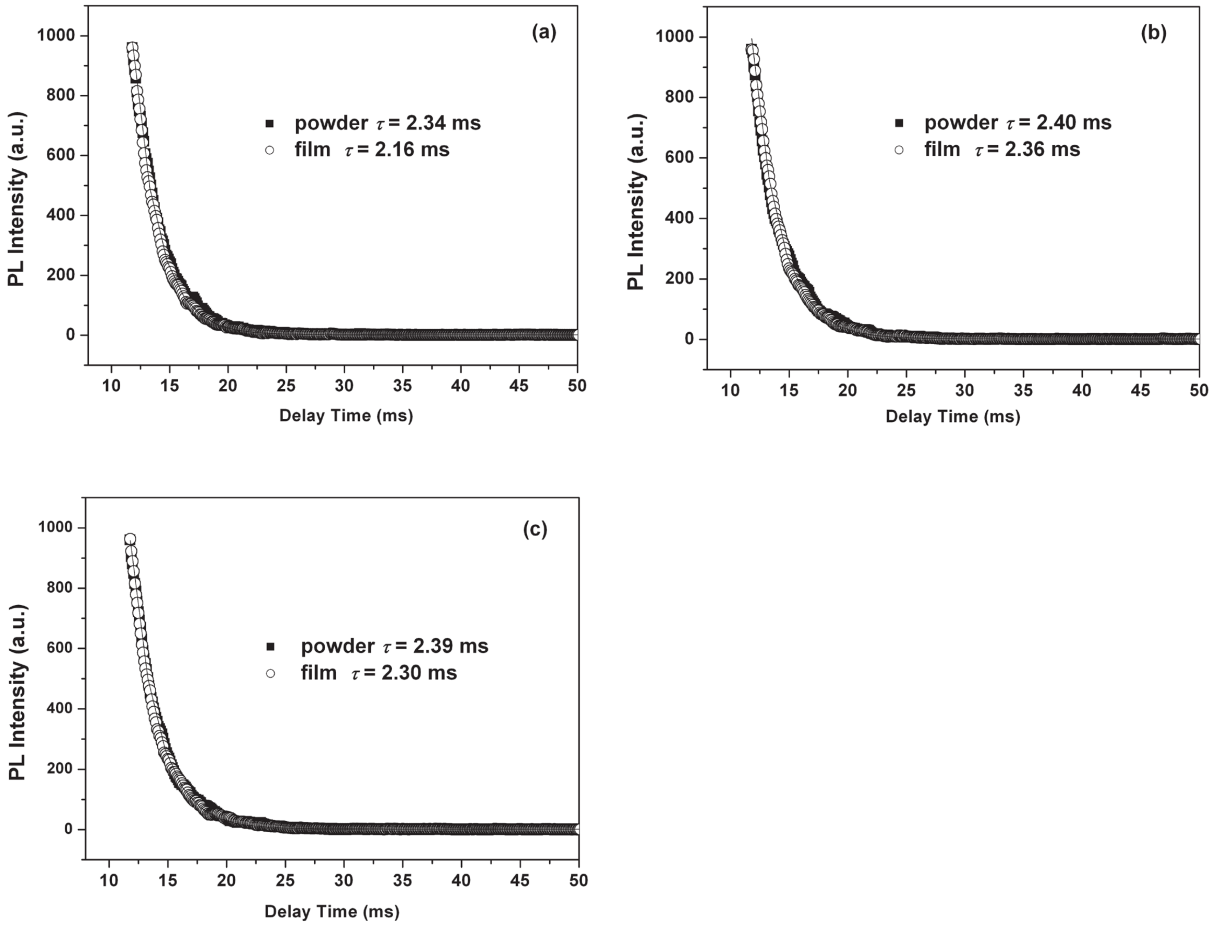

Fig. S4. Fluorescence decay curves for the 613-nm emission of the $(Y_{0.95}Eu_{0.05})_2O_3$ powder and film calcined at 800 °C (a), 1000 °C (b), and 1100 °C (c). The measurements are conducted under 253-nm and 238-nm excitations for the powder and film, respectively.The scattered data points and the solid lines are the experimental and fitting results, respectively.