

Supporting Information for (Dual-Emitting Nanocomposites Derived from Rare-Earth Compound Nanotubes for Ratiometric Fluorescence Sensing Applications)

Tian-Ying Sun,^a Da-Quan Zhang,^a Xue-Feng Yu,^{a,b*} Yang Xiang,^a Min Luo,^a Jia-Hong Wang,^a Guo-Long Tan,^c
Qu-Quan Wang,^a Paul K. Chu^{b*}

[*] ^a Department of Physics, Key Laboratory of Artificial Micro- and Nano-structures of Ministry
of Education, Wuhan University, Wuhan, 430072, P. R. China

^b Department of Physics and Materials Science, City University of Hong Kong, Tat Chee Avenue,
Kowloon, Hong Kong, China

^c Institute of New Materials, Wuhan University of Technology, Wuhan 430070, P. R. China

[**] T.-Y. Sun and D.-Q. Zhang contributed equally to this work.

*Address correspondence to yxf@whu.edu.cn (X.-F. Yu); paul.chu@cityu.edu.hk (P.K. Chu).

1. Empirical Formula of YHF:Ce NTs.

The empirical formula of the $(Y_{0.69}Ce_{0.31})(OH)_{1.682}F_{1.318}$ (YHF:Ce) NTs was investigated by using TG and EA measurements (see Figure S1). The TGA were taken or monitored continuously in a thermal process from 20 °C to 1000 °C with a heating rate of 10 °C min⁻¹ in a flow of N₂. The TG curve obviously indicated that there was no mass loss below 150 °C, corresponding to the inexistence of the bound water. And two weight losses characteristic of the compounds have been observed. The YHF:Ce NTs lost H₂O in the first stage (300 °C–505 °C) to form oxyfluorides. The subsequent weight loss in the temperature range of 700 °C–1000 °C resulted from the decomposition to Y₂O₃. The EA results of the YHF:31%Ce NTs are shown in Figure S1b. The founded element percentages of Y, Ce, F, H, O corresponded well with the calculated element percentages for $(Y_{0.69}Ce_{0.31})(OH)_{1.682}F_{1.318}$ NTs. The TGA and EA results demonstrated that the empirical formula of the YHF:31%Ce NTs could be estimated to be $(Y_{0.69}Ce_{0.31})(OH)_{1.682}F_{1.318}$.

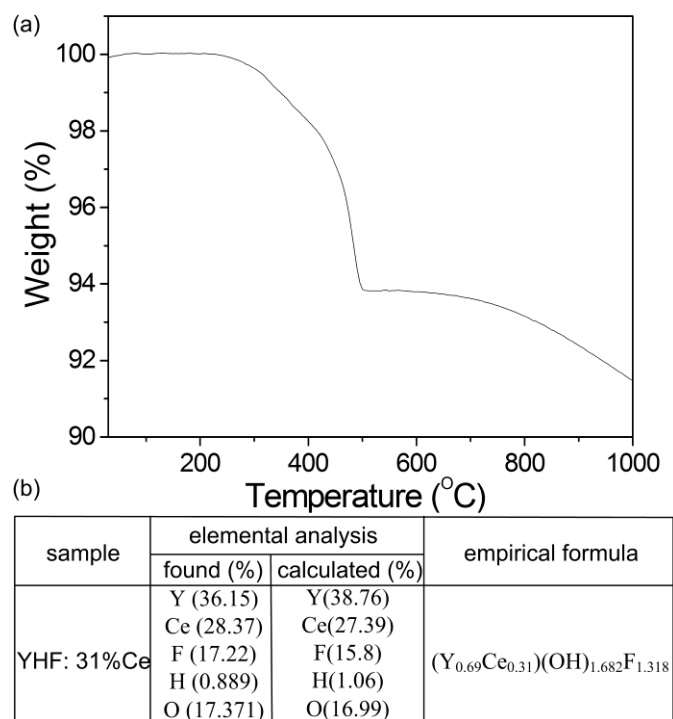


Figure S1. (a) TG curve of YHF: 31%Ce NTs and (b) EA results of YHF: 31%Ce NTs.

2. Europium-doped yttrium hydroxide fluoride NTs (YHF:Eu NTs).

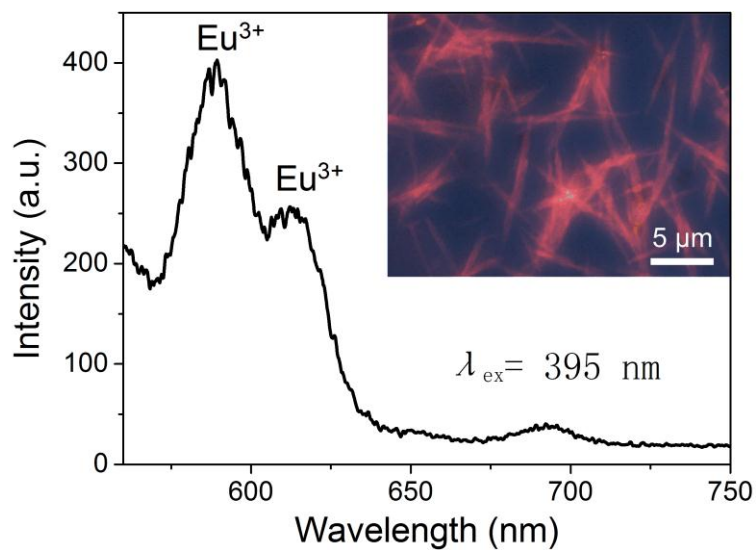


Figure S2. Emission spectra ($\lambda_{ex} = 395$ nm) of YHF:Eu NTs. Inset image shows the microscopy fluorescence images of YHF:Eu NTs.