

# pH Dependence of the Photoluminescence of $\text{Eu}^{3+}$ -Intercalated Layered Titanium Oxide

大学院自然科学研究科 助教 伊田進太郎  
" 前期課程 緒方盟子  
" 教授 松本泰道

## Abstract:

We investigated the pH dependence of  $\text{Eu}^{3+}$  emissions from  $\text{Eu}^{3+}$ -intercalated layered titanium oxide ( $\text{Eu}/\text{TiO}$ ) and evaluated the local structure of the intercalated  $\text{Eu}^{3+}$  at varying pH values using lifetime measurements and EXAFS. A red  $\text{Eu}^{3+}$  emission was observed under radiation by UV light with a higher energy than the band gap of the host  $\text{TiO}_x$  layer. The emission is based on energy transfer from the host  $\text{TiO}_x$  layer to  $\text{Eu}^{3+}$ . The emission intensity of  $\text{Eu}/\text{TiO}$  in 0.01 M NaOH aqueous solution was stronger than that in 0.01 M HCl aqueous solution, and the emission response of the  $\text{Eu}/\text{TiO}$  film was relatively stable to pH cycling. Two phenomena may provide a mechanism for the change in emission from  $\text{Eu}/\text{TiO}$ . One is a change in the efficiency of energy transfer from the  $\text{TiO}_x$  nanosheet to  $\text{Eu}^{3+}$ , and the other is a fine hydration state change of  $\text{Eu}^{3+}$  without a change in the total water amount.

(Journal of Physical Chemistry C, Vol. 113, No. 5, p. 1896-1900, 2009)