

10TH ANNUAL
CHEMISTRY & MASS SPECTROMETRY CONGRESS
OCTOBER 18-19, 2017 OSAKA, JAPAN

Sensitized NIR luminescence of lanthanide(III) (Ln=Pr, Nd, Ho, Er, Tm) complexes with mixed Schiff base and ligand

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Recently, active research and development of rare earth materials has been ongoing for applications in high-technology products. Rare earth materials is variety of advantage properties, such as highly efficient luminescence from visible to Near Infrared (NIR), strong magnetic susceptibility and thermal conductivity. Among the trivalent lanthanides, Pr, Nd, Ho, Er and Tm ions emit NIR luminescence. However, the luminescence are associated with $f \rightarrow f$ electronic transitions, forbidden by electric dipole moment but weakly allowed by induced crystal-field potential. Previously, to overcome this problem, we introduced a Schiff base (L=N,N'-bis(salicylidene)-3,6-dioxa-1,8-diaminooctanato) as a sensitizer to Eu (III) complex system. In this study, the synthesis and characterization of four Ln (III) complexes with mixed Schiff base (L) as a main ligand and 1, 10-phenanthroline (phen) as an auxiliary ligand. The Ln (III) complexes excited at near-UV light produced in sensitized NIR luminescence via the energy transfer from L to the Ln (III) ions. Based on the observed photo-physical properties of the Ln (III) complexes and the reported energy-levels of the free Ln (III) ions, we proposed the resonance energy-transfer pathway of the sensitized NIR luminescence.

Biography

Minkyu Park has completed his Master's degree in Chemistry from Yeungnam University, Republic of Korea.

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