

Synthesis and Photophysical Properties of a Eu(III) Coordination Polymer with Asymmetric Linker

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Lanthanide complexes exhibit narrow emission bands based on the 4f orbital. We have reported that lanthanide coordination polymers linked with bridging ligands show characteristic thermo-stability and thermo-sensing luminescence.^{1,2} In our previous studies, symmetric bridging ligands were attached in lanthanide coordination polymer.¹⁻⁴ Asymmetric linker ligand in Eu(III) coordination polymer is expected to promote the electronic unbalanced in Eu(III) luminescent centers. Here, we report on synthesis, steric structure and photophysical properties of a novel Eu(III) coordination polymer with asymmetric linker ligand (asym-DPPEO) (Fig. 1).

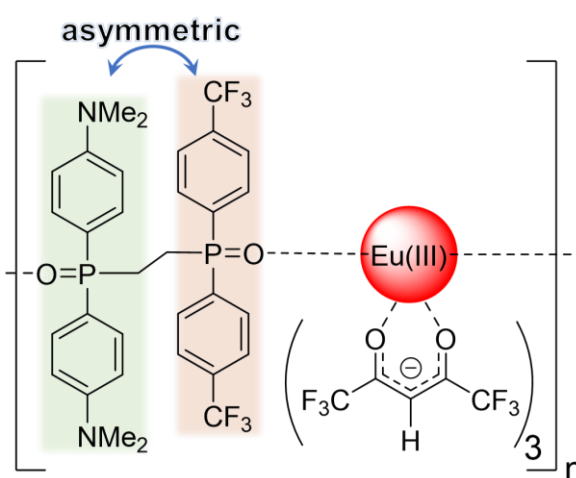


Fig. 1 Eu(III) coordination polymer with asymmetric linker ligand

$[\text{Eu}(\text{hfa})_3(\text{asym-DPPEO})]_n$ was synthesized by the chelation of $\text{Eu}(\text{hfa})_3(\text{H}_2\text{O})_2$ (hfa:hexafluoroacetylacetonate) with asym-DPPEO in methanol. The emission quantum yield of 4f-4f transition (Φ_{Ln}) and photosensitized energy transfer efficiency (η_{sens}) at room temperature were estimated to be 60 % and 3.2 %, respectively. The temperature-depended luminescence was also analyzed by the emission lifetime measurements and TD-DFT calculations. In this study, thermosensitive luminescent properties of asymmetric Eu(III) coordination polymer are demonstrated.

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