

Title of the Thesis: **Syntheses, Characterization, and Stimuli-Responsive Luminescence Behaviors of Ternary Lanthanide(III) Tris-(β -diketonate) Complexes Based on Terpyridyl-Imidazole Ligands**

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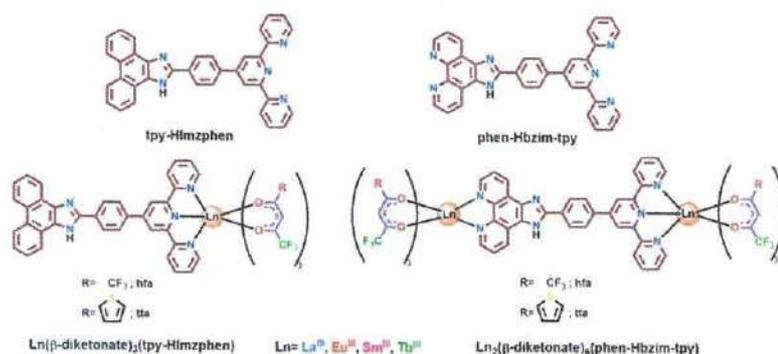
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Abstract

This thesis encompasses the design and syntheses of four different series of mono- and homobimetallic ternary lanthanide(III) tris-(β -diketonate) complexes based on two terpyridyl-imidazole ligands. All the synthesized complexes were thoroughly characterized by standard analytical tools and spectroscopic techniques, including single crystal X-ray diffraction analysis for representative complexes. The photophysical properties of the newly synthesized complexes were extensively explored via absorption, and both steady-state and time-resolved emission spectroscopic measurements. In conjunction with experimental demonstration, theoretical calculations of representative ligand were executed for the appropriate assignment of the spectral bands. Detailed investigations were made to comprehend the influence of excited states of the ligands on the luminescence behaviors of the resulting complexes. Emphasis has been given on the investigation of stimuli-responsive luminescence behaviors of the complexes upon the introduction of various stimuli like temperature, solvent and excitation wavelength. The stimuli-responsive luminescence spectral responses were utilized to generate various emitting colors, which could be instrumental for the fabrication of various display devices. Some of the designed complexes also function as efficient sensors of temperature, which in turn could be employed in molecular luminescence thermometry.



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