

2种稀土Eu³⁺, Tb³⁺ 配合物的合成与其光致发光性质

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Synthesis and Photoluminescence Properties of Two Organic Europium (III) and Terbium (III) Complexes

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摘要 设计合成新的三齿有机配体4-(4'-咪唑-9基-丁基氧)-吡啶-2,6-二甲酸(H₂CBODPA), 并以此为配体合成配合物Na₃Eu(CBODPA)₃和Na₃Tb(CBODPA)₃. 通过对有机配体分子结构的调控, 稀土Eu³⁺和Tb³⁺有机配合物的激发波长明显地向长波长方向移动, 与吡啶-2,6-二甲酸配合物的激发波长相比, 其有效激发波长向长波长方向移动约70 nm. Na₃Eu(CBODPA)₃和Na₃Tb(CBODPA)₃在近紫外光(350 nm)的激发下, 分别得到较强的特征红色发光(Eu³⁺)和特征绿色发光(Tb³⁺). 研究结果对合成长波长激发的稀土有机发光探针提供理论依据和应用参考价值.

关键词: 稀土Eu³⁺配合物 稀土Tb³⁺配合物 光致发光 长波长激发

Abstract: A new tridentate organic ligand, 4-(4-carbazol-9-yl-butoxy)-pyridine-2,6-dicarboxylic acid (H₂CBODPA), has been designed and synthesized. The corresponding europium and terbium complexes, Na₃Eu(CBODPA)₃ and Na₃Tb(CBODPA)₃, have also been synthesized. The effective excitation wavelengths of the two complexes shifted significantly to longer wavelengths by configuration of the organic ligand's structure, the effective excitation wavelengths shifted about 70 nm to longer wavelengths compared with those of the europium and terbium complexes with pyridine-2,6-dicarboxy acid as a ligand. Characteristic red emissions of europium ions and green emissions of terbium ions were obtained from dilute Na₃Eu(CBODPA)₃ and Na₃Tb(CBODPA)₃ solutions under near ultraviolet radiations at around 350 nm. The results may provide a theoretical basis to the design and synthesis of organic rare earth luminescent bioprobes with longer excitation wavelengths.

Keywords: rare earth europium complex, rare earth terbium complex, photoluminescence, longer excitation wavelength

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
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