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论文

吡啶-2,6-二甲酸衍生物及其Tb(Ⅲ)和Eu(Ⅲ)配合物的合成与荧光性质

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摘要:

以吡啶-2,6-二甲酸(DPA)为起始物,合成了4-羟甲基吡啶-2,6-二甲酸(4-HMDPA)和4-(N,N-二羧甲基氨基)亚甲基吡啶-2,6-二甲酸(4-BMDPA)两种新型多功能配体,并制备了DPA,4-HMDPA及4-BMDPA的Tb(Ⅲ)和Eu(Ⅲ)配合物,对配合物的固体和溶液态的荧光性质进行了研究. 结果表明,在吡啶4位引入弱吸电子基团4-羟甲基会减弱稀土配合物的荧光强度; 在水溶液中稀土配合物与溶液的pH值有着密切的关联,中性水溶液中荧光强度较大; 分子偶极矩较小的溶剂中稀土配合物荧光强度较强. 表明4-BMDPA是较理想的稀土荧光敏化剂.

关键词: 吡啶-2,6-二甲酸; 荧光性质; 稀土配合物

Synthesis of Eu(Ⅲ) and Tb(Ⅲ) Complexes with Novel Pyridine-2,6-Dicarboxylic Acid Derivatives and Their Fluorescence Properties

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Abstract:

Starting from pyridine-2,6-dicarboxylicacid(DPA),a series of novel pyridine-2,6-dicarboxylic acid derivatives were synthesized. In these compounds,4-(hydroxymethyl)pyridine-2,6-dicarboxylate(4-HMDPA) and 4-{［bis(carboxymethyl)amino］ methyl}pyridine-2,6-dicarboxylate(4-BMDPA) were used as multifunctional ligands to coordiate with Tb(Ⅲ) and Eu(Ⅲ) and their complexes were prepared. The fluorescence properties of the solid complexes and their solutions were investigated in detail. The results indicate that the weak election-withdrawing group 4-hydroxymethyl in 4-position of pyridine in 4-HMDPA could weaken the fluorescence intensity of the lanthanide complexes. The contradistinctive experimental results show that the fluorescence intensities of these complexes are related to pH value of the aqueous solution and the dipole moment of solvent molecule: in the neutral aqueous solution,the fluorescence intensities of these complexes were strongest,while the less the dipole moment was,the stronger the fluorescence intensity was. 4-BMDPA is the better sensitizer and may be used as time-resolved fluorommunoassay.

Keywords: Pyridine-2,6-dicarboxylic acid; Fluorescence property; Lanthanide complex

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