



### 发光学应用及交叉前沿

#### 水杨醛甘氨酸席夫碱-含氮杂环稀土配合物的合成及其与DNA作用的光谱研究

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**摘要：**合成了以水杨醛甘氨酸席夫碱(Sal-GlyK)、邻菲罗啉(Phen)和2,2'-联吡啶(Bipy)为配体、Eu<sup>3+</sup>、La<sup>3+</sup>为中心的配合物。对其进行了元素分析和摩尔电导、红外光谱及紫外吸收光谱测定，推测配合物的组成分别为RE(Sal-Gly)(NO<sub>3</sub>)·2H<sub>2</sub>O和RE(Sal-Gly)(Phen)(NO<sub>3</sub>)·H<sub>2</sub>O、RE(Sal-Gly)(Bipy)(NO<sub>3</sub>)·H<sub>2</sub>O(RE<sup>3+</sup>=Eu<sup>3+</sup>, La<sup>3+</sup>)。通过紫外吸收光谱及荧光光谱研究了稀土配合物与小牛胸腺DNA的作用方式及其结合常数。结果表明，本文合成的配合物与DNA的结合能力的顺序为RE(Sal-Gly)(Phen)(NO<sub>3</sub>)·H<sub>2</sub>O>RE(Sal-Gly)(Bipy)(NO<sub>3</sub>)·H<sub>2</sub>O>RE(Sal-Gly)(NO<sub>3</sub>)·2H<sub>2</sub>O。表明配合物是以插入方式与DNA结合，含有良好平面性和较大表面积配体的配合物可以更好地插入到DNA的碱基对中。

**关键词：**稀土配合物 水杨醛甘氨酸席夫碱 小牛胸腺DNA 插入作用

#### Synthesis, Spectral Studies on The Interaction of DNA and Rare Earth with Salicylidene-glycine Schiff and Nitrogen-heterocyclic Complexes

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**Abstract:** A series of novel rare earth complexes were synthesized with salicylidene-glycine schiff base (Sal-GlyK), 1,10-phenanthroline (Phen) and 2,2'-bipyridine (Bipy). The complexes were characterized by elemental analysis, rare earth coordination titration, molar conductivity measurement, IR spectroscopy and UV-Vis absorption spectroscopy. They were confirmed to be RE(Sal-Gly)(NO<sub>3</sub>)·2H<sub>2</sub>O, RE(Sal-Gly)(Phen)(NO<sub>3</sub>)·H<sub>2</sub>O and RE(Sal-Gly)(Bipy)(NO<sub>3</sub>)·H<sub>2</sub>O (RE<sup>3+</sup>=Eu<sup>3+</sup>, La<sup>3+</sup>) as the results of those measurement. The interaction between the rare earth complexes and calf thymus DNA (CT-DNA) was investigated by UV-Vis spectrophotometry and fluorescence spectroscopy. Red shift and hypochromicity of the absorption peak from UV spectra of the complexes were founded in the presence of DNA, and fluorescence quench experiment was used to confirm that the complexes can quench the fluorescence of ethidium bromide-DNA (EB-DNA) system. All these results indicate that intercalation model exists between the complexes and DNA, and good planarity and large surface area of the ligand have a positive effect on the intercalative reaction, so the sequence of binding ability of the complexes to DNA is RE(Sal-Gly)(Phen)(NO<sub>3</sub>)·H<sub>2</sub>O>RE(Sal-Gly)(Bipy)(NO<sub>3</sub>)·H<sub>2</sub>O>RE(Sal-Gly)(NO<sub>3</sub>)·2H<sub>2</sub>O.

**Keywords:** rare earth complexes salicylidene-glycine schiff base CT-DNA intercalation model

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