

2,9-二甲基-1,10-菲咯啉的1-缬氨酸衍生物的合成表征及其镧(III)配合物与 DNA作用光谱研究

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摘要 以2,9-二甲基-1,10-菲咯啉为初始原料,合成了1,10-菲咯啉的1-缬氨酸衍生物-----1,10-菲咯啉-2,9-二亚甲基氨基-(2,2'-二异丙基)二乙酸(L)。该配体经过元素分析、红外光谱、

核磁共振氢谱表征。通过电子光谱,研究了La(III)

的配合物与小牛胸腺DNA的相互作用。用溴化乙锭作为荧光探针,还研究了La(III)-

L配合物与小牛胸腺DNA的相互作用的过程。作为对比,也研究了La(III)分别与1,10-菲咯啉(Phen)、1-缬氨酸(Val)

的配合物与小牛胸腺DNA的相互作用。结果表明La(III)-L配合物与小牛胸腺DNA作用既有共价键合,又有插入作用。

关键词 [二氮杂菲P](#) [缬氨酸](#) [镧络合物](#) [脱氧核糖核酸](#) [光谱法](#) [元素分析](#) [红外分光光度法](#)

[质子磁共振谱法](#)

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Synthesis and characterization of l-valine derivative of 2,9- dimethyl-1,10-phenanthroline and DNA-binding spectral study of its lanthanum(III) complex

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Abstract Starting from 2,9-dimethyl-1,10-phenanthroline, its l-valine derivative, 1,10-phenanthroline-2,9-dimethanoimino- (2,2'- diisopropyl)diacetic acid (L) was synthesized and characterized by elemental analysis, IR and ¹H NMR. The protonation constants of L, the stability constants of La(III)-L binary complexes have been determined by pH titration method at (25±0.1)°C, I=0.1mol·L⁻¹ NaNO₃. The interaction of the lanthanum(III) complex with calf-thymus DNA was studied by electronic spectra. Using ethidium bromide as a fluorescence probe, the binding mode of the lanthanum(III) complex with calf-thymus DNA was studied spectroscopically. For comparison, the same measurements were carried out with La(III)-Phen [La(III)-1,10-phenanthroline complex] and La(III)-Val [La(III)-l-valine complex]. the results indicate that the lanthanum(III) complex possibly interacts with calf-thymus DNA by both intercalative and covalent binding.

Key words [PHENANTHROLINE P](#) [VALINE](#) [LANTHANUM COMPLEX](#) [DEOXYRIBONUCLEIC ACID](#) [SPECTROMETRY](#) [ELEMENTAL ANALYSIS](#) [INFRARED SPECTROPHOTOMETRY](#) [PROTON MAGNETIC RESONANCE SPECTROMETRY](#)

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