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Synthesis, structural analysis and DNA interaction of bis[4'-(4-methylphenyl)-2,2':6',2''-terpyridine]Co(III)(NO₃)₃.2H₂O complex

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There has been extensive studies of binding of chiral Ru(II) complexes to DNA backbone structures. J K Barton has studied the cationic coordination of a variety of chiral poly-pyridine Ru(II) complexes to demonstrate chiral discrimination in binding to different forms of DNA. Many experimental techniques have been applied to study the interaction of tris(phenanthroline) ruthenium(II) ([Ru(phen)₃]₂⁺) with DNA, but despite this, its binding mode and its effect on the DNA structure are uncertain and have been the subject of much controversy. In this study, bis[4'-(4-methylphenyl)-2,2':6',2''-terpyridine]Co(III) tris(nitrate) complex was synthesized and characterized using conventional method such as ¹H NMR, ES-MS, UV-vis spectrophotometry. The crystal structure of the complex was also determined. The complex was crystallized in the triclinic space group, P₁ with two well separated complex molecules in the unit cell along with four hydrogen bounded water molecules and six nitrate groups. The Co ion was six coordinated, but the geometry was significantly distorted from that of an ideal octahedral. In this study, the terpyridine type ligand fragment appealed because the ligand structure ensures a meridional arrangement of the donor atoms, which reduces the number of possible isomers. Co(III) ion was attracted because of its higher positive charge compared to Ru(II) which will have more affinity towards the negatively charged DNA structure. Absorbance and fluorescence methods and circular dichroism were used to study the interaction of the Co(III) complex solution in water with DNA.

Biography

Ramin Zibaseresht is a Professor in Chemistry at Maritime University of Imam Khomeini in Noshahr and Adjunct Professor at Aja University of Medical Sciences in Tehran. He has completed his BSc in Chemistry from Shiraz University and his MSc in Inorganic Chemistry from Pune University. He has completed his PhD in Inorganic Chemistry from the University of Canterbury. He is currently the Head of Biomaterials and Medicinal Chemistry Research Centre in Tehran. He has published more than 50 papers in reputed journals and some international conferences and more than 10 books in the area of chemistry and 4 patents. He has been serving as an Editorial Board Member of some peer-reviewed journals, academic book publishers, member of more than 10 academic committees, organizing committees and academic boards of international conferences.

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