Synthesis and structural studies of N - and O - donor complexes of transition and post-transition metal halides

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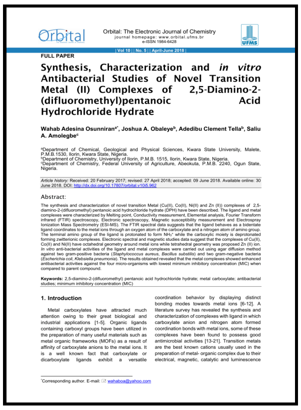
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FULL PAPER

Synthesis, Characterization and *in vitro* Antibacterial Studies of Novel Transition Metal (II) Complexes of 2,5-Diamino-2-(difluoromethyl)pentanoic Acid Hydrochloride Hydrate

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Abstract:

The synthesis and characterization of novel transition Metal (Cu(II), Co(II), Ni(II) and Zn (II)) complexes of 2,5-diamino-2-(difluoromethyl) pentanoic acid hydrochloride hydrate (DPH) have been described. The ligand and metal complexes were characterized by Melting point, Conductivity measurement, Elemental analysis, Fourier Transform infrared (FTIR) spectroscopy, Electronic spectroscopy, Magnetic susceptibility measurement and Electrospray Ionization Mass Spectrometry (ESI-MS). The FTIR spectral data suggests that the ligand behaves as a bidentate ligand coordinates to the metal ions through an oxygen atom of the carboxylate and a nitrogen atom of amino group. The terminal amino group of the ligand is protonated to form NH_3^+ while the carboxylic moiety is deprotonated forming zwitterionic complexes. Electronic spectral and magnetic studies data suggest that the complexes of Cu(II), Co(II) and Ni(II) have octahedral geometry around metal ions while tetrahedral geometry was proposed Zn (II) ion. *In vitro* anti-bacterial activities of the ligand and metal complexes were carried out using agar diffusion method against two gram-positive bacteria (*Staphylococcus aureus*, *Bacillus substilis*) and two gram-negative bacteria (*Escherichia coli*, *Klebsiella pneumonia*). The results obtained revealed that the metal complexes showed enhanced antibacterial activities against the four micro-organisms with lowest minimum inhibitory concentration (MIC) when compared to parent compound.

Keywords: 2,5-diamino-2-(difluoromethyl) pentanoic acid hydrochloride hydrate; metal carboxylate; antibacterial studies; minimum inhibitory concentration (MIC)

1. Introduction

Metal carboxylates have attracted much attention owing to their great biological and industrial applications [1-5]. Organic ligands containing carboxyl groups have been utilized in the preparation of many useful materials such as metal organic frameworks (MOFs) as a result of affinity of carboxylate anions to the metal ions. It is a well known fact that carboxylate or dicarboxylate ligands exhibit a versatile coordination behavior by displaying distinct bonding modes towards metal ions [6-12]. A literature survey has revealed the synthesis and characterization of complexes with ligand in which carboxylate anion and nitrogen atom formed coordination bonds with metal ions, some of these complexes have been found to possess good antimicrobial activities [13-21]. Transition metals are the best known cations usually used in the preparation of metal- organic complex due to their electrical, magnetic, catalytic and luminescence

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Tags: #Low

Effects of rare earth, transition and post transition metal ions on structural and optical properties and photocatalytic activities of zirconia (ZrO2) nanoparticles synthesized via the facile precipitation process

The use of metalorganic precursors instead of conventional halides or hydrides results in a temperature decrease of several hundreds of degrees Celsius temperatures down to 500 °C owing to the lower decomposition temperatures of the former. The former equations provide valuable information about the crystallization process, where the combination of temperature and time i. The equilibrium position of the proton transfer, expressed in terms of the Brønsted acids Ka or p Ka, gives information about both the Brønsted acid and about the conjugate Brønsted and Lewis base.

Macrocyclic ligand design: The interaction of selected transition and post

This raised the possibility of the nanoparticle application as a tool in the neuroscience, and the question of potential mechanisms of nanoparticle turnover in neurons.

Effects of rare earth, transition and post transition metal ions on structural and optical properties and photocatalytic activities of zirconia (ZrO2) nanoparticles synthesized via the facile precipitation process

Using congeneric array interaction logic, some 100 congeneric series, planars and volumes have been identified and are available in electronic form 20. Regular patterns of structure and behaviour are found over both the Li + to Cs + and LiH to CsH series in terms of ionic radius, electronegativity, percentage ionic character, bond length, etc. Pearson recognised that species become harder with increasing oxidation state Fe 3+harder than Fe 2+ and softer down a group Ni 2+is harder than Pd 2+, which is harder than Pt 2+.

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