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ORIGINAL PAPER

Synthesis, Spectral Characterization and Crystal Structures of Dioxidomolybdenum(VI) Complexes Derived from Nicotinoylhydrazones

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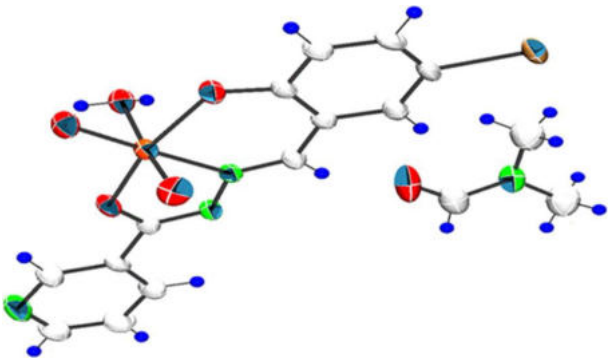
Abstract

Cis-dioxidomolybdenum(VI) complexes $[MoO_2L^1(DMSO)]$ (**1**), $[MoO_2L^2(H_2O)]\cdot DMF$ (**2**) and $[MoO_2L^3(DMF)]$ (**3**) were synthesized by solution based reactions of aroylhydrazones (H_2L^1 = 5-chloro-2-hydroxybenzaldehyde nicotinoylhydrazone, H_2L^2 = 2-hydroxy-5-iodobenzaldehyde nicotinoylhydrazone and H_2L^3 = 3,5-dichloro-2-hydroxybenzaldehyde nicotinoylhydrazone) with bis(acetylacetonato)dioxidomolybdenum(VI) complex, $[MoO_2(acac)_2]$ in presence of DMSO or DMF. The synthesized aroylhydrazones and their molybdenum complexes were characterized by elemental analysis, spectroscopic techniques (FT-IR, UV–Vis, ^{1}H NMR) and conductivity measurements. Finally the three dimensional structures of the complexes were confirmed by single crystal X-ray diffraction studies. Crystal structures of **1, 2** and **3** were solved by direct methods and refined with full-matrix least-squares calculations using the SHELXS97 and SHELXL2014 software programs respectively. Complex **1** got crystallized in monoclinic space group, $P2_1/c$ with Z = 4, whereas complexes **2** and **3** in triclinic space group, $P\bar{1}$ with Z = 2. The ligands, H_2L^{1-3} showed coordination to the metal ion in a dibasic tridentate manner through deprotonated phenolate oxygen, azomethine nitrogen and enolate oxygen.

Graphical Abstract



All the three dioxidomolybdenum(VI) complexes exhibit a distorted octahedral geometry around molybdenum atom. ORTEP plot of $[MoO_2L^2(H_2O)]\cdot DMF$. (Displacement ellipsoids are drawn at 50% probability)

Keywords Aroylhydrazones · Molybdenum complexes · X-ray diffraction studies · Crystal structure · Azomethinenitrogen

Introduction

Aroylhydrazones are significant class of ONO donor ligands which have played an important role in the development of coordination chemistry of molybdenum. Furthermore the study of oxidomolybdenum complexes coordinated with

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