Synthesis of new dithiocarbazate V(V) and Mo(VI) complexes: A crystallography perspective

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ABSTRACT

Metal complexes bearing dithiocarbazates exhibit structures with variety of physical and chemical properties. Among transition and non-transition metals, complexes of molybdenum and vanadium have still retained the attention of coordination inorganic chemists, especially because of the numerous oxidation states. The new complexes [MoO2(sedtc)MeOH] (1) and [VO(sedtc)OCH3,MeOH] (2) (sedtc: S-ethyl-3-(2-hydroxy-phenyl)methylenedithiocarbazate) are crystallized in the space group P2_1/c and P2_1 respectively and characterized by ^1^H-, ^13^C-NMR and IR spectroscopies, mass spectrometry and X-ray diffraction analysis. The X-ray diffraction data show that both complexes have distorted octahedral structure where the sedtc tridentate ONS ligand is coordinated to metallic ion via phenolic oxygen, imine nitrogen, and thioenolate sulfur donor atoms accompanied by an oxido-oxygen atom in 1 or a methoxy fragment in 2 in equatorial positions, while the other two axial positions in 1 and 2 are similarly occupied by an oxido-oxygen atom and a methanol molecule. Crystal structure investigation of the Mo complex illustrates the molecules are linked via O4-H4A···N2’ (i: 1-x,1-y,1-z) hydrogen bonds to form dimers and afterwards expand through H4-C4···S1’ (i: x,1+y,z) hydrogen bonds into one dimensional arrangement along the a axis. This dimer arrangement includes the R2_1(10) graph set. Similarly, adjacent molecules in crystal structure of the V(V) complex makes dimmers via O4-H4A···N2’ pairs of hydrogen bonds with alike graph set. In the ^1^H-NMR study, O-H and N-H signals are found to disappear in complexes which verifies ligands are coordinated to the central atoms in their deprotonated forms.

Keywords: dithiocarbazate, dioxo molybdenum(VI) complex, oxovanadium(V) complex

REFERENCES