

Poster Presentations

[MS24-P04] **Different Structural Motifs in Co(II) Complexes with Dicyanamide or Tricyanomethanide Anions.** Ivan Potočňák^a, Lucia Váhovská^a and Svitlana Vitushkina^b.

^aDepartment of Inorganic Chemistry, Faculty of Science, P.J. Šafárik University, Moyzesova 11, SK-041 54 Košice, Slovakia. ^bV.N. Karazin Kharkiv National University, Svobody sq. 4, UA-61077 Kharkiv, Ukraine. E-mail: ivan.potocnak@upjs.sk

In recent years, much attention has been devoted to dicyanamide (dca) or tricyanomethanide (tcm) complexes because of the large variety of topologies and magnetic properties that result from the versatility of dca and tcm as ligands [1]. Among them, Co(II) complexes drag an attention due to their interesting magnetic properties [2]. From the reaction mixtures containing Co(II) salts, bidentate ligands L (L = 1,10-phenanthroline (phen) or 2,2'-bipyridine (bpy)) and C(CN)₃ – (tcm) or N(CN)₂ – (dca) anions, seven complexes have been isolated: [Co(phen)₃](tcm)₂ (1), [Co(bpy)₃](dca)Cl·H₂O (2), [Co(phen)₂(dca)₂] (3), [Co(bpy)(μ₂-tcm)₂]_n (4), [Co(bpy)(μ₂-dca)₂]_n (5), [Co(phen)(μ₂-dca)₂]_n (6) [3] and [Co(phen)₂tcm]₂μ₂-tcm]tcm·H₂O (7). Ligands L in all prepared complexes are chelate coordinated to Co(II) atoms via N-donor atoms with the Co–N distances between 2.095(5) and 2.116(2) Å. The bond distances between Co(II) and N atoms of coordinated tcm or dca ligands span between 2.066(2) and 2.205(2) Å, thus the coordination environment of Co(II) atoms is distorted octahedral. Dca and tcm anions in the prepared compounds have different bonding modes what results in different structural motifs. While in 1 and 2 these anions remain uncoordinated and 0D ionic compounds are formed, dca in 3 is μ₁-coordinated through one nitrile nitrogen atom and thus 0D molecular complex results. Dca and tcm ligands in 4 – 6 are μ_{1,5}-coordinated through two nitrile nitrogen atoms forming a bridge between Co(II) atoms, however their structures are not

equal. In 4 and 5, bridging pseudohalide ligands link the Co(II) atom with its two neighbors, thus 1D polymeric chains along the c axis are formed. In 6, bridging dca ligands link the Co(II) atom even with its three neighbors (one neighbor is linked by two dca ligands as in 4 and 5, while two other neighbors are linked to the Co(II) by only one bridging dca ligand) what results in a polymeric 2D layered structure in the bc plane. Compound 7 is a 0D ionic compound with a unique structure containing all three bonding modes of tcm. Two Co(II) atoms in the [Co(phen)₂tcm]₂μ₂-tcm]⁺ dinuclear cation are bridged by one μ_{1,5}-coordinated tcm ligand while other two tcm ligands are μ₁-coordinated. The fourth tcm anion is uncoordinated. This work was supported by Slovak Research and Development Agency under the contract No. APVV-00014-11.

[1] Batten, S.R. & Murray, K.S. (2003). *Coord. Chem. Rev.* **246**, 103-130.

[2] Krivokapic, I., Zerara, M., Daku, M.L., Vargas, A., Enachescu, C., Ambrus, C., Tregenna-Piggott, P., Amstutz, N., Krausz, E. & Hauser, A. (2007). *Coord. Chem. Rev.* **251**, 364-378.

[3] Armentano, D., De Munno, G., Guerra, F., Julve, M. & Lloret, F. (2006). *Inorg. Chem.* **45**, 4626-4636.

Keywords: Co(II) complexes; dicyanamide; tricyanomethanide