

Abstract:

This thesis is the result of a work that we began years ago in a field of research on sulfur compounds such as thiophenesacid, benzothiazole, sulfanilamide, sulfamethoxazole and their derivatives. In this work, we studied the synthesis and characterization of 11 new complexes: six complexes of benzothiazole and five compounds of sulfanilamide with copper.

The six benzothiazole complexes are two with transition metals Cu and Zn, two with a post transition metal Sn and one with the metalloid Sb. The transition metals form coordination complexes, while metalloid and post transition metal gives hybrids.

Sulfanilamide complexes are all with copper. The first two complexes are monomers. In the compound $[\text{Cu}(\text{SA})_2(\text{NO}_3)_2(\text{H}_2\text{O})_2]$, the metal is octahedral (SA : sulfanilamide $\text{NH}_2\text{-C}_6\text{H}_4\text{-SO}_2\text{NH}_2$).

In the second compound, $[\text{Cu}(\text{SA})_2(\text{NO}_3)_2(\text{H}_2\text{O})]$, both nitrates are bidentates, and Cu is pentacoordinated in the plane, in addition, it coordinates perpendicular to the plane with two sulfanilamidemolecules in trans disposition.

Two one-dimensional polymers $[\text{Cu}_3(\text{DMF})_2(\text{SA})_4\text{Cl}_6]_n$ and $[\text{Cu}(\text{DMF})(\text{SA})\text{Cl}_2]_n$ were examined. In the first, the metal has two different environments, it adopts an octahedral environment and a square-based pyramidal geometry. In the other compound, copper is octahedral.

The last complex of general formula $[\text{Cu}(\text{SA})_2(\text{DMF})_2.2(\text{NO}_3)]_n$ crystallizes in the monoclinic system, $\text{P2}_1/\text{c}$. Copper is octahedral. While sulfanilamide is monodentate in the four preceding complexes and it coordinates through aniline nitrogen, in this compound it is bidentate

and the two donor centers are aniline nitrogen and an oxygen of the sulfonamide function. The compound is a two-dimensional polymer.

Sulfanilamide complexes have been characterized by different analytical techniques. Their thermal stability was verified by thermogravimetry. In addition, their antibacterial activities on three strains were done. Also, their electrochemical behavior was examined.

Key words: benzothiazole, sulfanilamide, physicochemical properties, thermal stability, structural study, XRD, Hirshfeld surface analysis, antibacterial activity, metal chelate activity and electrochemical study.