Structural Relationships in the Coordination Complexes of Bis(phenylthio)methane (L1) and Bis(phenylthio)propane (L3) with Silver(I) Salts

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The structures adopted by coordination polymers formed with flexible ligands are difficult to predict. The factors affecting the framework formation of coordination polymers, such as the ligand length, the stoichiometry, the role of the anion and the solvent were examined. We undertook the systematic synthesis and structural study of a large number of complexes. These were obtained with the above-named ligands, with an odd number of methylene groups, and combined with ten different silver salts. The counter-anions belong to three distinct classes: A = weakly coordinating anions, B = sulfonates such as p-tosylate and trifluorosulfonate, and C = fluorocarboxylates.

All complexes form extended networks of either 1D or 2D. Both the length of the ligand and the choice of the anion have a marked influence on the resulting crystal structures. For example, with complexes of L1, whatever the anion used, the 1D-coordination polymer is always observed. With type A anions, the ligand and Ag form a single chain and the anions are coordinated to the silver ions. With type B and C anions, the chains incorporate the anions in a double-bridge coordination mode. The chains are of the doublestranded type. For complexes of L3, type A anions give rise to hostguest compounds. The Ag and the ligands form 2D cationic sheets. The anions and the solvent are inserted within the sheets. Most complexes with B and C anions form 2D-ccordination networks. The details of these 1D and 2D networks will be described and illustrated. **Keywords: silver, flexible ligand, coordination polymer**