Silver Coordination Polymers with Flexible Ligands. Effect of the Size of the Ligand and the Solvent on the Network Formation

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In metal-organic crystal engineering, when flexible ligands are involved in the supramolecular networks, predicting the topology of the coordination polymer is more difficult since several factors such as the kind of solvent, the metal coordination, the counter-anion, the metal-to-ligand ratio and the degree of flexibility of the ligand affect the framework formation. In order to gain some insight into the influence of those factors, we report here the effect of the size of the ligand, its symmetry and degree of flexibility, as well as the influence of the anion, upon the supramolecular architecture when diarylthioether ligands are used as building blocks in silver(I) complexes. Only ligands with an even number of methylene groups will be discussed here. The non-coordinating anions favor the formation of cationic three-dimensional networks. As the anions, which are usually located within the channel, are relatively free to move, the anion-exchange properties of those complexes will be examined. The weakly coordinating anions give rise to 1Dcoordination polymers. As these anions serve as terminal ligands, the formation of two or three dimensional networks is ruled out. The more strongly coordinating acetate anions yield 2 or 3-dimensional networks. Weak silver-silver interactions are noted. In some casse, those interactions are retained in the 2D-network. The details of these 2D, 3D-networks and the silver-silver interactions will be described and illustrated. A rationalization of the influence of the various parameters upon the topologies of the supramolecular architectures will be presented.

Keywords: silver, flexible ligand, coordination polymer