

MS30-P4 Synthesis and crystal structures of new di- and polynuclear silver(I) saccharinate complexes with tertiary monophosphanes

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Over the years there has been a continuous interest in the biological activity of silver(I) metal complexes. Recently, we reported a number of silver(I) sac and found that these complexes have significant antibacterial and anticancer activities [1]. As an extension of our studies, in this work we synthesized and studied the crystal structures of four new silver(I) sac complexes containing the monophosphane ligands, namely $[\text{Ag}(\mu\text{-sac})(\text{PPh}_3)]_2$ (**1**), $[\text{Ag}(\mu\text{-sac})(\text{PPh}_2\text{Cy})]_2$ (**2**), $[\text{Ag}(\mu\text{-sac})(\text{PPhCy}_2)]_2$ (**3**) and $[\text{Ag}(\mu\text{-sac})(\text{PCy}_3)]_n$ (**4**), where PPh_3 = triphenylphosphane, PPh_2Cy = cyclohexyldiphenylphosphane, PPhCy_2 = dicyclohexylphenylphosphane and PCy_3 = tricyclohexylphosphane (see Figure.) The silver(I) ion in complex 1 is coordinated by a sac ligand via the N atom and a PPh_3 ligand, forming a $[\text{Ag}(\text{sac})(\text{PPh}_3)]$ unit and the $[\text{Ag}(\text{sac})(\text{PPh}_3)]$ units are further doubly bridged by relatively long Ag-O_{sulf} bonds, leading to a dinuclear structure $[\text{Ag}(\text{sac})(\text{PPh}_3)]_2$. The dimeric units of complex 1 are connected by weak intermolecular interactions such as C-H...O, $\pi(\text{sac})\dots\pi(\text{PPh}_3)$ and CH... $\pi(\text{sac}$ and $\text{PPh}_3)$. Complexes 2 and 3 show a structural similarity. Each complex also exhibits significant interactions between the silver(I) centers. The Ag–Ag distances are comparable with literature but significantly smaller than that found in other dinuclear sac complexes showing strong argentophilic interactions with Ag - Ag distances around 2.90 Å. Complex 4 is a one-dimensional metallopolymer in which the silver(I) ions are bridged by the sac ligands through the imino N and the carbonyl O atoms, leading to a linear one dimensional polymeric chain running along the b-axis. In all four crystal structures, the di- and polynuclear structures are achieved by the N/O bridging mode of the sac ligand. All phosphane ligands act as a monodentate donor through the P atom. Complexes 2 and 3 exhibit strong argentophilic interactions.

References:

[1] V.T. Yilmaz, E. Gocmen, C. Iysel, M. Cengiz, S.Y. Susluer, O. Buyukgungor, J. Biol. Inorg. Chem. 19 (2014)

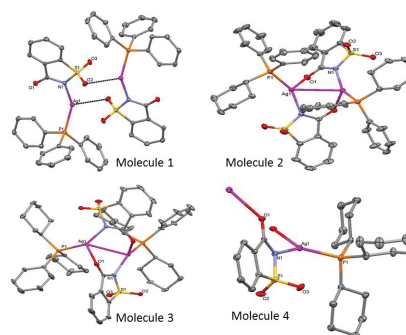


Figure 1. View of the molecular structures. Hydrogen atoms were omitted for clarity. The probability level of thermal ellipsoids are 30%.

Keywords: Crystal structure, Saccharinate, Phosphine