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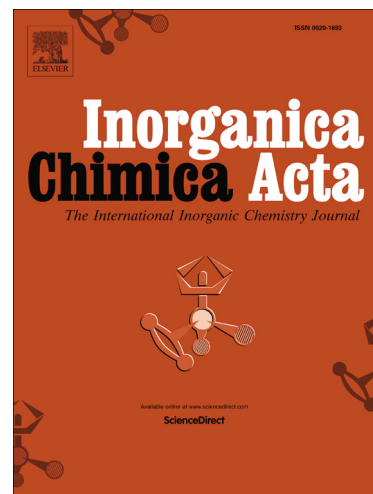
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## An unusual diverse coordination of silver(I) with N-allylthiohydantoin ligand in the presence of benzene- and *p*-toluenesulfonate anions

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### Highlights:

- Two novel complexes with unusual diverse coordination of Ag(I) with N-allylthiohydantoin were studied
- Different Ag(I) arrangements are determined by variable thiohydantoin coordination modes
- Simulations presence of molecular ligand and its ionic form were observed

**Abstract:** Crystalline silver(I) coordination compounds [Ag<sub>2</sub>(HL)<sub>4</sub>(C<sub>6</sub>H<sub>5</sub>SO<sub>3</sub>)<sub>2</sub>] $\cdot$ 0.5C<sub>3</sub>H<sub>7</sub>OH (**1**) and [Ag<sub>2</sub>(HL)(L)(CH<sub>3</sub>C<sub>6</sub>H<sub>4</sub>SO<sub>3</sub>)] (**2**) (HL = 3-(prop-2-en-1-yl)-2-thioxoimidazolidin-4-one) have been obtained using silver(I) salts and the organic ligand HL. Three independent Ag(I) atoms in crystal **1** adopt exclusively different coordination environment: tetragonal pyramidal, seesaw and distorted tetrahedral. In crystal **2** metal ions coordination polyhedra are characterized by seesaw and distorted tetrahedral arrangements. Thiohydantoin molecules in both structures are attached to Ag(I) only through thiohydantoin S-atom, while its anionic form in **2** plays a role of N,S-linker. C<sub>6</sub>H<sub>5</sub>SO<sub>3</sub><sup>-</sup> anions in **1** are bound to the Ag(I) ions in a bridging mode, connecting silver ions into serpentine-like {Ag<sub>4</sub>(C<sub>6</sub>H<sub>5</sub>SO<sub>3</sub>)<sub>4</sub>}<sub>n</sub> chains, within which silver ions are additionally bind with  $\mu_2$ -S atoms of HL. Simultaneous coordination of HL and L<sup>-</sup> moieties in polymeric chains of **2** allow the formation of Ag...Ag metallophilic interactions with the distance range of 2.99 - 3.13 Å.

**Keywords:** silver(I); benzenesulfonate anion; toluenesulfonate anion; thiohydantoin; crystal structure.

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