Research paper

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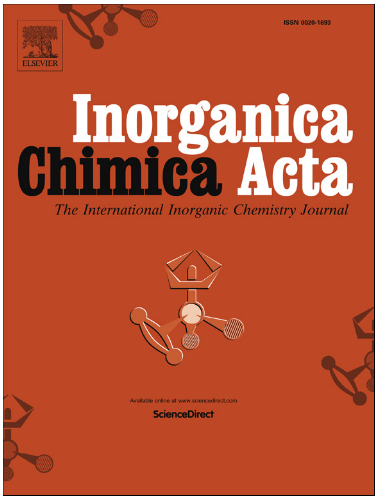

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Preparation, Crystal structure, and Properties of Novel TTF-pyridyl Thiolato Silver(I) complexes

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Abstract

Novel supramolecular silver(I) complexes with EDT-TTF-4-py, L1, (EDT-TTF-4-py = 4-ethylenedithiotetrathiafulvalenyl-pyridine) as the ligand, $[Ag(L1)]_2(NO_3)_2$ **1** and $[Ag(L1)_2]_3(CF_3SO_3)_4{\bullet}2H_2O$ **2** were prepared by the self-assembly method. These two complexes were characterized by elemental analysis, X-ray diffraction. In **1**, L1 acts as bis-bidentate ligand linking two silver ions through N and S atoms and forms a bimetallic macrocycle, and the bimetallic macrocycle is bridged by the weak Ag···O interactions to form a cyclic R_2^2 (14) supramolecular, resulting 1-dimensional loop chain along *c* axis. And there are S···S and C–H···O contacts between the loop chain. While in complex **2**, two different types of $Ag(L1)_2$ cations are coordinated by the $N_{pyridine}$ atom from L1 in a linear fashion and formed a trimer by weak Ag···Ag interaction. At room temperature, the electrical conductivity of complex **2** was 20 $S{\bullet}cm^{-1}$ and showed a semi-conductive behavior, whereas complex **1** is an insulator. Structural analyses of these two complexes suggest that the interactions between the cation and anion play a significant role in stabilizing the structures, and also indicate that the frameworks and the electrical conductivity of the silver(I) complexes with TTF-py can be adjusted by variations counter anion.