Bilayer Molecular Conductors with Polymeric Anions

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During the last few years a new type of two-dimensional (2D) conducting materials with a bilayer structure has emerged in salts of the electron donor cyanobenzene-ethylenedithio-tetrathiafulvalene (CNB-EDT-TTF) with a variety of small discrete anions A, with general composition (CNB-EDTTTF)$_4$A.[1-5] The donor bilayer structure of these compounds is promoted by a network of C-N$^{\cdots}$H-C hydrogen bond assisted interdonor interactions and their 2D metallic properties present unique characteristics derived both from the unusual 4:1 donor to anion stoichiometry and the weak interaction between paired donor layers.

More recently it has been shown that this type of donor bilayer structure with metallic properties, initially restricted to salts with small discrete anions, can be preserved in similar compounds of this donor with polymeric anions, either silver iodide polyanion [6] or silver and mercury ions with cyanate and thiocyanate ligands.[7]

In this presentation it will be discussed the enlargement of the family of bilayer conductors to salts with polymeric anions. The crystal structure and physical properties (electrical conductivity, thermoelectric power and magnetic susceptibility) of the compounds (β''-(CNB-EDT-TTF)$_6$ Ag$_{\sim 7.91}$I$_{\sim 9.15}$) and β''-(CNB-EDT-TTF)$_4$ A with different polymeric anions (A= $[Ag(CN)_2]^-$, $[Ag(CN)_2.H_2O]^-_\infty$, $[Ag_2(CN)_3]^-_\infty$, $[Ag(SCN)_2]^-_\infty$, and $[Hg_2(SCN)_5]^-_\infty$) are presented and compared with analogous compounds with small discrete anions.

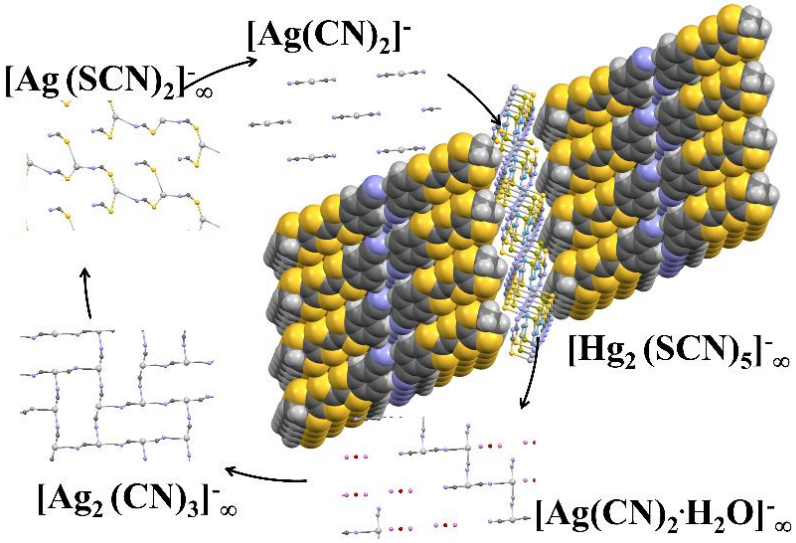

Fig. 1 Bilayer Molecular Conductors with Polymeric Anions.

References

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