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Chiral conductors based on tetrathiafulvalenes

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Introduction of chirality into molecular precursors is a topic of much current interest as it allows the preparation of multifunctional materials in which the chirality may influence, for example, the conducting properties.[1] One of the strategies we have been developing over the last several years consists in using chiral tetrathiafulvalene (TTF) derivatives in crystalline radical cation salts with diverse anions. This allowed us, for example, to observe the electrical magnetochiral anisotropy effect (eMChA) for the first time in the crystalline conductors [DM-EDT-TTF]$_2$ClO$_4$, based on dimethyl-ethylenedithio-tetrathiafulvalene (DM-EDT-TTF).[2] More recently, we have shown the existence of the chirality induced spin selectivity (CISS) effect in these chiral conductors.[3] On the other hand, the relationship between chirality and superconductivity is an intriguing question.[4] The two enantiomeric crystalline radical cation salts κ-[(*S,S*)-DM-BEDT-TTF]$_2$ClO$_4$ and κ-[(*R,R*)-DM-BEDT-TTF]$_2$ClO$_4$, showing kappa-type arrangement of the organic layers, were investigated in search for superconducting chiral molecular materials.[5]

References :

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