



Strategies towards chiral molecular conductors

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Introduction of chirality into conducting systems is a topic of much current interest as it allows the preparation of multifunctional materials in which the chirality may modulate the structural disorder or expresses its influence through the electrical magneto-chiral anisotropy effect. The access to various chiral electroactive precursors for molecular conductors is therefore of paramount importance. Different families of chiral tetrathiafulvalene (TTF) derivatives are reviewed together with the corresponding synthetic strategies. Systems based on stereogenic carbon or sulfur atoms, axial and supramolecular chirality have been developed. In other systems the use of achiral TTFs with chiral anions has provided molecular conductors, although in most of them to date the anion is present in racemic form. Starting from some of these precursors several chiral conductors have been prepared and in two cases, involving either chiral TTF-oxazoline salts or BEDT-TTF salts with metal-oxalate anions and chiral solvent molecules, differences between the conductivity of the racemic and enantiopure forms have been found, as a consequence of the structural disorder in the solid state. Further developments in this field are expected to be directed especially towards helical architectures, possibly based on supramolecular chirality, and systems combining conductivity, magnetism and chirality in both organic and inorganic lattices.

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