Novel Molecular Metals based on M(croconate)$_3$]$^{3-}$ (M=Fe, Ga) anions

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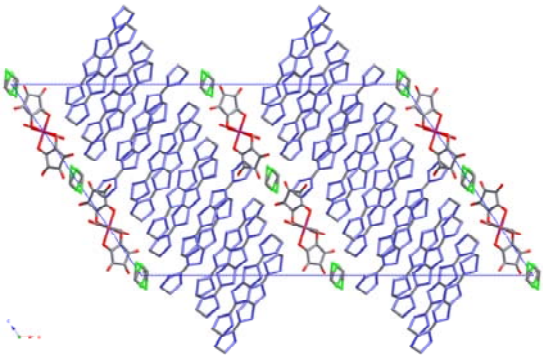
The synthesis, X-ray structure and physical properties of two novel radical salts formed by the bis-fused dihydrotetrathiafulvalene (BDH-TTP), an attractive organic donor which contains no TTF moiety and tends to stack with 2D interactions, thus stabilizing the metallic state, and a racemic mixture of the chiral anions M(croconate)$_3$]$^{3-}$ (M=Fe [1], Ga) (croconate=dianion of croconic acid=4,5-dihydroxycyclopent-4-ene-1,2,3-trione), are reported. The structure of the [Ga(croc)$_3$][(BDH-TTP)$_6$] ·CH_2Cl_2 (**1**) (Figure 1) and Fe(croc)$_3$][(BDH-TTP)$_6$] ·CH_2Cl_2 salts (**2**), which are isostructural, consist of layers of the BDH-TTP organic donor separated by layers of the anions and solvent molecules.



The BDH-TTP molecules are arranged in a *k*-type packing motif. Both compounds are metals up to low temperatures (T≈5-10 K) under high pressure (10-20 kbar) at which a M-I transition occurs. Magnetic measurements on **2** are in progress.

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[1] M. L. Mercuri *et al.*, *Inorg. Chem.*, 46 (2007) 4446 and references therein.