

Magnetotransport Properties of a New Hybrid Metal α -(BEDT-TTF)₂[Mn₂Cl₅(H₂O)₅]

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The crystal structure of the α -(BEDT-TTF)₂[Mn₂Cl₅(H₂O)₅] radical cation salt with a new type of magnetic polymeric complex anion, [Mn₂Cl₅(H₂O)₅]⁻ is characterized by radical cation layers alternating with layers of the polymeric 1-D chain anions constructed from MnCl₃(H₂O)₃ and MnCl₄(H₂O)₂ octahedra connected to each other via the apical Cl atoms [1]. The calculated electronic band structure suggests that the salt should be a stable 2-D metal and the conductivity measurements show that it exhibits metallic behavior down to 0.4 K. Shubnikov-de Haas oscillations, observed at 0.4 K and B > 10 T, are characterized by two fundamental frequencies F₁ = 4200 T and F₂ = 244 T, corresponding to magnetic breakdown orbit around the point Γ and by the lens around the point Y of the Brillouin zone respectively, in agreement with the electronic band structure calculations. Magnetic measurements reveal antiferromagnetic correlations in the anion network.

[1] L.V. Zorina, T.G. Prokhorova, S.S. Khasanov, S. V. Simonov, V. N. Zverev, A.V. Korobenko, A.V. Putrya, V. S. Mironov, E. Canadell, R.P. Shibaeva, E. B. Yagubskii. Cryst. Eng. Comm. (*in press*)