New Spin Liquid Candidate κ-$(ET)_2Cu[Au(CN)_2]Cl$ with Disorder-Free Anion Layer

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Triangular-lattice organic Mott insulators are attractive materials for the investigation of exotic physical properties such as quantum spin liquid and unconventional superconductivity. Recently, we have succeeded in obtaining a new spin liquid candidate κ-$(ET)_2Cu[Au(CN)_2]Cl$ with disorder-free anion layer (Fig.1) [1]. It is distinct from previously reported spin liquid candidates, all of which involves disorder in their crystal structures. Here we report our recent investigation on physical properties of κ-$(ET)_2Cu[Au(CN)_2]Cl$ at low temperatures and high pressures.

The magnetic susceptibility χ follows a triangular-lattice Heisenberg model with exchange interaction J/k_B = 210 K. It is associated with a Curies tail at low temperatures, implying contamination of Cu^{2+} impurities. The low temperature ^{1}H-NMR study revealed no magnetic order down to 0.45 K, indicating a spin liquid ground state.

We have performed transport measurements under high pressures and observed a Mott transition around 0.4 GPa as well as log$T$ dependence of resistance at low temperatures near the Mott critical pressure. We discuss possibility of Kondo screening in the spin frustrated organic spin liquid candidate.

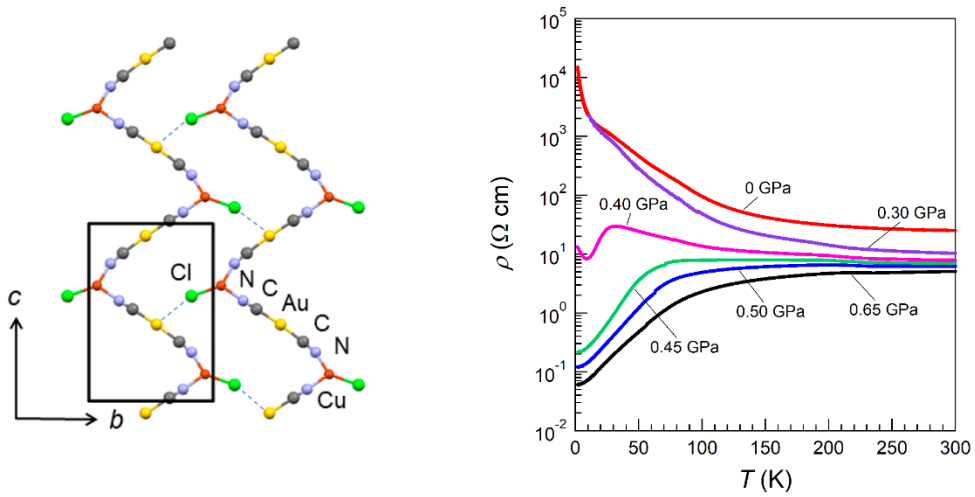

Fig. 1. Anion layer (left) and transport properties under pressures (right) of κ-$(ET)_2Cu[Au(CN)_2]Cl$.

References

[1] S. Tomeno et al., *Inorg. Chem.*, **59**, 8647 (2020).