Physical properties of a quantum spin liquid candidate κ-(ET)$_2$Cu[Au(CN)$_2$]Cl at low temperature and high pressure

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Quantum spin liquids (QSLs) have attracted much attention because they are exotic quantum phases of matter where long-range magnetic ordering is suppressed by the strong spin frustration. So far, several QSL candidates with triangular lattice have been reported in organic conductors.[1,2] However, all of them have disorder in the crystal structures. κ-(ET)$_2$Cu[Au(CN)$_2$]Cl (ET: bis(ethylenedithio)tetrathiafulvalene) is the first triangular-lattice organic QSL candidate with disorder-free polyanions.[3] This salt has a layered structure composed of alternating ET and {Cu[Au(CN)$_2$]Cl$^-$}$_\infty$ polyanion layers stacking along the *a* axis (Figure 1). This salt shows a Mott insulating behavior at ambient pressure but shows no magnetic order down to 0.45 K.[4]

In this study, we have performed transport measurements of κ-(ET)$_2$Cu[Au(CN)$_2$]Cl at high pressure and low temperature down to 0.5 K and investigated the pressure–temperature phase diagram in the vicinity of the QSL state.

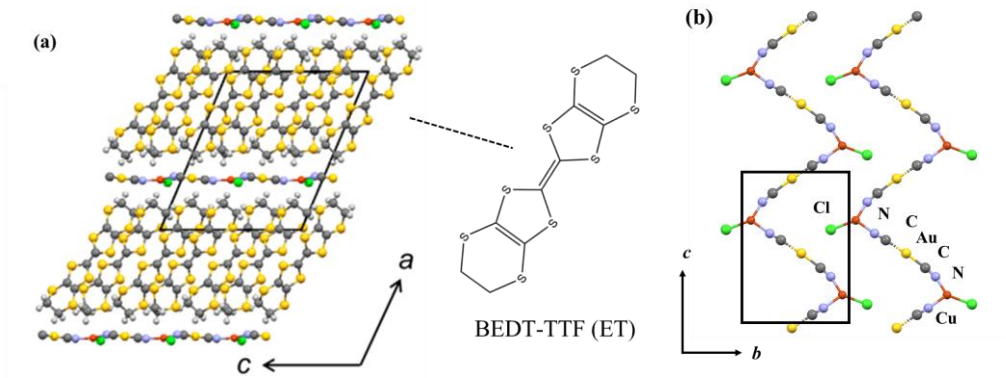

Figure 1. (a) Crystal structure of κ-(ET)$_2$Cu[Au(CN)$_2$]Cl viewed along the *b* axis. (b) Anion layer structure viewed along the *a* axis.

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