**Low Temperature Heat Capacity of Quantum Spin-Liquid State in Molecular Crystals $EtMe_3Sb[Pd(dmit)_2]_2$ and κ-$(BEDT\text{-}TTF)_2Cu_2(CN)_3$**

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In the case of a planer antiferromagnetic triangular lattice consisting of $S$ = 1/2 spins, the geometric frustration prohibits the formation of ordering and therefore a liquid-like ground state is expected. Since it is considered as a macroscopic appearance of a quantum mechanical character, the physics of the spin-liquid has been discussed as one of the central topics of condensed matter science in the last thirty years [1]. By our single crystal calorimetry measurements for dimer-based organic charge transfer salt of κ-$(BEDT\text{-}TTF)_2Cu_2(CN)_3$ down to the dilution temperatures, a $T$-linear heat capacity was clearly observed of which electronic heat capacity coefficient (γ) was about 15 $mJK^{-2}mol^{-1}$. One of the characteristic feature suggested by the RVB (Resonating Valence Bond) model explaining the formation of spin-liquid state is the existence of such linearly temperature dependent behavior in heat capacity. The degeneration of energy state should give a gap-less excitations from the ground state like a Fermi liquid state in usual metals [2]. The present thermodynamic result seems to be consistent with the Fermionic excitations as are suggested by the RVB like scenario. However, we have observed another peculiar thermodynamic character which predicts a kind of crossover behavior into the quantum spin-liquid state. This is an unexpected result which has been unveiled by the thermodynamic measurement. The discussion is also expanded to another organic triangular system of $EtMe_3Sb[Pd(dmit)_2]_2$ [3] , which also has a $T$-linear term expressed by $\gamma$ = 20 $mJK^{-2}mol^{-1}$ in its low temperature heat capacity. The characteristic features in the spin-liquid state observed at extremely low temperatures and an importance of thermodynamic measurements to understand the ground state of quantum spin system are discussed.

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[3] M. Tamura and R. Kato *J. Phys.: Condens. Matter* 14, 729 (2002)