

Low-Temperature Magnetization Study of Spin Gap System $(\text{CH}_3)_2\text{NH}_2\text{CuCl}_3$ with Nanometer Particle Size

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So far specific heat measurements for the title compound have revealed that the magnetic field vs. temperature phase diagram depended significantly on the system size. For instance, the single crystal showed the spontaneous magnetic ordered (SMO) phase in low fields and the field induced (FIMO) one in high fields separated by the magnetization plateau range between 2.0 T and 3.5 T, while the powder sample with typically nanometer particle size showed a quite different trend that FIMO phase extended to zero field even in the presence of SMO phase in low fields.

In this study, we measured dc and ac magnetization of single crystal and nanometer-size powder samples. Measurements were performed down to the lowest temperature of 0.5 K using commercial Quantum Design MPMS equipped with handmade ³He refrigerator insert.

Most remarkable feature is that the 1/2 plateau was not observed clearly in the magnetization process for the nanometer-sized powder sample indicating the disappearance of the spin gap. Detailed results will be presented.