Heat Transport in the Quasi-one-Dimensional Alternating Spin Chain Material $(CH_3)_2NH_2CuCl_3$

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$(CH_3)_2NH_2CuCl_3$ (MCCL) is an S = 1/2 alternating ferromagnetic (FM) and antiferromagnetic (AFM) dimer chain system. It exhibits a complex H-T phase diagram at low temperatures. In zero field, MCCL has a long-range AFM order below 0.9 K. A field induced gapped state and a field-induced magnetic ordered phase (FIMO) appears for 2 T $<$ H $<$ 3.5 T and H $>$ 3.5 T, respectively.
We study the very-low-temperature heat transport of MCCL single crystals to probe the field-induced magnetic transitions. It is found that the thermal conductivity (κ) show strong magnetic field dependence, particularly at the spin-flop transition and the transitions of field-induced gapped and FIMO. In general, the magnetic excitations in this low-dimensional spin system mainly act as phonon scatterers. In high-field limit, the κ can be strongly enhanced due to the disappearance of magnetic scattering on phonons.