Thermal Properties of Quasi-2D Cobaltites

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Two classes of cobaltites with a quasi-2D magnetic structure, i.e. $RBaCo_2O_{5.5}$ perovskites and a $LiCoPO_4$ olivine, will be considered. In the first class, Co ions in different spin state and a metal-insulator phase transition not related to a double exchange mechanism occur. Thermal properties of its three representatives, with R being: Y (nonmagnetic), Gd (magnetic but not influenced by crystalline field, CEF) and Tb (magnetic and strongly influenced by CEF), will be compared. Different contributions to specific heat and specific heat anomalies accompanying phase transitions will be analyzed.
The other class exhibits a large magnetoelectric effect, quasi-2D behavior and a large uniaxial magnetic anisotropy. Specific heat, magnetization, and magnetic torque studies of $LiCoPO_4$ will be presented. Near the Neèl temperature, the specific heat shows logarithmic divergence, expected for quasi-2D antiferromagnetic Ising system. A not known first-order phase transition induced by a magnetic field of 9 T at 9 K, discovered and proved to be related to steep change in magnetic anisotropy, will be presented.
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