MAGNETIC PROPERTIES OF SPIN-LADDERS $(\mathbf{A_2Cu_2O_3})_m(\mathbf{CuO_2})_n$

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9.7 cm

Magnetization measurements have been performed on several single crystals of the S=1/2 quasi one dimensional system $(A_2Cu_2O_3)_m(CuO_2)_n$ (A=Sr, Ca, Y, Nd, Pr + some small admixtures) in temperature range 5 K - 300 K and in wide magnetic field range. The studied crystals with m/n = 5/7, 7/10 and 9/13, of the orthorhombic structure, are incommensurate along the c-axis and in a commensurate approximation are characterized by approximate lattice constants a=11.3 Å, b=12.8 Å and c=19.5 Å, 27.5 Å, and 35.6 Å, respectively. In the crystal structure of investigated compounds there can be distinguished both simple CuO_2 chains and two-leg spin ladders of copper ions. The analysis of the temperature dependences of magnetic susceptibility indicates that the chain in these compounds has a spin gap in the excitation spectrum. The origin of this spin gap is yet unclear. The values of this spin gap are from about 30 K to 130 K for crystals with various compositions and structures. The contribution to the susceptibility both of Cu^{2+} ions located in various sites as well as other ions located in A-site has been estimated.

13.4 cm

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