

HIGH-FIELD MAGNETIZATION OF SINGLE-CRYSTAL LiCoPO_4

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The results of the differential magnetic susceptibility measurements of the single-crystal LiCoPO_4 in a pulse magnetic field up to 270 kOe are reported. This crystal is a magnetoelectric antiferromagnet with the Neel temperature $T_N = 21.8$ K. According to neutron-diffracted data, the magnetic structure of LiCoPO_4 is collinear, and its properties at low temperatures can be described by the Ising model. But some magnetic and magnetoelectric properties of this antiferromagnetic crystal have anomalies, which are unexplained till now. Thus, in LiCoPO_4 recently has been found out an ultra-weak ferromagnetism, origin of which remains uncertain. Moreover, the properties of the magneto-optical hysteretic specify an opportunity of a weak incommensurable magnetic structure.

The pulsed-field measurements were carried out in two temperature intervals: 1.6 - 4.2 K (in liquid helium) and 14 - 20.8 K (in liquid hydrogen). The magnetic field strength was directed along the antiferromagnetic ordering axis $\mathbf{H} \parallel \mathbf{b}$. At helium temperatures, the magnetic phase transformations at 122 kOe and 210 kOe were observed. The complex structure of peaks of the magnetic differential susceptibility at these transformations had been revealed. These complications specify that transitions to saturated paramagnetic state in LiCoPO_4 are more complex, than in the Ising antiferromagnetic model with two competitive interactions between the nearest and next nearest neighbors.

9.7 cm

13.4 cm

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