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MAGNETIC ORDERING IN THE RANDOM MIXTURE $CsMn_{1-x}Co_xCl_3.2H_2O$

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In order to clarify the question of the existence and the type of the oblique antiferromagnetic (OAF) phase, previous neutron measurements on the mixed magnetic system, $CsMn_{1-x}Co_xCl_3.2H_2O$ have been extended to samples with x= 0.035, 0.05 and 0.075, covering the region of concentration which appears to us, on the basis of the magnetic torque results, to be the most interesting for the study of the OAF-phase. In this system two kinds of magnetic ions with competing orthogonal spin anisotropies are randomly distributed.

The ordering temperature $T_N(x)$ are clearly detected through the appearance of magnetic Bragg reflections. The determined $T_N(x)$ are 4.80, 4.74 and 4.66 K for x=0.035, 0.05 and 0.075, respectively, with an error of 0.02 K.

The observation of a large tilting angle of the spin easy axis is conclusive for the existence of the OAF-phase in the sense that the resultant spin axis of the majority Mn spins is intermediate between the directions in the pure systems. However, other experimental facts like the observation of only one transition temperature and a gradual change of the tilting angle as a function of concentration and temperature suggest that a phase boundary between an ordinary antiferromagnetic phase and OAF-phase does not exist in the system studied.

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