MAGNETIC STRUCTURES IN CUBIC RCu_5 (R=Tb, Dy, Ho) COMPOUNDS

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9.7 cm

The magnetic and structural properties of melt spun RCu_5 (R=Tb, Dy, Ho) with the cubic $AuBe_5$ type structure have been investigated with the neutron diffraction and magnetic measurements. Samples consisting of small polycrystalline plates of RCu_5 have been measured in a magnetic field up to $5T$ and a temperature range of $1.7-50K$. By magnetisation measurements it has been found that $TbCu_5$ and $DyCu_5$ behave antiferromagnetically below a temperature of $15K$ and $7K$, respectively. In zero magnetic field the magnetisation of $HoCu_5$ shows a sharp maximum at $3K$ characteristic for antiferromagnetic ordering, but below $3K$ its dependence of the magnetisation on an applied magnetic field is typical for ferromagnetic materials. For R=Tb an antiferromagnetic G-type structure in the fcc lattice was determined by neutron diffraction experiments at $4.2K$ [1]. Our measurements confirm these results. The $HoCu_5$ sample did not show long range magnetic order zero field. At $2K$ and at magnetic fields greater than $0.5T$ ferromagnetic peaks were found.

[1] T. Kaneko et al., J. Magn. Magn. Mater. 54-57 (1986) 469

13.4 cm

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