

Magnetic Properties of YFe_3 Hydrides*

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Magnetization measurements of YFe_3H_x hydrides with $x = 0, 1.8, 3.7$ have been made on single crystal specimens as well as Mössbauer spectra on powder samples. The absorption of hydrogen produces complicated changes in the average Fe moment (μ_{Fe}) and the Curie temperature (T_c): at first μ_{Fe} and T_c increase and then decrease. The basal plane magnetocrystalline anisotropy of Fe and the Fe–Fe exchange significantly decrease with increasing hydrogen content.

1. Introduction

The absorption of hydrogen radically alters the physical properties of intermetallic compounds consisting of rare earth (R) and $3d$ transition metals. Among R–Fe compounds forming stable hydrides at normal conditions, the rhombohedral YFe_3 is a proper one for investigating the change in the magnetic properties of the Fe sublattice due to hydrogenation, in particular the magnetocrystalline anisotropy, since Y is nonmagnetic, and the anisotropy of Fe is larger than that of the other compounds RFe_2 and R_6Fe_{23} with cubic structure.

In this paper the experimental results of the influence of hydrogen on the magnetic properties of YFe_3 obtained with single crystal samples as well as Mössbauer spectra data of powdered samples are reported.

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