MAGNETIC ANISOTROPY OF $LuFe_{11}Ti$ SINGLE CRYSTAL AND ITS HYDRIDE

I.S. Tereshina[a], S.A. Nikitin[a], A.A. Salamova[b], and V.N. Verbetsky[b]

[a]Department of Physics, Moscow State University, 119899 Moscow, Russia

[b]Department of Chemistry, Moscow State University, 119899 Moscow, Russia

The magnetocrystalline anisotropy of $LuFe_{11}Ti$ single crystal and its hydride has been investigated. The anisotropy study has been performed by means of torque and magnetization measurements in the temperature range 77-750K and in magnetic fields up to 12,5T both on single crystal and magnetically aligned powder samples. The temperature dependencies of the magnetcrystalline anisotropy constants were determined using least-squares fitting for the corrected experimental torque curves.The Curie temperature, saturation magnetization and easy c-axis anisotropy increase upon hydrogenation. Interstitial hydrogen effect on the crystal field parameters is complex. From experimental data, it follows that introduction of H increases the lattice parameters and the unit-cell volume. The change of local environment of Fe ions resulting from hydrogenation makes valency bonds between Fe ions weaker and rearranges electron density of valency electrons. These effects are responsible for the singnificant increase of magnetic anisotropy in $LuFe_{11}TiH$ single crystal.

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Corresponding author :

I.S.Tereshina

Address for correspondence :

Department of Physics,
Moscow State University,
119899 Moscow,
Vorobievy Gory
Russia

Email address :

irina@rem.phys.msu.su