FERROMAGNETIC RESONANCE IN EVOPORATED U—Fe AMORPHOUS FILMS[1]

ФЕРРОМАГНИТНЫЙ РЕЗОНАНС В АМОРФНЫХ ПЛЕНКАХ U—Fe, ОБРАЗОВАННЫХ НАПЫЛЕНИЕМ

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Several authors reported magnetic properties of crystalline uranium-iron compounds [1—3]. In this contribution we wish to present the results of a FMR study of amorphous U—Fe thin films at the frequency 9.37 GHz at room temperature. The films were prepared by ultra-high vacuum flash evaporation onto glass substrates cooled with liquid nitrogen. The evaporated starting material was the intermetallic compound UFe_2. The composition of the films was not investigated chemically.

Table 1

Sample	thickness [nm]	$\mu_0 H_1$ [mT]	$\mu_0 H_2$ [mT]	$\Delta\mu_0 H_1$ [mT]	$\Delta\mu_0 H_2$ [mT]	J_{eff} [mT]	$\mu_0 H_u$ [mT]	J_s [mT]
1 UFe	92	58	490	33.5	177	338	−188	150
2 UFe	57	54.5	687.5	81	483	512	−312	200

H_1 — the resonance field in parellel configuration
H_2 — the resonance field in prependicular configuration
ΔH_1 — the line width in parallel configuration
ΔH_1 — the line width in perpendicular configuration
J_{eff} — the effective polarization
H_u — the effective field of perpendicular anisotropy
J_s — the static value of saturation polarization

[1] Contribution presented at the 6th Conference on Magnetism in Košice, September 2—5, 1980.

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From the resonance field measurements in a parallel (H_1) and a perpendicular configuration (H_2) there were computed the effective polarization J_{eff} and the effective field of perpendicular anisotropy H_u. The character of anisotropy is determined by the sign of H_u; for $H_u > 0$ we have the easy axis anisotropy normal to the film plane. A negative H_u corresponds to an easy plane anisotropy [4]. The obtained results are summarized in Table 1. It can be seen that H_u is negative and, therefore, the investigated films possess an easy-plane type anisotropy. The large values of ΔH are probably connected with the chemical heterogeneity of the films. Such an assumption is supported by the Hall effect measurements [5].

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Received October 20th, 1980