

## HALL EFFECT IN BARIUM HEXAGONAL FERRITE

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The ferrite  $\text{BaFe}_{12}\text{O}_{19}$  is investigated by measuring the magnetisation, Hall effect EMF, as well as the electrical resistivity in the temperature range from  $30^{\circ}\text{C}$  to  $80^{\circ}\text{C}$  and in magnetic fields up to 10 kG.

The experimental data, obtained by those measurements, are used for determination of the coefficients for the normal and anomalous Hall effect. Thus, for the temperature  $T = 35,3^{\circ}\text{C}$

$$R_{\text{norm}} = 7.0 \cdot 10^{-5} \frac{\text{V cm}}{\text{A Oe}} \quad \text{and} \quad R_{\text{anom}} = -2.6 \cdot 10^{-2} \frac{\text{V cm}}{\text{A Oe}}$$

Both of these coefficients decrease with the increase in temperature.

The electric measurements have shown that the examined ferrite is a semiconductor of p-type; the concentration of the current carriers at  $T = 35.5^{\circ}\text{C}$  is  $n = 8 \cdot 10^{14} \text{ cm}^{-3}$  and increases with the increase in temperature. At the same time, the Hall mobility of carriers does not change in the investigated temperature interval and has the value of  $\mu_{\text{H}} = 0.17 \text{ cm}^2/\text{V} \cdot \text{cm}$ . Such data indicate that in this magnetic semiconductor the electric transport is probably due to the zone mechanism.

Large remanent magnetisation of hard Ba-ferrite causes the existence of one appreciate "remanent" Hall effect: Hall effect also exists in the absence of the external magnetic field. The corresponding measurements are not described in the literature as well as there is

no theory concerning this effect. As an illustration of the above mentioned in Fig. 1. the experimental data obtained by the investigation of this Hall effect, are

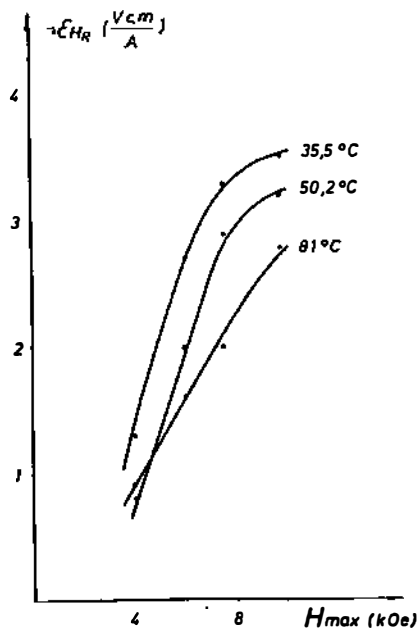


Fig. 1.

shown: the dependence of the remanent Hall effect EMF on the maximum field strength, in which the magnetisation has previously been performed, is given. The three given curves correspond to the three different temperatures.