substance: hematite (α-Fe_2O_3)
property: Seebeck coefficient, carrier mobilities in pure Fe_2O_3

Seebeck coefficient: *S* also shows three regions (Fig. 1). The sharp rise to positive values above 1000 K suggests $\mu_p > \mu_n$ in the intrinsic region. Values of 290...330 μV K^{-1} have also been reported in this region [59L]. See also Fig. 2.

carrier mobilities

μ_n	$(232/T)\ \exp(-0.1[\text{eV}]/kT)$ [cm^2/Vs]	*T* in K; ceramic samples	63G
	0.073 cm^2/Vs *T* = 1273 K		
μ_p	$(1.73\cdot10^5)\ \exp(-0.69[\text{eV}]/kT)$ [cm^2/Vs]	*T* in K; ceramic samples	63G
	0.253 cm^2/Vs *T* = 1273 K		

The much larger value of μ_p indicates that at temperatures higher than 1273 K, the conductivity should increase with increasing oxygen pressure owing to the dominance of intrinsic effects.

Hall effect: It shows highly anomalous dependence on the field strength and appears to vanish above the Néel temperature [51M].

References:

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Fig. 1.

Fe_2O_3. Seebeck coefficient vs. temperature for a high purity ceramic sample. (i) and (ii) fired specimens cooled (i) from 1364ºC in air or (ii) quenched from 1300ºC and heated, (iii) and (iv) unfired specimens, rising temperature [63G].

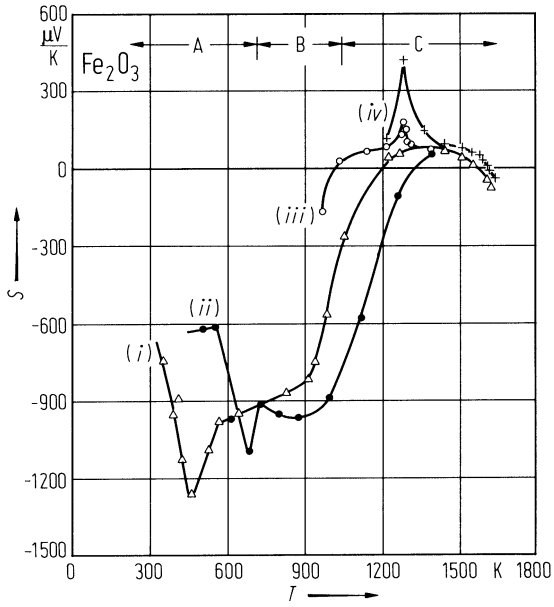

Fig. 2.

Fe_2O_3:Mg. Seebeck coefficient vs. temperature. Samples as in Fig. 3 [66G].

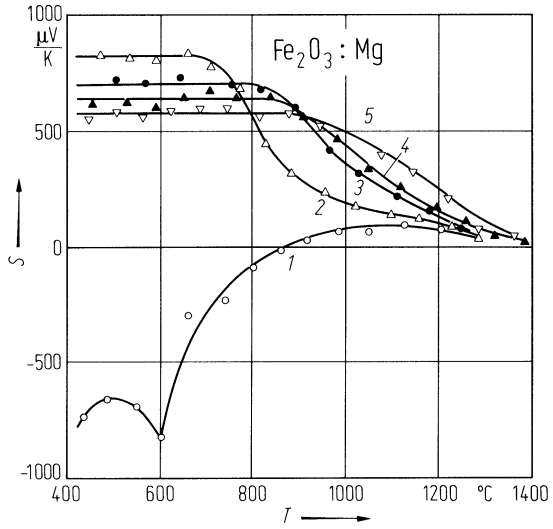

Fig. 3.

Fe_2O_3:Mg. Conductivity vs. reciprocal temperature for Mg doped ceramic samples fired at 1300ºC. (*1*) pure sample, (*2*) 0.01 at% Mg, (*3*) 0.03 at% Mg, (*4*) 0.05 at% Mg, (*5*) 0.2 at% Mg [66G].