THE MAGNETIC PROPERTIES OF SPECULAR HEMATITE

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(*Received November* 11, 1967)

The temperature variation of magnetisation and susceptibility of specular hematite ($\sim$99.1% $\alpha-Fe_2O_3$, origin Mt. Popa, Burma; obtained from the collections in the laboratory) has been studied in the range of 100°K to 1000°K for fresh as well as samples heat treated to a temperature of 1000°K. The results are shown in fig. 1.

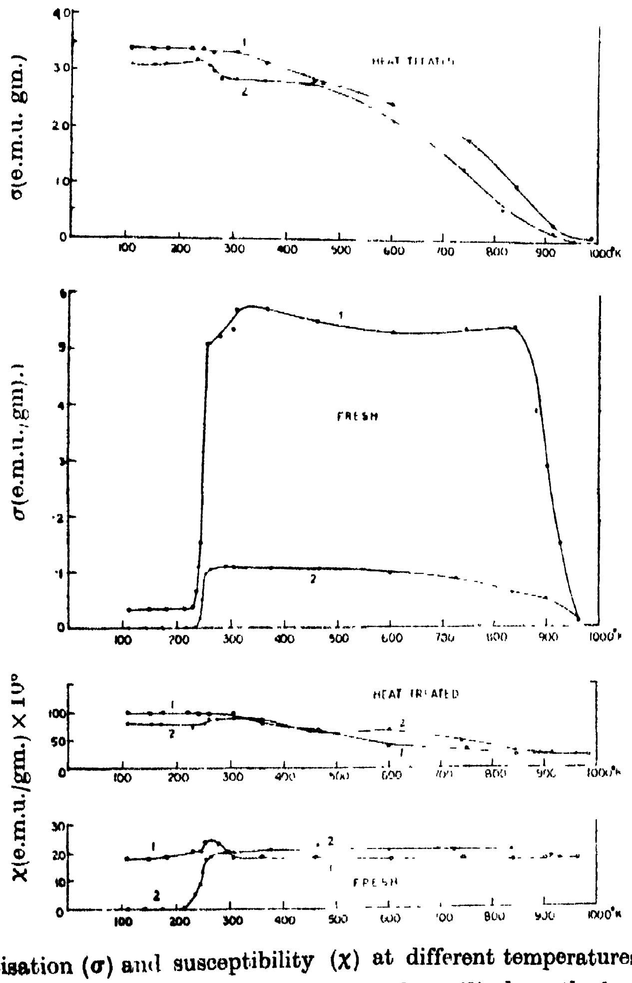

Fig. 1. Magnetisation (σ) and susceptibility (χ) at different temperatures of single crystals of hematite for fresh and heat treated samples. (1) along the basal plane (2) along the trigonal axis.

For fresh samples the temperature variation of field independent susceptibilities both along the c-axis and in the basal plane agree well with the findings of Tasaki and Iida (1963) on synthetic hematite, but there the ferromagnetism, unlike ours, appears only along the plane above Morin temperature (~250°K) and at lower temperatures no ferromagnetism exists at all in either of the directions. In respect of the temperature variations of both the susceptibilities and the ferromagnetism in the plane, the present observations resemble those of Néel *et al* (1952) and Lin (1959), on very pure natural crystals, but differ with their observations of ferromagnetism along the c-axis. Lin (1959) observed considerable ferromagnetism along the axis below the Morin temperature (~250°K) which falls sharply to a low value at higher temperatures. Néel *et al.*, (1952) no doubt observed considerable ferromagnetism at lower temperatures (below ~250°K) but its temperature variation unlike the observation of Lin (1959) was rather slow. In our case on the contrary the ferromagnetism along the c-axis vanishes below ~250°K and appears rather sharply above this temperature.

The measurements on heat treated samples agree closely with those of Mukerjee (1967), the magnitude of magnetisation and susceptibility increasing considerably and the sharp changes at ~250°K vanishing altogether.

The author is thankful to Shri A. K. Dutta for his constant guidance and Professor A. Bose for his kind interest in the work.

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A SIMPLE EXPERIMENTAL DEMONSTRATION OF THE BREAKDOWN OF FARADAY'S LAW OF ELECTROLYSIS

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The author adduced experimental evidence (Palit, 1967) indicating wide deviation from Faraday's law in the electrolysis of weakly conducting solutions, particularly conductivity water. Since this fact runs counter to a long accepted idea, the author presents here a simple experimental device which conclusively demonstrates the failure of Faraday's law.