fitted over a range of three decades by a theory based on the statistical fluctuations in the macroscopic anisotropy energy.

The success of the molecular-field approach in describing our results may be somewhat fortuitous. The separation of the complete Hamiltonian into relatively independent individual-ion Hamiltonians is a rough approximation, known to neglect the correlation of the spin directions of near ions. However, we have made full use of this approach in calculating the anisotropy, its temperature dependence, and the line widths. It is possible that the inclusion of the strong anisotropy, with its effect of aligning the spins along the preferred axis, partially compensates for the neglect of correlation.

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Gyromagnetic Ratio of Nickel Ferrite

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The gyromagnetic ratio of the ferrite $NiOFe_2O_3$ was determined by measurements of the Einstein-de Haas effect. The g' value of 1.849 ± 0.002 indicates that the magnetization is largely due to the Ni^{++} ions as in the Néel model. Comparison with values of g determined by ferromagnetic resonance investigations furnishes evidence as to the validity of the Kittel-Van Vleck relation for ferrites.

INTRODUCTION

MAGNETOMECHANICAL determination of g factors for ferrites should furnish very direct evidence as to the source of the net magnetization in these materials. It was therefore thought that Einstein-de Haas experiments on a nickel ferrite would be of considerable interest.

The facility for making these measurements which has previously been reported[1] can be readily adapted for working with ferrites. In fact, for rods having length-to-diameter ratios of 15 to 1, many ferrites can be magnetized to the same order of intensity as the ferromagnetic metals with which we have previously been concerned. In addition, the high homogeneity which can be attained with ferrites reduces the random errors due to coupling with very small external fields.

The rod used in these experiments was made in the General Motors Research Laboratories. Considerable care was used to assure the stoichiometry of $NiOFe_2O_3$.

[1] G. G. Scott, Phys. Rev. **119**, 84 (1960).

RESULTS

These experiments on $NiOFe_2O_3$ were conducted on six different days. The values obtained on these days for g' were 1.849, 1.847, 1.845, 1.853, 1.850, and 1.848. Thus the magnetomechanical factor for this ferrite is 1.849 ± 0.002. The corresponding factors for Ni and Fe are 1.835 and 1.919, respectively. Hence it appears that the net magnetization in this material is largely due to the Ni^{++} ions as in the Néel model.

The g' value of 1.849 corresponds to a g value of 2.178. Resonance experiments by Yager, Galt, and Merritt[2] give a g value of 2.196 for $(NiO)_{0.95}(FeO)_{0.05}Fe_2O_3$. Also Yager *et al.*[3] obtain for $NiOFe_2O_3$ a g factor of 2.19. Hence these experiments also furnish evidence as to the validity of the Kittel-Van Vleck relation for ferrites.

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[2] W. A. Yager, J. K. Galt, and F. R. Merritt, Phys. Rev. **99**, 1203 (1955).

[3] W. A. Yager, J. K. Galt, R. F. Merritt, and E. A. Wood, Phys. Rev. **80**, 744 (1950).