TABLE VIII. Comparison of some relative diffractometer and calculated intensities.

hkl	I_0	I_c
400 110	1	1
$40\bar{1}$	0.23	1.15
002 $20\bar{2}$	0.40	2.00
$11\bar{1}$	0.01	0.56
111	0.05	2.19

tion. On the other hand, Remeika has discovered a new structure of formula $Ga_{2-x}Fe_xO_3$ which is ferrimagnetic (and also piezoelectric).[3] Crystals have been made with composition $x=0.7$ to 1.4, and these have been reported by Wood[31] to belong to space group C_{2v}^9–$Pc2n$ with eight formula units per cell. Thus there must be in this crystal four sets of metal ions in the general positions, the only positions, in the space group. Because the crystal with $x=1.0$ is still quite ferrimagnetic (n_B at 4.2°K and $H=\infty$ is 0.95)[3] the indication is that the metal ions in the structure show a site preference which gives the net moment. Because both Fe^{3+} and Ga^{3+} ions have spherical electronic configurations, and the difference in their $CN(6)$ radii is presumably much smaller than the difference in their tetrahedral radii, there is the strong implication that there are in the $Ga_{2-x}Fe_xO_3$ two kinds of coordinations for the metal ions.

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[31] E. A. Wood (to be published).

APPENDIX

β-Ga_2O_3 Powder Data

The data obtained from the x-ray diffraction powder pattern of pulverized β-Ga_2O_3 crystals taken with Cu$K\alpha$ radiation are in good agreement with those of Kohn *et al.*[4] However, there are some minor discrepancies. Furthermore, a knowledge of the structure allows us to index the pattern more adequately, although the indexing of the highest-angle lines may still be in some doubt.

In Table VII, the calculated spacings and intensities[32] are compared with those observed. The calculations were carried out with an IBM 704 program devised by Dr. R. G. Treuting. Several calculations of spacings with slightly different values of lattice constants indicated that the values given by Kohn *et al.*[4] are good to within the limits of error specified. Calculations of spacings only were carried out with a separate IBM 704 program also devised by Dr. Treuting.

It will be noticed immediately that the observed intensities given are only qualitative. It would appear that quantitative intensity measurements taken with a diffractometer would be called for. Attempts were made to do this, but preferred orientation difficulties indicated that obtaining a proper pattern would indeed be a time-consuming project.

A finely divided powder all of which passed through a 400-mesh sieve, was used as the specimen for the revolving specimen holder of the Norelco diffractometer. Examination of Table VIII, in which the intensity of the ({400}, {110}) reflection is taken as unity and several others are compared with it, is indicative of the extreme effect.

Examination of the powder specimen with a microscope (144×) indicated that the crystallites were needle- or platelike with the needle axis or plate tending to lie flat. The rotating specimen photographed with the Norelco 114.6 cm camera indicated a much more random distribution of crystallites and gave qualitative intensities in much better agreement with the calculated ones.

[32] The expression for the calculated relative intensities is $I_c=(p/4)LPF^2\times10^{-4}$ where p is the multiplicity, L the Lorentz factor, P the polarization factor, and F the structure amplitude.