SHORT COMMUNICATIONS

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Acta Cryst. (1976). B32, 667

Concerning the β phase of iron(III) oxide.*

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(*Received* 8 *September* 1975; *accepted* 12 *September* 1975)

β-Fe_2O_3, body centred cubic, $Ia3$, $a_0 = 9{\cdot}393$ (2) Å, $Z = 16$, $D_x = 5{\cdot}14$ g cm^{-3}. In the 24(d) and 8(b) symmetry positions the Fe^{3+} ions are octahedrally coordinated, the former being more distorted than the latter.

Bonnevie-Svendsen (1958) was the first to announce the structure of a new cubic iron oxide phase which he prepared from the hydrolysis of $FeCl_3.6H_2O$. The X-ray powder diffraction pattern was similar to that of the mineral bixbyite and to β-Mn_2O_3 (also known as α-Mn_2O_3). Since α- and γ-Fe_2O_3 were already known, he assigned the letter β to the new material. The lattice constant reported by him was $a_0 = 9{\cdot}40$ Å. Braun & Gallagher (1972) recently reported the structure of a new tetragonal iron oxide phase prepared from the vacuum dehydration of β-FeOOH. They, too, assign the letter β to this material having overlooked the earlier communication. Geller, Williams & Sherwood (1961) and Grant, Geller, Cape & Espinosa (1968) 'predict' the existence of the above cubic iron oxide from Vegard's Law extrapolation, having also overlooked its former discovery. Okamoto (1968), reporting the structure of a δ-FeOOH, mentions Bonnevie-Svendsen's β-Fe_2O_3, erroneously stating that one of the Fe^{3+} ions is tetrahedrally and the other octahedrally coordinated.

In the present study, a thin film‡ of Fe_2O_3 was prepared by chemical vapour deposition at 300°C, from iron trifluoroacetylacetone onto microscope glass, fused silica and polycrystalline alumina.

The film was polycrystalline and the diffraction pattern was taken with a Guinier camera and non-filtered Co $K\alpha$ radiation. From the X-ray data it was found that this low-temperature growth yielded a cubic iron oxide phase which was successfully indexed as β-Fe_2O_3 in accordance with Bonnevie-Svendsen's findings. On annealing at *ca* 500°C this phase transforms into α-Fe_2O_3.

We thank the Central Research Fund of the Faculty of Science, Hebrew University of Jerusalem, for financial support.

* A preliminary report was communicated at the third International Conference on Vapor Growth and Epitaxy in Amsterdam, Holland, 18–21 August 1975.

† In partial fulfilment of the Ph. D. degree of the Hebrew University.

‡ Detailed growth and characterization data of the films will be published elsewhere.

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