

Table 1. *X-ray diffraction data for Nb₂Al*

<i>hkl</i>	<i>d_o</i> (Å)	<i>d_c</i> (Å)	Relative intensity
101	4·599	4·599	<i>w</i>
210	4·448	4·447	<i>w</i>
111	4·171	4·174	<i>vw</i>
220	3·520	3·515	<i>vw</i>
211	3·376	3·376	<i>vw</i>
310	3·145	3·144	<i>w</i>
301	2·792	2·793	<i>w</i>
002	2·591	2·593	<i>w</i>
410	2·412	2·412	<i>vs</i>
330	2·342	2·344	<i>s</i>
202	2·305	2·299	<i>s</i>
212	2·238	2·240	<i>vs</i>
411	2·187	2·187	<i>vs</i>
331	2·137	2·136	<i>m</i>
222	2·083	2·087	<i>w</i>
312	1·998	2·001	<i>w</i>
432	1·577	1·578	<i>w</i>
522	1·503	1·504	<i>m</i>
532	1·425	1·425	<i>m</i>
710, 550, 413	1·404	1·406	<i>m</i>
333	1·389	1·391	<i>w</i>
720, 423	1·366	1·366	<i>m</i>
622	1·344	1·344	<i>vw</i>
542	1·334	1·332	<i>vw</i>
721	1·321	1·321	<i>vw</i>
513	1·292	1·294	<i>vw</i>
304	1·206	1·206	<i>w</i>
324	1·174	1·173	<i>w</i>
414	1·139	1·142	<i>m</i>
812, 742	1·114	1·114	<i>w</i>
553, 713	1·089	1·091	<i>vw</i>

alloys, obtained with Cu $K\alpha$ radiation ($\lambda=1.5418 \text{ \AA}$) showed that the 24.4 atomic per cent aluminum alloy consisted of Nb₃Al with a small amount of Nb₂Al, the 28.8 atomic per cent aluminum alloy consisted of nearly equal amounts of Nb₃Al and Nb₂Al, and the 34 atomic per cent aluminum alloy consisted of Nb₂Al. The diffraction pattern of Nb₃Al was identical to that reported by Wood *et al.* (1958).

The observed X-ray diffraction data and calculated interplanar spacings for the Nb₂Al phase are shown in Table 1. The pattern could be indexed as tetragonal with $a_0=9.943 \text{ \AA}$, $c_0=5.186 \text{ \AA}$, $c/a=0.522$. The cell dimensions and relative intensities of the diffraction lines suggest a structure of the sigma type, which has 30 atoms per unit cell (Bergman & Shoemaker, 1955). The calculated density of the 34 atomic per cent aluminum alloy, assuming 30 atoms per unit cell, is 6.85 g.cm.^{-3} , in good agreement with the measured density of 6.87 g.cm.^{-3} .

This preliminary survey established the existence of the intermediate phase Nb₂Al. The structure is tetragonal and appears to be of the sigma type. If so, this niobium-aluminum phase should be of exceptional theoretical interest since all presently established binary sigma phases are composed of two transition elements from the Long Periods (Knapton, 1958).

References

- BERGMAN, G. & SHOEMAKER, D. P. (1955). *Acta Cryst.* **7**, 857.
 BRAUER, G. (1939). *Z. anorg. Chem.* **242**, 1.
 CORENZWIT, E. (1959). *J. Phys. Chem. Solids*, **9**, 93.
 KNAPTON, A. G. (1958). *J. Inst. Metals*, **87**, 28.
 WOOD, E. A., COMPTON, V. B., MATTHIAS, B. T. & CORENZWIT, E. (1958). *Acta Cryst.* **11**, 604.

Books Received

The undermentioned works have been received by the Editors. Mention here does not preclude review at a later date.

Vector Space and Its Application in Crystal Structure Investigation. By M. J. BUEGGER. Pp. XIV+347. With many figs. and tables. New York: John Wiley & Sons. 1959. Price \$12, £4.16.0.

Dendritic Crystallization. By D. D. SARATOVKIN. Pp. 126 with many figs. and six tables. New York: Consultants Bureau Inc. 1959. \$6.00.

Cristalofísica. By JOSÉ LUIS AMOROS. Part 1: Propiedades continuas. Pp. XIII+233. Madrid: Aguilar. 1958.

The Determination of Molecular Structure. By P. J. WHEATLEY. Pp. VI+263 with many figs. and tables. Oxford: Clarendon Press, Oxford University Press. 1959. Price 35s.

Materialprüfung mit Röntgenstrahlen. By R. GLOCKER. Pp. VII+530. 4th ed. Berlin: Springer-Verlag. 1958. Price DM. 61.50.

Applications of Finite Groups. By J. S. LOMONT. Pp. XI+346. New York & London: Academic Press. 1959. Price \$11.00.