calculated for L-cystine dihydrochloride and L-cystine dihydrobromide, respectively; it is significantly different from the observed angle of 74° for hexagonal L-cystine. The interplanar distance between the almost parallel glycine-like groups for CDA is approximately 6·3 Å.

The equation of the mean plane through the atoms C(2), O, C(3) and N(2) is $0{\cdot}9507X+0{\cdot}1510Y+0{\cdot}2709Z+6{\cdot}402=0$. The maximum deviation from the mean plane for the above atoms is 0·03 Å. The amino nitrogen, N(1), which was not used in the mean plane calculation, deviates by 0·32 Å.

The final observed and calculated structure factors are given in Table 3.

The authors wish to acknowledge support from the National Science Foundation, Grant No. GB3807. They are also indebted to Indiana University and to the Medical School for making available computer facilities and to the Heart Research Center, Grant HE06308 from the National Heart Institute, U.S. Public Health Service, for their X-ray equipment.

References

JOHNSON, C. K. (1965). *ORTEP*. ORNL-3794, Oak Ridge National Laboratory, Oak Ridge, Tennessee.
OUGHTON, B. M. & HARRISON, P. M. (1959). *Acta Cryst.* **12**, 396.
PETERSON, J., STEINRAUF, L. K. & JENSEN, L. H. (1960). *Acta Cryst.* **13**, 104.
STEINRAUF, L. K., PETERSON, J. & JENSEN, L. H. (1958). *J. Amer. Chem. Soc.* **80**, 3835.
STAPLETON, I. W. & SWAN, J. (1962). *Aust. J. Chem.* **15**, 106.
YAKEL, H. L. & HUGHES, E. W. (1954). *Acta Cryst.* **7**, 291.

Acta Cryst. (1968). B**24**, 1567

A note on the structure of $MoZn_{\sim 22}$.*

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(*Received* 16 *July* 1968)

The powder data of Toussaint & Venker on the basis of which they assigned an orthorhombic structure to $MoZn_{\sim 22}$ are explained better by assuming a f.c.c. structure with $a_0=18{\cdot}41$ Å.

In a recent paper Toussaint & Venker (1968) reported to have found a new type of intermetallic compound of approximate composition $MoZn_{22}$. They show a list of powder data, in which each reflection is indexed satisfactorily on the assumption that the structure is orthorhombic with $a_0=6{\cdot}510$, $b_0=10{\cdot}633$, $c_0=9{\cdot}205$ Å.

This author found that each of the published powder data can be explained by assuming a face-centered cubic lattice with $a_0=18{\cdot}41$ Å. The relationship between the edge lengths of the orthorhombic cell and the length of the cube edge is $6{\cdot}510\times 2\times \sqrt{2}=10{\cdot}633\times\sqrt{3}=9{\cdot}205\times 2=18{\cdot}41$ and the corresponding relationship between the indices is $h'^2+k'^2+l'^2=8h^2+3k^2+4l^2$, where the primed indices refer to the cubic and the unprimed to the orthorhombic lattice.

The advantages of indexing the observed powder lines on the basis of a cubic lattice with one parameter rather than a tetragonal lattice with two parameters ($a_0=6{\cdot}510\times\sqrt{2}$, $c_0=10{\cdot}633$ Å), an orthorhombic lattice with three parameters, or a triclinic lattice seem obvious: (1) The chances that the metric relationship between the cell edges of the noncubic lattice would be so exact as to preclude splitting of lines seem very small, especially since the observed lines seem to be very well defined as is indicated by the extremely good fit between observed and calculated $\sin^2\theta$ values. (2) Within the range of observation ($\sin^2\theta_{\max}=0{\cdot}4810$), there are 129 possible powder lines for the orthorhombic case, of which 42 would not be indexable on the basis of the face-centered cubic lattice. None of these 42 lines is observed. There are 93 possible powder lines for the cubic case, but only six of these (none present) are capable of ruling out the orthorhombic case.

It is interesting to note that in the cubic case, the strongest peak ($I/I_1=100$) corresponds to the 066 and 228 reflections. A characteristic feature of a series of other face-centered cubic structures having cell edges of lengths of the order of 18 or 19 Å, for example, $Cd_{\sim 6}Ni$ and $Sn_{\sim 4}Cu$ (Samson, unpublished), is the very high intensity of the 066 reflection.

The intermetallic compounds so far known to have the stoichiometry 1:22 are $ZrZn_{22}$ (Samson, 1961), $ReBe_{22}$ (Sands, Johnson, Zalkin, Krikorian & Kromholtz, 1962), and probably $MoBe_{22}$ and WBe_{22} (Paine & Carrabine, 1960). These are face-centered cubic but have cell edges of lengths of the order of 13 or 14 Å. It thus appears that $MoZn_{\sim 22}$ represents a new type of cubic AB_{22} structure.

References

PAINE, R. M. & CARRABINE, J. A. (1960). *Acta Cryst.* **13**, 680.
SAMSON, S. (1961). *Acta Cryst.* **14**, 1229.
SANDS, D. E., JOHNSON, Q. C., ZALKIN, A., KRIKORIAN, O. H. & KROMHOLTZ, L. (1962). *Acta Cryst.* **15**, 832.
TOUSSAINT, C. J. & VENKER, H. (1968). *Acta Cryst.* B**24**, 743.

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* Contribution number 3723 from the Arthur Amos Noyes Laboratory.