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# The Crystal Structure of CdSb and ZnSb

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Attempts to solve the crystal structure of the intermetallic compounds CdSb and ZbSb have previously been made by Halla and Adler [1], Halla, Nowotny and Tompa [2] and Ölander [3]. Of them, only Ölander was successful in approximately determining the dimensions of and the number of atoms in the elementary cell for CdSb, but without Weissenberg photographs a determination of the space group was difficult. The dimensions of the elementary cell given by Halla and coworkers do not agree at all with those given by Ölander or those found in this investigation and are certainly wrong. In an electrochemical investigation Ölander [4] also found that at 240°—290° C there is not more than one stable intermediate phase in the Cd-Sb system between 16.0 and 86.5 atomic % Cd.

In this investigation the alloys were prepared by melting Cd (Zn) together with Sb in evacuated silica tubes in such proportions as to obtain alloys containing 50.0 atomic % Sb. The powder photographs of CdSb (Table 5) are those taken by Ölander [3]. Powder photographs of ZnSb (Table 6) were obtained from filings of the alloy, annealled at 400° C in evacuated silica tubes. The filings were allowed to cool rather slowly after the annealing. The powder photographs which were taken with Cr-K radiation in Phragmén focussing cameras, are very rich in lines, and it was not possible to determine the indices of the reflections until the structure was solved by means of Weissenberg photographs.

In order to obtain single crystals, small fragments of the alloy were annealed at 400° C in evacuated silica tubes for one week and allowed to cool rather slowly. The Weissenberg photographs of these fragments were very sharp, but in spite of taking photographs of several crystals it was not possible to avoid strong absorption effects in parts of them. There is no doubt that the absorption depends on the shape of the crystals used.

From the photographs it was found that the two compounds are isomorphous and orthorhombic with the following lattice dimensions:

| | *a* | *b* | *c* |
|---|---|---|---|
| CdSb | 6.471 Å (6.458 kX) | 8.253 Å (8.236 kX) | 8.526 Å (8.509 kX) |
| ZnSb | 6.218 » (6.205 » ) | 7.741 » (7.725 » ) | 8.115 » (8.099 » ) |

If there are 16 atoms in the elementary cell the calculated density is 6.83 for CdSb and 6.36 for ZnSb. These values agree with the values given in the litterature: 6.92 for CdSb [1] and 6.383 for ZnSb [5]. From the photographs the following three groups of systematic absences are found:

$0kl$ where $k$ is odd
$h0l$ where $l$ is odd
$hk0$ where $h$ is odd

This is characteristic of the space group $D_{2h}^{15}$—$P/bca$.

In the attempts to solve the crystal structure, the structure problem of CdSb was attacked first. In this case, it was possible to calculate the intensities assuming all the atoms to be of the same kind, as the Cd and Sb atoms have nearly the same scattering power. From the intensity calculations it was easily found that the positions 4 (a) and 4 (b) of the space group could not be occupied by atoms. It therefore only remained to place both the Cd atoms and the Sb atoms in the eightfold position 8 (c), provided that $D_{2h}^{15}$ is the correct space group. The parameter values were found by the method of trial and error. As the intensities of the reflections $h00$, $0k0$ and $00l$ are determined by only two unknown parameters it was possible to find probable but rather approximate values of the atomic coordinates from those reflections. Somewhat better values were obtained when the other reflections were taken into account.

Having obtained an approximately correct structure for CdSb, a more accurate evaluation of the atomic coordinates of ZnSb was made. In this case it was possible to distinguish between the two kinds of atoms. The structure cannot be disordered, because if it were, the intensities of the reflections would be approximately the same as in the photographs of CdSb Ölander's [4] determination of the degree of disorder in CdSb confirms this statement. At 265° C the degree of disorder in CdSb amounts to $5 \cdot 10^{-3}$ %. After the atomic coordinates in ZnSb were ascertained a more exact determination of the parameters in CdSb was made. However, it was not possible to obtain perfect agreement between the observed and the calculated intensities for the reflections in the Weissenberg photographs (Tables 1—4). An attempt to refine

the parameters with Fourier projections was made, but the peaks were not sharp enough to allow a more accurate determination of the atomic coordinates than I had arrived at by means of the method of trial and error. There is no doubt that the discrepancies depend on the strong absorption mentioned above. However, the powder photographs (Tables 5—6) show a very good agreement between the observed and the calculated intensities.

The following parameter values were obtained:

| | $x_1$ | $y_1$ | $z_1$ | $x_2$ | $y_2$ | $z_2$ |
|---|---|---|---|---|---|---|
| CdSb | 0.136 | 0.072 | 0.108 | 0.456 | 0.119 | — 0.128 |
| ZnSb | 0.142 | 0.081 | 0.111 | 0.461 | 0.103 | — 0.122 |

*Table 1. CdSb. Weissenberg photograph. Reflections 0kl. Cu-K radiation.*

| l \ k | 0 | | 2 | | 4 | | 6 | | 8 | | 10 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | m | 9.9 | st | 19.4 | m | 11.8 | — | 0.0 | — | 0.1 |
| 1 | | | — | 0.7 | w | 3.7 | m | 7.8 | — | 0.1 | $st^+$ | 8.4 |
| 2 | vvw | 0.7 | — | 0.3 | — | 0.0 | vvw | 0.3 | vw | 0.3 | — | 0.0 |
| 3 | | | — | 0.1 | $w^+$ | 6.9 | m | 8.1 | vw | 0.4 | vst | 11.1 |
| 4 | vst | 50.0 | m | 5.2 | $m^+$ | 13.6 | m | 8.5 | — | 0.0 | | |
| 5 | | | $m^+$ | 2.9 | — | 0.2 | m | 4.7 | — | 0.0 | | |
| 6 | vw | 2.4 | w | 1.2 | — | 0.0 | m | 1.8 | st | 2.1 | | |
| 7 | | | w | 0.4 | $m^+$ | 5.7 | m | 6.2 | w | 0.4 | | |
| 8 | st | 18.5 | vw | 1.6 | m | 7.3 | m | 3.6 | | | | |
| 9 | | | st | 4.8 | w | 0.4 | | | | | | |
| 10 | m | 2.8 | m | 1.6 | | | | | | | | |

*Table 2. CdSb. Weissenberg photograph. Reflections h0l. Cu-K radiation.*

| h \ l | 0 | | 2 | | 4 | | 6 | | 8 | | 10 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | vvw | 0.7 | vst | 50.0 | vw | 2.4 | m | 18.5 | w | 2.8 |
| 1 | | | vw | 4.4 | $w^+$ | 1.5 | vw | 1.2 | $m^-$ | 2.6 | — | 0.1 |
| 2 | m | 8.3 | — | 0.1 | w | 5.5 | vw | 0.3 | w | 3.3 | w | 0.4 |
| 3 | | | — | 0.4 | vw | 0.8 | — | 0.5 | $m^-$ | 1.6 | w | 0.9 |
| 4 | m | 3.5 | vw | 0.5 | vw | 2.0 | w | 2.8 | vvw | 0.3 | | |
| 5 | | | st | 28.2 | vw | 0.7 | $m^+$ | 17.6 | $m^-$ | 1.6 | | |
| 6 | vw | 0.7 | — | 0.1 | vw | 0.5 | $w^+$ | 0.4 | | | | |
| 7 | | | m | 7.9 | | | | | | | | |
| 8 | vw | 0.4 | vw | 0.2 | | | | | | | | |

*Table 3. ZnSb. Weissenberg photograph. Reflections 0kl. Cu-K radiation.*

| l \ k | 0 | | 2 | | 4 | | 6 | | 8 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | st | 9.6 | st | 11.0 | st | 17.6 | vvw | 1.0 |
| 1 | | | vw | 0.5 | $m^-$ | 1.9 | w | 0.9 | vw | 0.2 |
| 2 | w | 0.8 | vvw | 0.2 | — | 0.1 | vvw | 0.3 | vvw | 0.1 |
| 3 | | | $st^-$ | 1.7 | m | 3.5 | vw | 1.0 | m | 0.7 |
| 4 | st | 31.6 | st | 5.3 | st | 7.4 | vst | 13.3 | vw | 0.7 |
| 5 | | | vvw | 0.0 | vvw | 0.1 | w | 0.5 | — | 0.0 |
| 6 | m | 3.0 | w | 0.7 | vw | 0.6 | m | 1.8 | st | 0.4 |
| 7 | | | $m^+$ | 1.5 | st | 3.0 | w | 0.8 | | |
| 8 | st | 11.5 | m | 1.4 | $m^+$ | 3.6 | vvst | 6.9 | | |
| 9 | | | m | 0.5 | w | 0.1 | | | | |
| 10 | vst | 4.0 | st | 1.0 | | | | | | |

*Table 4. ZnSb. Weissenberg photograph. Reflections h0l. Cu-K radiation.*

| h \ l | 0 | | 2 | | 4 | | 6 | | 8 | | 10 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | w | 0.8 | vst | 31.6 | m | 3.0 | vst | 11.5 | vst | 4.0 |
| 1 | | | st | 7.7 | m | 0.9 | m | 2.8 | $st^-$ | 1.6 | m | 0.7 |
| 2 | w | 1.6 | vvw | 0.01 | m | 0.9 | w | 0.03 | w | 0.6 | m | 0.03 |
| 3 | | | vvw | 0.1 | w | 0.2 | — | 0.02 | m | 0.4 | | |
| 4 | st | 4.1 | w | 0.2 | $st^-$ | 2.7 | m | 1.3 | $st^-$ | 1.0 | | |
| 5 | | | vst | 17.2 | $m^-$ | 1.0 | vvst | 10.7 | vvst | 2.5 | | |
| 6 | m | 3.0 | vvw | 0.1 | $m^+$ | 2.3 | m | 0.5 | | | | |
| 8 | | | m | 1.8 | | | | | | | | |

In this table suffix 1 refers to Sb and suffix 2 to Cd and Zn. The accuracy of the parameter values amounts to $\pm$ 0.005.

The intensities are calculated from the formula $I = p \cdot S^2$ where $p$ is the frequency factor and $S$ is the structure factor. $\beta$ reflections have been omitted if they do not coincide with an $\alpha$ reflection. The following abbreviations are used in the tables: st = strong, m = medium, w = weak and v = very. Reflections in the powder photographs with $\sin^2\Theta < 0.23$ must not be compared with reflections of higher glancing angles as the inner and the outer parts of the photographs are taken in different cameras.

As far as could be ascertained this type of crystal structure has not been found previously. Each atom is surrounded by four other atoms. One of them is of the same kind as the central atom, and the other three are of the

*Table 5. CdSb. Powder photograph. Cr-K radiation.**

| *hkl* | $\sin^2\Theta$ calc | $\sin^2\Theta$ obs | *I* obs | *I* calc |
|---|---|---|---|---|
| 020 | 0.0771 | 0.0781 | vw | 18.7 |
| 021 | 0,0951 | — | — | 2.3 |
| 112 $\beta$ | 0.1015 | 0.1023 | m | 22.2 |
| 102 | 0.1035 | | | 17.7 |
| 112 | 0.1228 | 0.1237 | st$^+$ | 111 |
| 200 | 0.1253 | 0.1253 | w | 14.8 |
| 121 | 0.1264 | 0.1275 | st | 58.9 |
| 210 | 0.1446 | — | — | 0.7 |
| 022 | 0.1493 | — | — | 1.0 |
| 211 | 0.1627 | 0.1642 | st | 88.2 |
| 122 | 0.1806 | 0.1819 | w | 24.2 |
| 202 | 0.1975 | — | — | 0.2 |
| 220 | 0.2024 | — | — | 0.1 |
| 113 | 0.2130 | 0.2134 | vw | 5.9 |
| 212 | 0.2168 | — | — | 1.3 |
| 221 | 0.2205 | 0.2212 | w | 48.8 |
| 131 | 0.2228 | 0.2241 | vw | 29.8 |
| 123 $\beta$ | 0.2238 | | | 4.8 |
| 004 $\beta$ | 0.2393 | 0.2400 | w | 19.1 |
| 023 | 0.2395 | | | 0.4 |
| 041 $\beta$ | 0.2704 | 0.2717 | w | 2.9 |
| 123 | 0.2708 | | | 24.2 |
| 222 | 0.2746 | — | — | 0.1 |
| 132 | 0.2769 | 0.2777 | st$^+$ | 198 |
| 004 | 0.2888 | 0.2895 | st$^-$ | 95.4 |
| 230 | 0.2987 | 0.2995 | w | 18.9 |
| 232 $\beta$ | 0.3066 | 0.3079 | st | 1.0 |
| 213 | 0.3073 | | | 119 |
| 040 | 0.3083 | | | 36.5 |
| 231 | 0.3168 | — | — | 1.0 |
| 311 | 0.3193 | 0.3200 | st | 89.2 |
| 104 | 0.3201 | | | 5.9 |
| 041 | 0.3263 | 0.3272 | w | 14.6 |
| 114 | 0.3394 | — | — | 0.6 |
| 302 | 0.3542 | 0.3551 | vw | 1.3 |
| 322 $\beta$ | 0.3565 | | | 1.6 |
| 141 | 0.3576 | 0.3590 | m$^-$ | 35.6 |
| 240 $\beta$ | 0.3584 | | | 5.5 |
| 223 | 0.3648 | 0.3657 | m | 41.2 |
| 024 | 0.3658 | 0.3672 | m | 21.0 |
| 133 | 0.3672 | | | 21.5 |
| 232 | 0.3709 | 0.3720 | vw | 5.0 |
| 312 | 0.3735 | — | — | 0.4 |
| 321 | 0.3771 | 0.3784 | m$^+$ | 69.2 |
| 042 | 0.3804 | — | — | 0.0 |
| 124 | 0.3972 | 0.3980 | vw | 3.7 |
| 142 | 0.4118 | — | — | 0.5 |
| 204 | 0.4141 | 0.4148 | w | 22.5 |
| 400 $\beta$ | 0.4144 | | | 1.4 |
| 115 $\beta$ | 0.4147 | | | 0.4 |
| 143 $\beta$ | 0.4149 | | | 2.4 |
| 410 $\beta$ | 0.4303 | 0.4335 | m$^-$(br) | 4.4 |
| 323 $\beta$ | 0.4310 | | | 9.1 |
| 322 | 0.4313 | | | 7.8 |
| 214 | 0.4334 | | | 0.4 |
| 240 | 0.4336 | | | 27.7 |
| 241 | 0.4516 | — | — | 2.7 |
| 233 | 0.4612 | — | — | 0.1 |
| 125 $\beta$ | 0.4625 | 0.4645 | m$^-$ | 9.8 |
| 313 | 0.4637 | | | 44.2 |
| 043 | 0.4707 | 0.4715 | w$^+$ | 28.9 |
| 304 $\beta$ | 0.4718 | | | 0.6 |
| 331 | 0.4735 | — | — | 1.8 |
| 224 | 0.4912 | — | — | 0.1 |
| 215 $\beta$ | 0.4924 | 0.4950 | w | 4.4 |
| 243 $\beta$ | 0.4926 | | | 0.6 |
| 421 $\beta$ | 0.4930 | | | 10.1 |
| 044 $\beta$ | 0.4934 | | | 11.1 |
| 134 | 0.4935 | | | 4.2 |
| 400 | 0.5014 | 0.5026 | w$^+$(br) | 7.2 |
| 250 $\beta$ | 0.5017 | | | 9.1 |
| 115 | 0.5018 | | | 2.2 |
| 143 | 0.5020 | | | 12.1 |
| 341 $\beta$ | 0.5028 | | | 3.9 |
| 242 | 0.5058 | — | — | 0.1 |
| 410 | 0.5206 | 0.5215 | m | 21.9 |
| 323 | 0.5215 | | | 45.7 |
| 332 | 0.5276 | 0.5286 | w | 9.3 |
| 025 | 0.5282 | | | 11.6 |

* In the powder photographs of CdSb is has been impossible to identify the following three linies: 0.2598 (vw), 0.2836 (vw) and 0.4197 (vw).

| *hkl* | $\sin^2\Theta$ calc | $\sin^2\Theta$ obs | *I* obs | *I* calc |
|---|---|---|---|---|
| 151 | 0.5310 | — | — | 3.0 |
| 411 | 0.5387 | — | — | 7.2 |
| 430 $\beta$ | 0.5577 | 0.5593 | m | 6.8 |
| 153 $\beta$ | 0.5582 | | | 1.9 |
| 125 | 0.5596 | | | 48.8 |
| 304 | 0.5708 | 0.5711 | vvw | 3.2 |
| 431 $\beta$ | 0.5726 | | | 2.7 |
| 060 $\beta$ | 0.5733 | | | 4.9 |
| 402 | 0.5735 | | | 2.0 |
| 420 | 0.5784 | 0.5804 | vw | 14.1 |
| 116 $\beta$ | 0.5788 | | | 11.1 |
| 152 | 0.5852 | — | — | 0.0 |
| 234 | 0.5875 | 0.5886 | w | 22.1 |
| 061 $\beta$ | 0.5881 | | | 6.4 |
| 314 | 0.5900 | — | — | 2.8 |
| 412 | 0.5928 | — | — | 0.0 |
| 215 | 0.5958 | 0.5966 | st | 21.8 |
| 243 | 0.5960 | | | 3.2 |
| 421 | 0.5965 | | | 50.4 |
| 044 | 0.5970 | | | 55.4 |
| 244 $\beta$ | 0.5970 | | | 8.5 |
| 250 | 0.6070 | 0.6072 | m | 45.7 |
| 341 | 0.6083 | | | 19.5 |

| *hkl* | $\sin^2\Theta$ calc | $\sin^2\Theta$ obs | *I* obs | *I* calc |
|---|---|---|---|---|
| 333 | 0.6178 | — | — | 3.7 |
| 251 | 0.6250 | 0.6250 | m- | 39.4 |
| 144 | 0.6283 | — | — | 0.7 |
| 324 | 0.6478 | — | — | 1.7 |
| 006 | 0.6497 | — | — | 4.9 |
| 422 | 0.6506 | — | — | 1.2 |
| 404 $\beta$ | 0.6530 | 0.6540 | m | 1.7 |
| 225 | 0.6536 | | | 32.3 |
| 145 $\beta$ | 0.6536 | | | 7.8 |
| 135 | 0.6559 | | | 19.7 |
| 342 | 0.6625 | 0.6624 | w | 24.5 |
| 154 $\beta$ | 0.6626 | | | 0.8 |
| 430 | 0.6748 | 0.6747 | w | 33.9 |
| 153 | 0.6754 | | | 9.7 |
| 252 | 0.6792 | — | — | 1.8 |
| 106 | 0.6810 | — | — | 5.1 |
| 413 | 0.6830 | 0.6846 | vvw | 2.7 |
| 441 $\beta$ | 0.6841 | | | 5.5 |
| 431 | 0.6928 | 0.6929 | w+ | 13.3 |
| 060 | 0.6936 | | | 24.4 |
| 116 | 0.7003 | 0.7000 | w+ | 55.3 |

second kind. The four surrounding atoms form a deformed tetrahedron. It is possible to regard the lattice as a very strongly deformed diamond lattice. The interatomic distances may be seen from the following table:

| CdSb | | ZnSb | |
|---|---|---|---|
| Cd — Cd | 2.99 kX | Zn — Zn | 2.58 kX |
| Cd — Sb | 2.80 » | Zn — Sb | 2.66 » |
| | 2.81 » | | 2.69 » |
| | 2.91 » | | 2.74 » |
| Sb — Sb | 2.81 » | Sb — Sb | 2.81 » |

These distances seem to be plausible. If the coordination number is assumed to be four, the following distances can be calculated by Pauling's [6] method:

| | | | |
|---|---|---|---|
| Cd — Cd | 2.80 kX | Zn — Zn | 2.57 kX |
| Cd — Sb | 2.85 kX | Zn — Sb | 2.67 kX |
| | Sb — Sb 2.89 kX | | |

*Table 6. ZnSb. Powder photograph. Cr-K radiation.*

| *hkl* | $\sin^2\Theta$ calc | $\sin^2\Theta$ obs | *I* obs | *I* calc | *hlk* | $\sin^2\Theta$ calc | $\sin^2\Theta$ obs | *I* obs | *I* calc |
|---|---|---|---|---|---|---|---|---|---|
| 020 | 0.0876 | 0.0862 | vw | 18.3 | 232 | 0.4128 | 0.4142 | m | 2.7 |
| 021 | 0.1076 | — | — | 2.1 | 321 | 0.4132 | | | 29.8 |
| 102 | 0.1137 | 0.1132 | w | 28.7 | 042 | 0.4303 | — | — | 0.2 |
| 112 | 0.1356 | 0.1350 | m | 53.6 | 124 | 0.4405 | — | — | 1.8 |
| 200 | 0.1358 | | | 2.8 | 204 | 0.4548 | — | — | 3.8 |
| 121 | 0.1415 | 0.1405 | w | 48.8 | 142 | 0.4643 | 0.4642 | vvw | 4.9 |
| 210 | 0.1577 | — | — | 6.7 | 322 | 0.4730 | — | — | 1.8 |
| 022 | 0.1674 | — | — | 1.0 | 214 | 0.4767 | 0.4761 | vvw | 8.2 |
| 211 | 0.1777 | 0.1778 | w | 60.9 | 240 | 0.4864 | — | — | 4.7 |
| 122 | 0.2013 | 0.2014 | vw | 17.1 | 241 | 0.5063 | 0.5094 | w | 8.0 |
| 221 $\beta$ | 0.2016 | | | 4.6 | 313 | 0.5069 | | | 34.0 |
| 202 | 0.2156 | — | — | 0.0 | 233 | 0.5124 | — | — | 0.1 |
| 220 | 0.2235 | — | — | 0.0 | 331 | 0.5228 | — | — | 0.4 |
| 113 | 0.2353 | — | — | 0.0 | 043 | 0.5300 | 0.5304 | vw | 14.7 |
| 212 | 0.2375 | — | — | 0.7 | 224 | 0.5424 | — | — | 0.2 |
| 221 | 0.2434 | 0.2440 | m | 22.8 | 400 | 0.5433 | — | — | 8.5 |
| 123 $\beta$ | 0.2493 | 0.2503 | vw | 3.8 | 134 | 0.5501 | 0.5511 | vw | 5.8 |
| 131 | 0.2511 | | | 3.0 | 243 $\beta$ | 0.5514 | | | 2.0 |
| 023 | 0.2670 | 0.2681 | vvw | 7.3 | 115 | 0.5542 | 0.5552 | vw | 4.0 |
| 123 | 0.3010 | 0.3020 | w | 19.0 | 044 $\beta$ | 0.5544 | | | 6.0 |
| 222 | 0.3032 | — | — | 0.0 | 143 | 0.5639 | 0.5641 | vw | 13.5 |
| 132 | 0.3109 | 0.3116 | vst | 136 | 410 | 0.5653 | 0.5675 | vw | 9.5 |
| 004 | 0.3189 | 0.3208 | m | 59.8 | 242 | 0.5661 | | | 0.0 |
| 230 | 0.3330 | 0.3335 | m⁻ | 29.6 | 250 $\beta$ | 0.5661 | | | 2.7 |
| 223 $\beta$ | 0.3337 | | | 5.0 | 323 | 0.5727 | 0.5739 | vw | 13.7 |
| 141 $\beta$ | 0.3350 | | | 6.9 | 332 | 0.5826 | 0.5828 | w | 22.4 |
| 024 $\beta$ | 0.3367 | 0.3380 | st | 4.2 | 251 $\beta$ | 0.5826 | | | 4.7 |
| 213 | 0.3372 | | | 85.0 | 143 $\beta$ | 0.5826 | | | 2.4 |
| 312 $\beta$ | 0.3373 | | | 0.7 | 411 | 0.5852 | — | — | 0.0 |
| 311 | 0.3475 | 0.3495 | st | 72.9 | 025 | 0.5860 | — | — | 0.1 |
| 040 | 0.3506 | | | 21.4 | 151 | 0.6016 | — | — | 0.0 |
| 104 | 0.3529 | — | — | 3.5 | 125 | 0.6199 | 0.6216 | w | 43.8 |
| 231 | 0.3530 | — | — | 0.1 | 402 | 0.6231 | | | 1.0 |
| 041 | 0.3705 | 0.3706 | vvw | 7.5 | 304 | 0.6246 | — | — | 0.7 |
| 114 | 0.3748 | — | — | 1.7 | 420 | 0.6310 | — | — | 6.7 |
| 302 | 0.3854 | — | — | 0.4 | 412 | 0.6450 | — | — | 0.2 |
| 240 $\beta$ | 0.4028 | 0.4040 | m | 0.9 | 314 | 0.6465 | — | — | 1.4 |
| 223 | 0.4029 | | | 24.8 | 421 | 0.6509 | 0.6529 | m | 40.1 |
| 141 | 0.4045 | | | 34.6 | 234 | 0.6520 | | | 38.7 |
| 024 | 0.4066 | 0.4074 | vw | 21.2 | 215 | 0.6561 | — | — | 14.6 |
| 312 | 0.4073 | | | 3.5 | 152 | 0.6614 | — | — | 8.0 |
| 133 | 0.4106 | — | — | 2.0 | 341 | 0.6761 | — | — | 13.9 |
| 243 | 0.6658 | — | — | 9.9 | 333 | 0.6822 | — | — | 0.4 |
| 044 | 0.6695 | 0.6695 | w | 30.1 | 250 | 0.6836 | 0.6848 | vw | 13.7 |
| 061 $\beta$ | 0.6697 | | | 0.7 | 315 $\beta$ | 0.6840 | | | 13.5 |

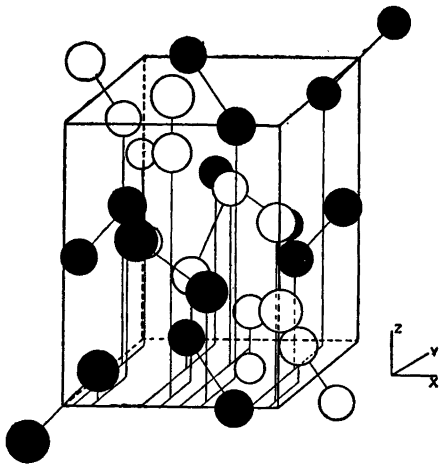


*Fig. 1. The crystal structure of CdSb and ZnSb.* ● *Sb,* ○ *Cd or Zn.*

Only the distance between the Cd atoms in CdSb differs rather much from the calculated value.

The structure is reproduced in Fig. 1.

SUMMARY

The intermetallic compounds CdSb and ZnSb are isomorphous, crystallize in the space group $D_{2h}^{15} - P/bca$, and their orthorhombic cells contain eight formula units. The lattice dimensions, the atomic coordinates and the interatomic distances are determined and may be seen from the tables in the text.

Finally, I wish to thank Professor A. Ölander for his encouraging interest in my work and Mr Aage Kivikanto who has performed part of the experimental work.

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