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Crystal data for robustic acid methyl ether.

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In the course of the study of scandenin (Krishna Rao & Venkateswara Rao, 1963) and related compounds, the authors have determined the space group and the unit-cell dimensions of robustic acid methyl ether ($C_{23}H_{22}O_6$). This compound has been obtained as platy crystals with a pinacoidal habit, by Khan (1960) during his studies on the structure of robustic acid.

Rotation and zero-layer Weissenberg photographs, taken with Fe K radiation, showed that the crystal belongs to the triclinic system with the following cell dimensions.

$a = 11{\cdot}83$,	$b = 9{\cdot}09$,	$c = 9{\cdot}36$ Å;
$\alpha = 94°$,	$\beta = 96°$,	$\gamma = 100°$.

Of the two possible space groups $P1$ and $P\bar{1}$, it is likely that the crystal belongs to $P\bar{1}$, in view of its pinacoidal habit.

The observed density 1·35 g.cm^{-3}, determined by the flotation method with a mixture of ethylbenzene and bromobenzene, agrees with the value 1·33 g.cm^{-3} calculated for two molecules per unit cell.

No further work on this crystal is contemplated.

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An X-ray study of the γ-Cu_4Cd_3 phase alloy.

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The present note reports some crystallographic data of the γ-Cu_4Cd_3 phase alloy based on X-ray powder diffraction studies. Earlier Owen & Pickup (1933) while studying the copper-cadmium alloy system observed a diffraction pattern for the γ phase which according to them corresponded to a very complicated structure. Later Laves & Mueller (1938) reported that the powder photographs of both β-Al_3Mg_2 and γ-Cu_4Cd_3 are very similar and conclude that the two structures are isomorphous. The structure of the β-Al_3Mg_2 phase was found by Perlitz (1944) to be face-centred cubic with $a = 28{\cdot}16$ kX and 1166 atoms per unit cell. This has also been confirmed by Soulnier & Mirand (1960) from an electron-diffraction study of the alloy. However, no independent study of the γ-Cu_4Cd_3 phase seems to have been made yet.

According to *Metals Handbook* (Smith, 1948) the γ-Cu_4Cd_3 phase does not form on solidification but appears only after prolonged annealing at about 500 °C. The alloy investigated was made from spectroscopically pure Johnson–Matthey copper and cadmium to the composition Cu_4Cd_3 by melting them in evacuated silica tubes. The alloy thus prepared was annealed for several days at a temperature of 470 °C, after which filings were obtained with a No. 1 file. The filings were then annealed at 470 °C for two hours to make them strain-free. All the annealing processes mentioned above were performed in evacuated and sealed Pyrex tubes. X-ray powder diffraction photographs of the alloy were taken on a 114·6 mm camera with filtered Cu $K\alpha$ radiation. Good photographs could be obtained after 30 hours of exposure at 36 kV and 20 mA in the Philips PW 1010 X-ray unit. It was found that the photographs did not contain lines of phases other than the γ phase. A diffractometric study was also made. The powder diffraction data are given in Table 1. All intensities below 4 were obtained with the diffractometer. All the lines could be indexed on the basis of a tetragonal unit cell with $a = 13{\cdot}701$ Å and $c = 9{\cdot}944$ Å, taking wave lengths ${}^{\lambda}k_{\alpha_1} = 1{\cdot}5405$ Å and ${}^{\lambda}K_{\alpha_2} = 1{\cdot}5443$ Å for copper radiation.

The density of the alloy measured by a density bottle is 9·09 g.cm^{-3}. The calculated density on the basis of 120 atoms per unit cell is 9·00 g.cm^{-3}. By considering the extinctions the space group appears to be $P4_2/ncm$.

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