SPACE GROUP AND UNIT CELL
DIMENSIONS OF DIGLYCINE
STRONTIUM CHLORIDE TRIHYDRATE
AND DIGLYCINE MANGANESE
CHLORIDE

The investigation of the crystal structures of diglycine barium chloride monohydrate, diglycine strontium chloride trihydrate and diglycine manganese chloride has been taken up in this laboratory to gather information regarding the orientation of the glycine units in its different addition compounds and also to study the nature of the hydrogen bonds present. The preliminary results obtained with the strontium and manganese compounds are given here.

Diglycine strontium chloride trihydrate was crystallised by slow evaporation of an aqueous solution of glycine and strontium chloride in stoichiometric proportions. The sample used for collecting X-ray diffraction data was cut from a big crystal, along 'b' and 'c' axes and ground to needles of thickness 0.30 mm. Rotation and Weissenberg photographs established the crystal to be orthorhombic with a tetramolecular unit cell of dimensions:

\[ a = 16.52 \text{ Å} \quad b = 9.34 \text{ Å} \quad c = 8.25 \text{ Å} \quad (\pm 0.015 \text{ Å}) \]

From systematic absences in the Weissenberg photographs, the space group could be uniquely identified as \( P_{bnm} \). The density of the crystal was measured by flotation method using bromoform and trichloroethylene.

\[ d_{\text{measured}} = 1.90 \text{ mg./c.c.} \]
\[ d_{\text{calculated}} = 1.892 \text{ gm./c.c.} \]

The number of molecules in the unit cell, \( Z = 4 \).

Diglycine manganese chloride was also crystallised by slow evaporation of an aqueous solution of glycine and manganese chloride in stoichiometric proportions. Three prominent zone axes were chosen as rotation axes for collecting X-ray diffraction data. Absence of rotation and mirror symmetries established the crystals to be triclinic with the following dimensions for the unit cell. These were obtained from the 'a' and 'c' axes rotation and Weissenberg photographs and by the application of Buerger's offset method to higher level pictures. The space group is \( P1 \) or \( \overline{P1} \).

\[ a = 4.96 \text{ Å} \quad b = 8.16 \text{ Å} \quad c = 7.01 \text{ Å} \quad (\pm 0.015 \text{ Å}) \]
\[ a = 111°48', \quad b = 115°20', \quad c = 103°30' \quad (+1°) \]

The density of the crystal, measured by flotation method using a mixture of bromoform and trichloroethylene, gives only one molecule in the unit cell.

\[ d_{\text{measured}} = 1.94 \text{ gm./c.c.} \]
\[ d_{\text{calculated}} = 1.932 \text{ gm./c.c.} \]

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STUDY OF ULTRASONIC VELOCITY IN MOLLEN METALS

Ultrasonic velocity is studied in the liquid state over a wide temperature range in the elements sulphur, cadmium, zinc and tellurium. The wave path interference pulse technique is employed and two fused quartz rods are used to serve as delay lines and also to isolate the transmitting and receiving X-cut quartz crystals of 3 Mc/sec. fundamental from these high temperatures. Metals when melted will be oxidised to a great extent and form a coating on the quartz rod absorbing completely the ultrasonic signal. As there is no provision for vacuum melting, an eutectic mixture of KCl + LiCl is covered over the melt to prevent oxidation and to give an acoustic contact as done by Kleppa. Only in the case of sulphur, nitrogen atmosphere is provided by a continuous flow to prevent oxidation.

The velocity values in sulphur at lower temperatures are slightly higher though the general shape of the velocity-temperature curve is similar to that obtained by the earlier workers. No jump (Fig. 1) in velocity near 160°C is observed as reported by Pryor and Richardson. The velocity decrease with temperature is not strictly linear and the gradient is high at lower temperatures and changes to