Acta Cryst. (1954). **7**, 781

The crystal structures of SrCd, BaCd, SrHg and BaHg.

By Riccardo Ferro, *Chemical Institute of Genoa University, Genoa, Italy*

(*Received* 9 *August* 1954)

SrCd, BaCd, SrHg and BaHg have been prepared by electric melting of the various metals in pure iron vessels, followed by heating to 950° C. and slow cooling (in about 100 hr.) to room temperature. None of the metals used was below 99·9% purity.

The alloys obtained are brittle (especially those with cadmium) and, particularly the amalgams, easily alterable in air; therefore it is necessary to handle them under inert gas.

The micrographic appearance, although difficult to observe owing to the reactivity of the samples, agrees with the hypothesis of the existence of only one phase for the 1:1 composition.

The amalgams were analysed by treating them with HCl, collecting the mercury on a Gooch crucible and precipitating the $SrSO_4$ or $BaSO_4$ from the filtrate. The alloys with cadmium, after dissolution in HCl, were first treated with H_2SO_4 to precipitate $SrSO_4$ or $BaSO_4$ and then the cadmium in the filtrate was determined as $CdSO_4$. The tested samples had the following compositions:

SrCd: Cd% $57{\cdot}0_5$ (56·19 theor.);
BaCd: Cd% $45{\cdot}1_0$ (45·01 theor.);
SrHg: Hg% $70{\cdot}8_1$ (69·60 theor.);
BaHg: Hg% $60{\cdot}2_2$ (59·36 theor.).

The specific gravity was checked by filling the picnometer (under vacuum) with rectified benzene which had been dehydrated on sodium and potassium.

The alloys were examined by X-rays (Cu $K\alpha$ radiation) using the powder method. The positions and intensities of the reflexions were in accordance with a CsCl-type cubic structure. The constants are shown in Table 1.

It is interesting to compare these data with those of CaCd (a_0 = 3·830 kX.) and CaHg (a_0 = 3·751 kX.) (Iandelli, 1949), and to observe how the interatomic distances vary, as regards the various cadmium compounds, in perfect correspondence with those of the amalgams. Finally it is useful to note the resemblance with rare earths, of which the following isostructural compounds are known: LaCd, CeCd, PrCd (Iandelli & Botti, 1937); LaHg, CeHg, PrHg and NdHg (Iandelli & Ferro, 1951).

Table 1. *Structure data for A* Cd *and A* Hg *Compounds*

(All distances are in kX. units.)

AB	a_0	*A–B* distance	r_A+r_B	Specific gravity	
				Calc.	Meas.
SrCd	4·003	3·476	3·56	5·15	5·06
BaCd	4·207	3·643	3·66	5·54	5·69
SrHg	3·922	3·396	3·59	7·88	7·77
BaHg	4·125	3·572	3·69	7·95	7·90

Differences between interatomic distances

3·572 − 3·396 = 0·176 (Ba–Hg) (Sr–Hg)
3·396 − 3·248 = 0·148 (Sr–Hg) (Ca–Hg)
3·643 − 3·467 = 0·176 (Ba–Cd) (Sr–Cd)
3·467 − 3·317 = 0·150 (Sr–Cd) (Ca–Cd)

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Acta Cryst. (1954). **7**, 781

Crystallographic data on some diester phosphate compounds.*

By J. Scanlon and R. L. Collin, *Cancer Research Institute, New England Deaconess Hospital, Boston* 15, *Massachusetts, U.S.A.*

(*Received* 16 *July* 1954)

In the course of a structural investigation into simple compounds related to the nucleic acids we have obtained preliminary crystallographic data on several diester phosphates.

Dibenzyl phosphates

Crystals of silver dibenzyl phosphate were supplied by Dr E. G. Heineman of Harvard University. The silver salt was converted to the free acid by acidification with dilute sulfuric acid and then extracted with chloroform. The chloroform solution was evaporated slowly to give crystals of dibenzyl phosphoric acid.

Diethyl phosphate salts

Excess silver oxide was added to a solution of diethyl chlorophosphate (kindly supplied by Victor Chemical Works) and allowed to stand for about four hours at 60° C. with occasional stirring. The precipitate of silver chloride and the excess silver oxide were filtered off and the solution of silver diethyl phosphate was then titrated with a dilute solution of the appropriate chloride (e.g. cupric chloride) until no more silver chloride precipitated. This was filtered and the solution of the salt (e.g. cupric diethyl phosphate) was concentrated by vacuum distillation and then dried by evaporation at room temperature.

Further crystallizations were carried out to obtain good crystals for X-ray work. Cupric diethyl phosphate was crystallized from chloroform and magnesium diethyl phosphate from a mixture of ethyl alcohol and ethyl

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* This work was aided by U.S. Atomic Energy Contract AT(30-1)-901 with the New England Deaconess Hospital, Boston 15, Massachusetts, U.S.A.