

CXXXV.—*The Binary System Barium Iodide-Water.*

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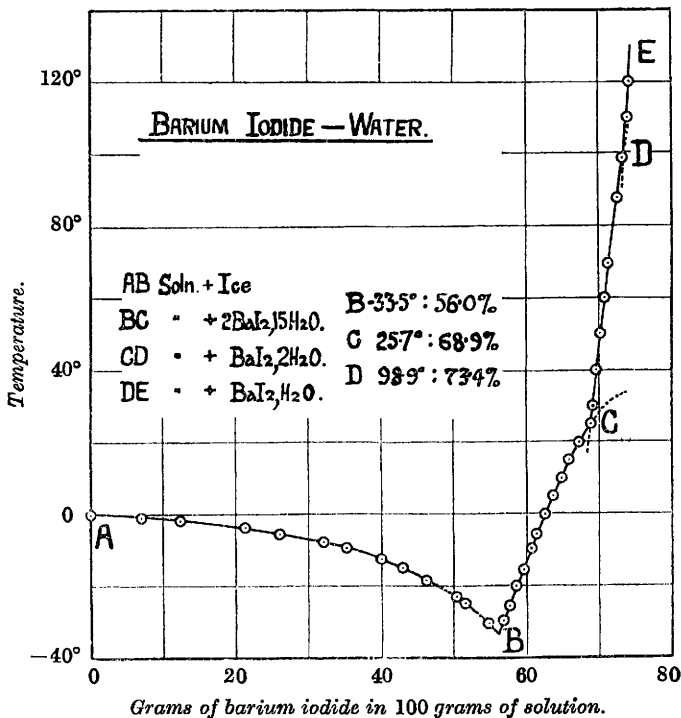
HAVING had occasion recently to seek information regarding the solubility of barium iodide in water at three or four temperatures, we found the available figures scanty and uncertain and were obliged to make new measurements. It seemed worth while to supplement these and to place on record the full binary system from the eutectic temperature (-33.5°) to 120° .

Barium Iodide-Water.

Temp.	D_4^{20} .	% BaI ₂ in soln.	Solid phases.	Temp.	D_4^{20} .	% BaI ₂ in soln.	Solid phases.
— 1.0°	1.060	7.00	Ice	— 5.8°	2.036	61.45	2BaI ₂ , 15H ₂ O
— 1.7	1.117	12.4	"	0.0	2.071	62.5	"
— 3.7	1.221	21.35	"	+ 5.0	2.105	63.6	"
— 5.35	1.281	26.05	"	10.0	2.144	64.8	"
— 7.75	1.371	32.05	"	15.0	2.176	65.75	"
— 9.35	1.423	35.15	"	19.9	2.222	67.15	"
— 12.35	1.507	39.90	"	25.0	2.277	68.8	"
— 14.95	1.568	42.95	"	25.7	—	68.9	2BaI ₂ , 15H ₂ O
— 18.15	1.634	46.1	"				and
— 22.9	1.731	50.4	"				BaI ₂ , 2H ₂ O
— 24.6	1.764	51.5	"	26.0	2.282	68.9	BaI ₂ , 2H ₂ O
— 30.2	1.842	54.6	"	30.0	2.287	69.1	"
— 33.5	—	56.0	Ice and	40.0	2.304	69.6	"
			2BaI ₂ , 15H ₂ O	50.0	2.32	70.1	"
			(extrapolated	60.0	2.331	70.7	"
			eutectic)	69.5	2.35	71.15	"
— 29.75	1.905	56.8	2BaI ₂ , 15H ₂ O	87.7	—	72.55	"
— 25.4	1.927	57.5	"	98.9	—	73.35	BaI ₂ , 2H ₂ O
— 20.0	1.952	58.6	"				and
— 15.4	1.983	59.65	"				BaI ₂ , H ₂ O
— 9.7	2.012	60.65	"	110.0	—	74.0	BaI ₂ , H ₂ O
				120.0	—	74.3	"

Commercial (B.D.H.) barium iodide, approximating in composition to BaI₂, 2H₂O, was purified by crystallisation, and used, as the hydrate 2BaI₂, 15H₂O. The procedure adopted in examining the

system followed the usual lines. Concentrations were determined by estimating iodide volumetrically against silver nitrate, with ferric thiocyanate as indicator: they are expressed in the table as weights of anhydrous salt in 100 g. of solution. In some cases, the values were checked by estimations of barium as sulphate. Transition points were measured thermometrically and confirmed by intersections of extrapolated curves.



The mono- and di-hydrates are well known, whilst hydrates with six and seven molecules of water have been stated to exist. It is difficult to obtain a deliquescent hydrate, like the highest in this series, in a sufficiently pure state for analysis. Probably the surest procedure is to investigate it by the method depending on analysis of wet solids in a suitable ternary system, and this we have done in the system barium iodide-iodine-water, which we hope shortly to describe. The highest hydrate appears to be $2\text{BaI}_2 \cdot 15\text{H}_2\text{O}$, and we have not found either hexa- or hepta-hydrate.

The table and figure indicate all details of the system.