

<b>COMPONENTS:</b> (1) Lithium chlorate: $\text{LiClO}_3$ ; [13453-71-9] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Mylius, F.; Funk, R. <i>Ber. Dtsch. Chem. Ges.</i> <u>1897</u> , 30, 1716-25.						
<b>VARIABLES:</b> $T/K = 291$	<b>PREPARED BY:</b> Hiroshi Miyamoto						
<b>EXPERIMENTAL VALUES:</b> <p>The solubility of <math>\text{LiClO}_3</math> in water at <math>18^\circ\text{C}</math> is given:</p> <table> <tr> <td>75.8 mass %</td><td>(authors)</td></tr> <tr> <td>313.5 g/100 g <math>\text{H}_2\text{O}</math></td><td>(authors)</td></tr> <tr> <td>34.7 mol <math>\text{kg}^{-1}</math></td><td>(compiler)</td></tr> </table> <p>The density of the saturated solution was given as</p> <p style="text-align: center;"><math>1.814 \text{ g cm}^{-3}</math></p>		75.8 mass %	(authors)	313.5 g/100 g $\text{H}_2\text{O}$	(authors)	34.7 mol $\text{kg}^{-1}$	(compiler)
75.8 mass %	(authors)						
313.5 g/100 g $\text{H}_2\text{O}$	(authors)						
34.7 mol $\text{kg}^{-1}$	(compiler)						
<b>AUXILIARY INFORMATION</b>							
<b>METHOD/APPARATUS/PROCEDURE:</b> The salt and water were placed in a bottle and agitated in a constant temperature bath for a long time (time not specified). After the saturated solution settled, aliquots for analyses were withdrawn with a pipet. $\text{LiClO}_3$ was determined by evaporation to dryness.	<b>SOURCE AND PURITY OF MATERIALS:</b> The salt was stated to be of a "pure grade", and trace impurities stated to be absent.  <b>ESTIMATED ERROR:</b> Soly: precision within 1 %. Temp: nothing specified.  <b>REFERENCES:</b>						

COMPONENTS:			ORIGINAL MEASUREMENTS:		
(1) Lithium chlorate; LiClO <sub>3</sub> ; [13453-71-9]			Kraus, C.A.; Burgess, W.M.		
(2) Water; H <sub>2</sub> O; [7732-18-5]			J. Am. Chem. Soc. 1927, 49, 1226-35.		
VARIABLES:			PREPARED BY:		
T/K = 234.1 to 400.8			Hiroshi Miyamoto and Mark Salomon		
EXPERIMENTAL VALUES:					
t/°C	Water mass %	Lithium mass % (compiler)	Chlorate mol % (compiler)	mol kg <sup>-1</sup> (compiler)	Nature of the
- 8.7	84.24	15.76	3.595	2.070	Ice
-13.2	79.27	20.73	4.954	2.893	"
-15.2	77.37	22.63	5.508	3.236	"
-17.4	75.56	24.44	6.056	3.578	"
-19.9	73.30	26.70	6.768	4.030	"
-23.3	71.32	28.68	7.420	4.449	"
-26.2	69.67	30.33	7.984	4.816	"
-30.5	67.29	32.71	8.832	5.378	"
-36.6	64.62	35.38	9.838	6.057	"
-39.1	63.27	36.73	10.37	6.422	"
-39.0	62.58	37.42	10.65	6.615	LiClO <sub>3</sub> ·3H <sub>2</sub> O
-37.1	61.9	38.1	10.9	6.81	"
-33.9	60.95	39.05	11.32	7.088	"
-15.7	54.65	45.35	14.19	9.180	"
- 8.8	52.06	47.94	15.51	10.19	"
- 7.3	51.04	48.96	16.05	10.61	"
- 4.8	49.51	50.49	16.89	11.28	"
- 1.8	48.05	51.95	17.73	11.96	"
+ 0.5	46.73	53.27	18.51	12.61	"
2.2	45.43	54.57	19.32	13.29	"
4.8	43.34	56.66	20.67	14.46	"
6.1	41.84	58.16	21.69	15.38	"
7.3	39.85	60.15	23.13	16.70	"
continued.....					
AUXILIARY INFORMATION					
METHOD/APPARATUS/PROCEDURE:			SOURCE AND PURITY OF MATERIALS:		
Solubilities were determined by thermal analysis (cooling curves). A weighed quantity of salt (12-28 g) was placed in a tube which was sealed with a rubber stopper. The stopper was fitted with a mercury sealed stirrer, a nitrogen inlet, an inlet to permit additions of water from a pycnometer with a long delivery tube, and a copper-constantan thermocouple. The solubility tube was fitted with an air jacket, and the apparatus placed in an oil or water thermostat. Nitrogen was passed through the upper part of the tube during additions of water, and experiments were carried with a slight excess pressure of N <sub>2</sub> . After the determination of the melting point of the anhydrous salt, successive known quantities of water were added, and the solution cooled to obtain precipitation. Four independent series of experiments were carried out.			Lithium chlorate solutions were prepd by slowly adding a 5.5 N solution of barium chlorate to a 4.5 N solution of lithium sulfate, both solutions being near the boiling point. The pptd BaSO <sub>4</sub> was removed by filtration, and the filtrate treated with barium chlorate and sulfate to insure equivalence of LiClO <sub>3</sub> . LiClO <sub>3</sub> was pptd from the filtrate in several steps by slowly evaporating the solvent in vacuum over P <sub>2</sub> O <sub>5</sub> . Care was taken to prevent the salt in the highly concentrated solution (around 90 % of salt) from decomposing by keeping the temp below 50°C. The resulting salt was pulverized and finally dried in a desiccator over P <sub>2</sub> O <sub>5</sub> under high vacuum.		
			Lithium sulfate prepd from the recrystd carbonate with sulfuric acid. The ppt was washed and dried at 130°C. Barium chlorate of the highest obtainable purity was recrystd from water several times and was dried at 130°C.		
			ESTIMATED ERROR:		
			Nothing specified.		

COMPONENTS:				ORIGINAL MEASUREMENTS:	
(1) Lithium chlorate; LiClO <sub>3</sub> ; [13453-71-9]				Kraus, C.A.; Burgess, W.M.	
(2) Water; H <sub>2</sub> O; [7732-18-5]				J. Am. Chem. Soc. <u>1927</u> , 49, 1226-35.	

EXPERIMENTAL VALUES: (Continued)					
t/°C	Water mass %	Lithium mass % (compiler)	Chlorate mol % (compiler)	mol kg <sup>-1</sup> (compiler)	Nature of the solid phase
7.85	38.49	61.51	24.16	17.68	LiClO <sub>3</sub> ·3H <sub>2</sub> O
7.9	36.56	63.44	25.70	19.20	"
7.4	35.12	64.88	26.91	20.44	"
6.8	33.89	66.11	27.99	21.58	"
6.0	32.82	67.18	28.97	22.64	"
4.5	31.61	68.39	30.13	23.94	"
4.0	30.56	69.44	31.17	25.14	"
3.4	30.26	69.74	31.48	25.50	"
0.9	28.82	71.18	32.99	27.32	"
0.0	28.11	71.89	33.76	28.29	"
- 1.6	27.20	72.80	34.79	29.61	"
- 1.8	27.61	72.39	34.32	29.07	"
- 3.6	26.26	73.74	35.88	31.07	"
- 5.8	25.37	74.63	36.96	32.54	"
- 7.3	25.03	74.97	37.38	33.14	"
- 7.8	24.55	75.45	37.99	34.00	"
-13.6	22.75	77.25	40.36	37.57	"
+ 3.8	28.11	71.89	33.76	28.29	LiClO <sub>3</sub> ·H <sub>2</sub> O
5.1	27.61	72.39	34.32	29.01	"
6.8	27.20	72.80	34.79	29.61	"
9.1	26.26	73.74	35.88	31.07	"
11.2	25.37	74.63	36.96	32.54	"
12.0	25.03	74.97	37.38	33.14	"
13.4	24.55	75.45	37.99	34.00	"
14.1	23.41	76.59	39.47	36.19	"
14.6	23.79	76.21	38.97	35.44	"
16.7	22.75	77.25	40.36	37.57	"
18.9	21.46	78.54	42.18	40.49	"
20.5	19.73	80.27	44.78	45.01	"
- 3.2	23.41	76.59	39.47	36.19	γ-LiClO <sub>3</sub>
+ 2.9	22.41	77.59	40.83	38.30	"
8.4	21.67	78.33	41.87	39.99	"
12.8	20.74	79.26	43.24	42.28	"
16.4	20.32	79.68	43.87	43.38	"
22.1	18.32	81.68	47.05	49.32	"
27.2	17.33	82.67	48.74	52.77	"
27.6	18.33	81.67	47.03	49.29	"
32.0	17.20	82.80	48.96	53.26	"
32.0	16.09	83.91	50.97	57.69	"
32.8	16.42	83.58	50.36	56.31	"
36.2	15.48	84.52	52.11	60.40	"
36.8	14.64	85.36	53.75	64.50	"
39.6	13.73	86.27	55.60	69.51	"
43.9	12.83	87.17	57.52	75.16	"
36.9	13.73	86.27	55.60	69.51	β-LiClO <sub>3</sub>
48.1	13.67	86.33	55.73	69.87	"
48.3	12.83	87.17	57.52	75.16	"
49.8	12.51	87.49	58.23	77.37	"
61.6	11.81	88.19	59.81	82.61	"
67.2	10.57	89.43	62.77	93.60	"
71.3	9.72	90.28	64.93	102.8	"
72.6	9.98	90.02	64.26	99.79	"
78.9	8.61	91.39	67.90	117.4	"
85.8	7.46	92.54	71.20	137.2	"

COMPONENTS:		ORIGINAL MEASUREMENTS:			
(1)	Lithium chlorate; LiClO <sub>3</sub> ; [13453-71-9]	Kraus, C.A.; Burgess, W.M.			
(2)	Water; H <sub>2</sub> O; [7732-18-5]	J. Am. Chem. Soc. <u>1927</u> , 49, 1226-35.			

EXPERIMENTAL VALUES: (Continued)					
t/°C	Water mass %	Lithium mass % (compiler)	Chlorate mol % (compiler)	mol kg <sup>-1</sup> (compiler)	Nature of the solid phase
86.4	7.85	92.15	70.06	129.9	β-LiClO <sub>3</sub>
86.6	7.40	92.60	71.38	138.4	"
90.0	6.55	93.45	73.98	157.8	"
90.7	7.06	92.94	72.40	145.6	"
92.3	6.32	93.68	74.71	164.0	"
95.7	6.23	93.77	75.00	166.5	"
95.7	5.65	94.35	76.90	184.7	"
100.2	4.91	95.09	79.42	214.3	α-LiClO <sub>3</sub>
102.5	5.40	94.60	77.74	193.8	"
103.4	4.44	95.56	81.09	238.1	"
107.3	4.30	95.70	81.60	246.2	"
107.7	3.68	96.32	83.91	289.6	"
108.0	3.98	96.02	82.78	266.9	"
114.1	3.14	96.86	86.01	341.3	"
115.1	2.67	97.33	87.90	403.3	"
115.3	2.46	97.54	88.77	438.6	"
120.3	1.44	98.56	93.17	757.2	"
121.3	1.53	98.47	92.77	712.0	"
126.7	0.83	99.17	95.97	1322	"
127.0	0	100	100	---	"
127.6	0	100	100	---	"

COMPONENTS:					ORIGINAL MEASUREMENTS:
(1) Lithium chlorate; $\text{LiClO}_3$ ; [13453-71-9]					Berg, L.
(2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]					Z. Anorg. Allg. Chem. 1929, 181, 131-6.
VARIABLES:					PREPARED BY:
T/K = 273.2 to 400.7					Hiroshi Miyamoto
EXPERIMENTAL VALUES:					
t/°C	Water mass %	Lithium Chlorate		mol kg <sup>-1</sup>	Nature of the solid phase
		mass % (compiler)	mol % (compiler)	(compiler)	
127.5 <sup>a</sup>	0.0	100	100	-	$\alpha\text{-LiClO}_3$
126 <sup>a</sup>	0.5	99.5	97.5	2200	"
124 <sup>a</sup>	1.0	99.0	95.2	1100	"
118.5 <sup>a</sup>	2.4	97.6	89.0	450	"
113.5 <sup>a</sup>	3.0	97.0	86.6	358	"
106.6	4.1	95.9	82.3	259	"
105 <sup>a</sup>	4.5	95.5	80.9	235	"
104	4.6	95.4	80.5	229	"
100	4.9	95.1	79.5	215	"
100	5.0	95.0	79.1	210	"
95	5.5	94.5	77.4	190	$\beta\text{-LiClO}_3$
90	7.0	93.0	72.6	147	"
(90)	6.2	93.8	75.1	167	"
89 <sup>a</sup>	7.0	93.0	72.6	147	"
85	7.9	92.1	69.9	129	"
84 <sup>a</sup>	8.1	91.9	69.3	126	"
81 <sup>a</sup>	9.0	91.0	66.8	112	"
80.9	9.0	91.0	66.8	112	"
70.0	10.8	89.2	62.2	91.4	"
68	11.2	88.8	61.2	87.7	"
60.0	11.9	88.1	59.6	81.9	"
55 <sup>a</sup>	12.6	87.4	58.0	76.7	"
55.0	12.9	87.1	57.4	74.7	"
50.0	13.9	86.1	55.2	68.5	"
45.0	14.3	85.7	54.4	66.3	"
continued .....					
AUXILIARY INFORMATION					
METHOD/APPARATUS/PROCEDURE:				SOURCE AND PURITY OF MATERIALS:	
Two different methods were used to determine the solubility of lithium chlorate in water. (1) Synthetic method used with visual observation of temperature of crystallization. The weighed salt and water were placed into a test-tube equipped with a stirrer and a thermocouple. The test-tube was placed in a larger test-tube which was then placed in a paraffin oil bath. The bath was slowly and evenly warmed. When the salt in the tube disappeared, the temperature of the sample solution was measured by the thermocouple. Next the bath was gently cooled, and when the salt appeared the temperature was measured again. (2) The isothermal method was used to obtain an accurate liquidus curve. The salt and water were placed into an apparatus with stirrer fitted with a mercury seal. The apparatus was placed in an oil thermostat. The lithium content was determined gravimetrically (in duplicate) as lithium sulfate.				No information was given.	
				ESTIMATED ERROR:	
				Soly: precision within 0.2 %.	
				Temp: precision $\pm 0.1$ K (author).	

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Lithium chlorate; $\text{LiClO}_3$ ; [13453-71-9]	Berg, L.
(2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	Z. Anorg. Allg. Chem. 1929, 181, 131-6.

## CRITICAL EVALUATION: (Continued)

$t/^{\circ}\text{C}$	Water mass %	Lithium Chlorate		mol $\text{kg}^{-1}$ (compiler)	Nature of the solid phase
		mass % (compiler)	mol % (compiler)		
42 <sup>a</sup>	15.1	84.9	52.8	62.2	$\text{LiClO}_3 \cdot 1/3\text{H}_2\text{O}$
40.0	15.3	84.7	52.5	61.2	"
35.0	15.8	84.2	51.5	59.0	"
30.0	16.3	83.7	50.6	56.8	"
25.0	17.1	82.9	49.1	53.6	"
20.0	17.5	82.5	48.4	52.2	"
30.0	17.7	82.3	48.1	51.4	"
25.0	18.9	81.1	46.1	47.5	"
20.0	19.6	80.4	45.0	45.4	$\text{LiClO}_3 \cdot \text{H}_2\text{O}$
20.0	20.5	79.5	43.6	42.9	"
18.0	22.3	77.7	41.0	38.5	"
16.2	23.2	76.8	39.8	36.6	"
12.7	24.8	75.2	37.7	33.5	"
9.2	25.9	74.1	36.3	31.7	"
8.0	26.3	73.7	35.8	31.0	"
7.4	34.4	65.6	27.5	21.1	"
6.0	42.6	57.4	21.2	14.9	"
3.0	45.9	54.1	19.0	13.0	"
0.0	29.0	71.0	32.8	27.1	$\text{LiClO}_3 \cdot 3\text{H}_2\text{O}(?)$
0.0	46.9	53.1	18.4	12.5	$\text{LiClO}_3 \cdot \text{H}_2\text{O}(?)$

<sup>a</sup>These data obtained by synthetic method experiments. All other data from isothermal solubility determinations.

<b>COMPONENTS:</b> (1) Lithium chlorate; $\text{LiClO}_3$ ; [13453-71-9]  (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Treadwell, W.D.; Ammann, A.  <i>Helv. Chim. Acta.</i> <u>1938</u> , 21, 1249-65.
<b>VARIABLES:</b> One temperature: 293 K	<b>PREPARED BY:</b> Hiroshi Miyamoto
<b>EXPERIMENTAL VALUES:</b>  The solubility of lithium chlorate in water at 20°C is given as: $18.32 \text{ mol kg}^{-1}$  The concentration solubility product was also given simply as the square of the solubility: $3.36 \times 10^2 \text{ mol}^2 \text{ kg}^{-2}$	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b> No information was given.	<b>SOURCE AND PURITY OF MATERIALS:</b> No information was given.
	<b>ESTIMATED ERROR:</b> Nothing specified.
	<b>REFERENCES:</b>

COMPONENTS:			ORIGINAL MEASUREMENTS:	
(1) Lithium chlorate; LiClO <sub>3</sub> ; [13453-71-9]			Campbell, A.N.; Griffiths, J.E.	
(2) Water; H <sub>2</sub> O; [7732-18-5]			Can. J. Chem. 1956, 34, 1647-61.	
VARIABLES:			PREPARED BY:	
T/K = 229.9 to 400.7			Hiroshi Miyamoto	
EXPERIMENTAL VALUES:				
t/°C	solubility		Method	Nature of the solid phase <sup>a</sup>
	mass %	mol kg <sup>-1</sup> (compiler)		
0.0	-	-	Thermal analysis	A
- 6.5	10.4	1.28	"	"
-14.2	20.0	2.77	"	"
-26.2	29.2	4.56	"	"
-28.6	30.2	4.79	"	"
-40.4	36.0	6.22	"	"
-43.3	37.3	6.58	"	A+B
-16.9	45.8	9.35	Solubility	B
- 1.5	52.8	12.4	"	"
+ 3.0	56.7	14.5	"	"
5.2	57.9	15.2	"	"
6.0	58.7	15.7	"	"
8.1	60.8	17.2	"	"
6.0	68.1	23.6	"	"
3.0	70.8	26.8	"	"
- 0.1	73.1	30.1	Thermal analysis	B+C
3.0	73.6	30.8	Solubility	C
5.6	74.2	31.8	"	"
6.0	74.1	31.7	"	"
8.5	75.1	33.4	"	"
10.5	75.7	34.5	"	"
continued.....				
AUXILIARY INFORMATION				
<p>For solutions in equilibrium with ice, the solubilities were determined by the thermal method. The compositions of saturated solutions were determined by chemical analysis. The method of thermal analysis was also used for binary eutectics and <math>\alpha \rightarrow \beta</math> transition, and all other solubilities were determined "in the usual way" (i.e. the isothermal method, compiler). Temperatures for thermal analyses were measured with an iron-constantan thermocouple and a potentiometer. The composition of the solid solutions was determined by chlorate analysis. Aliquots were transferred to a 250 ml iodine flask and 40 ml concentrated orthophosphoric acid added, followed by the addition of about 0.1 g sodium carbonate to exclude air from the flask. Approximately 25 ml of iodate-free potassium iodide solution (0.2 gm/ml) was added, and the stoppered flask allowed to stand at room temperature for 60 to 70 min. The free iodine was titrated with sodium thiosulphate. Standardization of the method with pure sodium chlorate indicated an accuracy of <math>\pm 0.4</math> %.</p>				



<b>COMPONENTS:</b>	<b>ORIGINAL MEASUREMENTS:</b>
(1) Lithium chlorate; $\text{LiClO}_3$ ; [13453-71-9]	Campbell, A.N.; Griffiths, J.E.
(2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	Can. J. Chem. <u>1956</u> , 34, 1647-61.

## EXPERIMENTAL VALUES: (Continued)

t/°C	Solubility		Method	Nature of the solid phase <sup>a</sup>
	mass %	mol kg <sup>-1</sup> (compiler)		
14.0	77.5	38.1	Solubility	C
15.0	78.0	39.2	"	"
16.0	78.5	40.4	"	"
18.0	79.3	42.4	"	"
20.5	81.9	50.1	"	C+D
21.5	82.0	50.4	Solubility	D
25.0	82.6	52.5	"	"
30.2	83.4	55.6	"	"
32.6	83.6	56.4	"	"
38.5	85.2	63.7	"	"
-10.5	78.7	40.9	Thermal Analysis	B+D
-25.0	82.7	52.9	"	B+E
44.2	86.7	72.1	Solubility	E
47.9	87.2	75.4	"	"
54.0	87.8	79.6	"	"
63.2	89.5	94.3	"	"
72.8	91.0	112	"	"
81.7	92.4	135	"	"
86.2	93.7	165	"	"
90.7	93.8	167	"	"
94.2	94.8	202	"	"
97.5	95.5	235	"	"
98.9	95.9	259	"	"
127.5	100.0	∞	Thermal Analysis	F

<sup>a</sup> A = Ice; B =  $\text{LiClO}_3 \cdot 3\text{H}_2\text{O}$ ; C =  $\text{LiClO}_3 \cdot \text{H}_2\text{O}$ ; D =  $(\text{LiClO}_3)_4 \cdot \text{H}_2\text{O}$ ; E =  $\beta\text{-LiClO}_3$ ;  
F =  $\alpha\text{-LiClO}_3$ .

## AUXILIARY INFORMATION

## SOURCE AND PURITY OF MATERIALS:

A 1 mol dm<sup>-3</sup> barium chlorate solution was heated to about 85°C, and a 1 mol dm<sup>-3</sup> lithium sulfate solution was added slowly from a dropping funnel until equivalence was reached. The precipitated barium sulfate was removed by repeated filtration. The solution was evaporated slowly up to an approximated concentration of 50 % lithium chlorate. The filtered solution was transferred to a 250 ml Claissen flask and dehydration was carried out under a reduced pressure of less than 5 mm Hg, the distillate being absorbed in concentrated sulfuric acid. In this process, the temperature was kept below 85°C. Upon cooling, the solution to room temperature, the salt crystallized; it was placed under vacuum over phosphorus pentoxide. To remove the last trace of water, the salt was placed in a vacuum oven over phosphorus pentoxide, and maintained at 80°C.

## ESTIMATED ERROR:

Isothermal method:

Soly: accuracy of  $\pm 0.4$  % (authors)

Temp: precision  $\pm 0.05$  K (authors).

Thermal analysis: nothing specified.

<b>COMPONENTS:</b> (1) Sodium chlorate; NaClO <sub>3</sub> ; [7775-09-9] (2) Water; H <sub>2</sub> O; [7732-18-5]		<b>ORIGINAL MEASUREMENTS:</b> Blanc, M.L.; Schmandt, W. Z. <i>Pysik. Chem.</i> <u>1911</u> , 77, 614-638.																			
<b>VARIABLES:</b> T/K = 277.93, 293.00, 303.18, 308.25 and 317.87		<b>PREPARED BY:</b> Hiroshi Miyamoto																			
<b>EXPERIMENTAL VALUES:</b>  <div>Solubility of NaClO<sub>3</sub><sup>a</sup></div> <table><tr><td>t/°C</td><td>mass %</td><td>mol kg<sup>-1</sup></td></tr><tr><td>4.78</td><td>45.47</td><td>7.834</td></tr><tr><td>19.85</td><td>48.91</td><td>8.994</td></tr><tr><td>30.05</td><td>51.22</td><td>9.865</td></tr><tr><td>35.10</td><td>52.36</td><td>10.33</td></tr><tr><td>44.72</td><td>54.50</td><td>11.25</td></tr></table> <sup>a</sup> Molalities calculated by the compiler.				t/°C	mass %	mol kg <sup>-1</sup>	4.78	45.47	7.834	19.85	48.91	8.994	30.05	51.22	9.865	35.10	52.36	10.33	44.72	54.50	11.25
t/°C	mass %	mol kg <sup>-1</sup>																			
4.78	45.47	7.834																			
19.85	48.91	8.994																			
30.05	51.22	9.865																			
35.10	52.36	10.33																			
44.72	54.50	11.25																			
<b>AUXILIARY INFORMATION</b>																					
<b>METHOD/APPARATUS/PROCEDURE:</b>  Nothing specified.		<b>SOURCE AND PURITY OF MATERIALS:</b>  Nothing specified.																			
		<b>ESTIMATED ERROR:</b>  Nothing specified.																			
		<b>REFERENCES:</b>																			

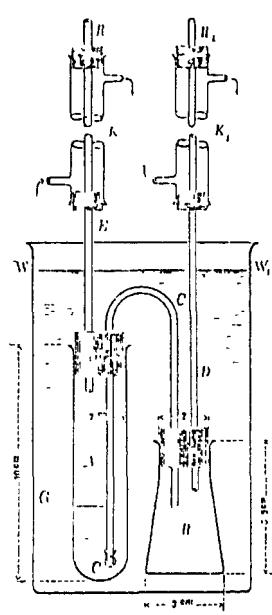
<b>COMPONENTS:</b> (1) Sodium chlorate; NaClO <sub>3</sub> ; [7775-09-9] (2) Water; H <sub>2</sub> O; [7732-18-5]		<b>ORIGINAL MEASUREMENTS:</b> Bell, H.C.  J. Chem. Soc. <u>1923</u> , 123, 2712-3.																																					
<b>VARIABLES:</b> T/K = 273 - 373		<b>PREPARED BY:</b> Hiroshi Miyamoto																																					
<b>EXPERIMENTAL VALUES:</b>  <div>Solubility of NaClO<sub>3</sub><sup>a</sup></div> <table><tr><th>t/°C</th><th>mass %</th><th>mol % (compiler)</th><th>mol kg<sup>-1</sup> (compiler):</th></tr><tr><td>0</td><td>44.32</td><td>11.87</td><td>7.478</td></tr><tr><td>10</td><td>46.70</td><td>12.91</td><td>8.232</td></tr><tr><td>20</td><td>48.95</td><td>13.96</td><td>9.008</td></tr><tr><td>25</td><td>50.13</td><td>14.54</td><td>9.444</td></tr><tr><td>30</td><td>51.30</td><td>15.13</td><td>9.896</td></tr><tr><td>35</td><td>52.38</td><td>15.69</td><td>10.33</td></tr><tr><td>40</td><td>53.54</td><td>16.32</td><td>10.83</td></tr><tr><td>100</td><td>67.10</td><td>25.66</td><td>19.16</td></tr></table> <sup>a</sup> Nature of the solid phase not specified.				t/°C	mass %	mol % (compiler)	mol kg <sup>-1</sup> (compiler):	0	44.32	11.87	7.478	10	46.70	12.91	8.232	20	48.95	13.96	9.008	25	50.13	14.54	9.444	30	51.30	15.13	9.896	35	52.38	15.69	10.33	40	53.54	16.32	10.83	100	67.10	25.66	19.16
t/°C	mass %	mol % (compiler)	mol kg <sup>-1</sup> (compiler):																																				
0	44.32	11.87	7.478																																				
10	46.70	12.91	8.232																																				
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40	53.54	16.32	10.83																																				
100	67.10	25.66	19.16																																				
<b>AUXILIARY INFORMATION</b>																																							
<b>METHOD/APPARATUS/PROCEDURE:</b> A solution of sodium chlorate, saturated at the boiling point, was stirred vigorously in an electrically controlled thermostat at the required temperature for about three hours. A weighed sample was evaporated in a conical flask by immersing this in a bath at 100°C and gently distilling benzene on to the surface of the liquid. In about fifteen minutes the salt was obtained in a thin crust over the bottom of the flask. A shallow layer of benzene was then poured into the flask, which was heated in an air oven at 120°C until its weight was constant. The necessary buoyancy corrections were made to the observed weighings.		<b>SOURCE AND PURITY OF MATERIALS:</b> Nothing specified.																																					
		<b>ESTIMATED ERROR:</b> Soly: nothing specified. Temp: precision ± 0.02 K.																																					
		<b>REFERENCES:</b>																																					

<b>COMPONENTS:</b> (1) Sodium chlorate; $\text{NaClO}_3$ ; [7775-09-9] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Treadwell, W.D.; Ammann, A. <i>Helv. Chim. Acta.</i> <u>1938</u> , 21, 1249-56.
<b>VARIABLES:</b> One temperature: 293 K	<b>PREPARED BY:</b> Hiroshi Miyamoto
<b>EXPERIMENTAL VALUES:</b> <p>The solubility of sodium chlorate in water at 20°C was given as:</p> $9.20 \text{ mol kg}^{-1}$ <p>The concentration solubility product was also given simply as the square of the solubility:</p> $8.46 \times 10^1 \text{ mol}^2 \text{ kg}^{-2}$	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b> No information was given.	<b>SOURCE AND PURITY OF MATERIALS:</b> No information was given.
	<b>ESTIMATED ERROR:</b> Nothing specified.
	<b>REFERENCES:</b>

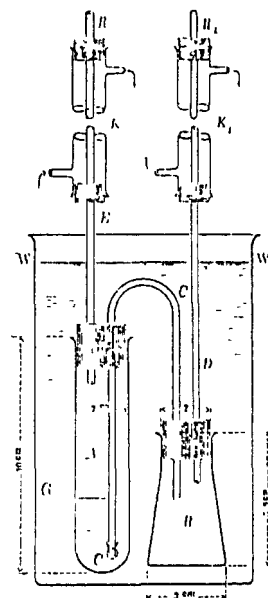
COMPONENTS:		ORIGINAL MEASUREMENTS:	
(1) Potassium chlorate; KClO <sub>3</sub> ; [3811-04-9]		Pawlewski, B.	
(2) Water; H <sub>2</sub> O; [7732-18-5]		Ber. Dtsch. Chem. Ges. 1899, 32, 1040-1.	
VARIABLES:		PREPARED BY:	
T/K = 273 to 373		Hiroshi Miyamoto	
EXPERIMENTAL VALUES:			
Solubility of KClO <sub>3</sub> <sup>a</sup>			
t/°C	mass %	g/100 gH <sub>2</sub> O	mol kg <sup>-1</sup>
0	3.06	3.14	0.256
5	3.67	3.82	0.312
10	4.27	4.45	0.363
15	5.11	5.35	0.437
20	6.76	7.22	0.589
25	7.56	8.17	0.667
30	8.46	9.26	0.756
35	10.29	11.47	0.936
40	11.75	13.31	1.086
45	13.16	14.97	1.222
50	15.18	17.95	1.465
55	16.85	20.27	1.654
60	18.97	23.42	1.911
65	20.32	25.50	2.081
70	22.55	29.16	2.379
75	24.82	32.99	2.692
80	26.97	36.93	3.013
85	29.25	41.35	3.374
90	31.36	46.11	3.763
95	33.76	51.39	4.193
100	35.83	55.54	4.532

<sup>a</sup> Molalities calculated by the compiler.

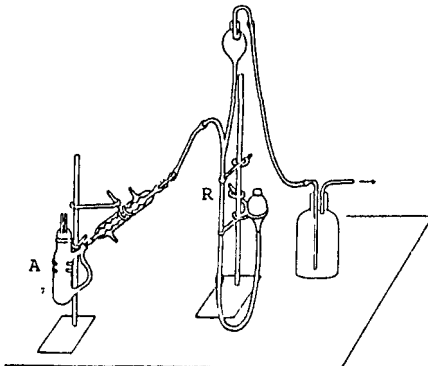
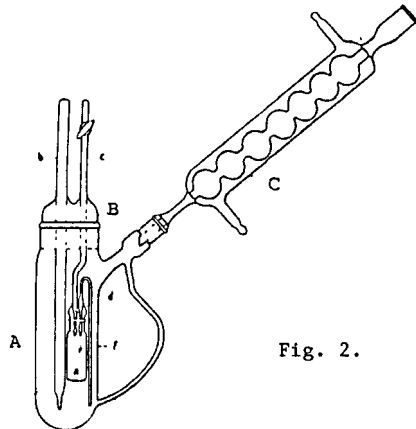
There are a number of inconsistencies between the experimental g/100 gH<sub>2</sub>O solubilities and the author's calculations of mass %. We assume the author made several mistakes in calculation.



AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus for the solubility measurement is shown in the Figure above. The water and potassium chlorate were placed in test tube A. The tube A was equipped with a condenser K and a siphon glass tube C, and connected with a weighing bottle B equipped with a condenser K'. The apparatus was placed into a large thermostated glass beaker. To mix the water and potassium chlorate, air was bubbled through the mixture. After equilibrium was established, the saturated solution in the tube A was filtered into the weighing tube B through the siphon tube C equipped with a cotton wool filter. The apparatus was removed from the large beaker, cooled and/or dried, and bottle B weighed. KClO <sub>3</sub> was determined gravimetrically after evaporation of the solvent.	No information was given.
	ESTIMATED ERROR:
	Nothing specified.
	REFERENCES:



<b>COMPONENTS:</b> (1) Potassium chlorate; KClO <sub>3</sub> ; [3811-04-9] (2) Water; H <sub>2</sub> O; [7732-18-5]		<b>ORIGINAL MEASUREMENTS:</b> Calzolari, F. <i>Gazz. Chem. Ital.</i> <u>1912</u> , 42, 85-92.																			
<b>VARIABLES:</b> T/K = 281 to 372		<b>PREPARED BY:</b> B. Scrosati and H. Miyamoto																			
<b>EXPERIMENTAL VALUES:</b> <table><tr><th colspan="3">Solubility</th></tr><tr><th>t/°C</th><th>g/100gH<sub>2</sub>O</th><th>mol kg<sup>-1</sup> (compiler)</th></tr><tr><td>8</td><td>4.48</td><td>0.366</td></tr><tr><td>19.8</td><td>7.15</td><td>0.583</td></tr><tr><td>30</td><td>10.27</td><td>0.838</td></tr><tr><td>99</td><td>57.3</td><td>4.675</td></tr></table>				Solubility			t/°C	g/100gH <sub>2</sub> O	mol kg <sup>-1</sup> (compiler)	8	4.48	0.366	19.8	7.15	0.583	30	10.27	0.838	99	57.3	4.675
Solubility																					
t/°C	g/100gH <sub>2</sub> O	mol kg <sup>-1</sup> (compiler)																			
8	4.48	0.366																			
19.8	7.15	0.583																			
30	10.27	0.838																			
99	57.3	4.675																			
<b>AUXILIARY INFORMATION</b>																					
<b>METHOD/APPARATUS/PROCEDURE:</b> Method of equilibration not specified, but probably the isothermal method was employed. Aliquots of saturated solution for analysis were withdrawn with a pipet. The aliquots were placed in platinum dishes and the water evaporated. The residues were dried at 120°C to constant weight.		<b>SOURCE AND PURITY OF MATERIALS:</b> Potassium chlorate was prepared by treating potassium sulfate with barium chlorate. The product was repeatedly recrystallized until no trace of sulfate and barium was detected. The purity of the salt was checked by volumetrically determining chlorine in the anhydrous chloride dried at 150-160°C. The result was not given.																			
		<b>ESTIMATED ERROR:</b> Not possible to estimate due to insufficient data.																			
		<b>REFERENCES:</b>																			

<b>COMPONENTS:</b> (1) Potassium chlorate; $\text{KClO}_3$ ; [3811-04-9] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Tschugaeff, L.; Chlopin, W. <i>Z. Anorg. Chem.</i> <u>1914</u> , <b>86</b> , 154-62.															
<b>VARIABLES:</b> T/K = 326 to 341	<b>PREPARED BY:</b> Hiroshi Miyamoto															
<b>EXPERIMENTAL VALUES:</b> <div style="text-align: center;">Solubility of <math>\text{KClO}_3^a</math></div> <table><thead><tr><th>t/°C</th><th>mass %</th><th>mol kg<sup>-1</sup></th></tr></thead><tbody><tr><td>53</td><td>17.37</td><td>1.715</td></tr><tr><td>68</td><td>23.25</td><td>2.472</td></tr><tr><td>81</td><td>28.53<sup>b</sup></td><td>3.258</td></tr><tr><td>86<sup>c</sup></td><td>30.46</td><td>3.574</td></tr></tbody></table> <p><sup>a</sup> Molalities computed by the compiler.</p> <p><sup>b</sup> Original value of 23.53 mass % is obviously a typographical error as correct value (28.53 mass %) is given in Figure 4 of the original publication.</p> <p><sup>c</sup> Original value of 68°C is obviously a typographical error. Figure 4 shows the correct temperature to be 86°C.</p>		t/°C	mass %	mol kg <sup>-1</sup>	53	17.37	1.715	68	23.25	2.472	81	28.53 <sup>b</sup>	3.258	86 <sup>c</sup>	30.46	3.574
t/°C	mass %	mol kg <sup>-1</sup>														
53	17.37	1.715														
68	23.25	2.472														
81	28.53 <sup>b</sup>	3.258														
86 <sup>c</sup>	30.46	3.574														
<b>METHOD/APPARATUS/PROCEDURE:</b> The apparatus used to determine solubilities at high temperatures is shown in Figs. 1 and 2. A saturation vessel A with a condenser C was connected to an aspirator to reduce the pressure. The constancy and the value of the pressure were regulated by a mercury-regulator R. Very fine crystals of potassium chlorate and water were placed in the vessel A. After reaching a desired pressure by aspirating the system, the vessel A was dipped in an oil-bath whose temperature was kept at a temperature 5-10°C above the boiling point. After the solution boiled and reached saturation, an aliquot for analysis was removed through stopcock C by admitting air through the condenser. The concentration of the solution was determined by evaporation of the solvent or by another method. Details of the other method were not reported.																
<div><div></div><div></div><div>Fig. 1.</div><div>Fig. 2.</div></div>																
<b>SOURCE AND PURITY OF MATERIALS:</b> Potassium chlorate was repeatedly recrystallized from distilled water.	<b>ESTIMATED ERROR:</b> Nothing specified.															

<b>COMPONENTS:</b> (1) Potassium chlorate; $\text{KClO}_3$ ; [3811-04-9] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]		<b>ORIGINAL MEASUREMENTS:</b> Flottman, F.  Z. Anal. Chem. <u>1928</u> , 73, 1-39.	
<b>VARIABLES:</b>  T/K = 288, 293 and 298		<b>PREPARED BY:</b>  Hiroshi Miyamoto	
<b>EXPERIMENTAL VALUES:</b> Solubility of potassium chlorate <sup>a</sup>			
t/°C	mass %	mol kg <sup>-1</sup>	density/g cm <sup>-3</sup>
15	5.7381	0.497	1.0363
	5.7390		
	(Av)5.739		
20	6.7927	0.595	1.0420
	6.7963		
	6.7907		
	(Av)6.793 (σ=0.003)		
25	8.0046	0.709	1.0484
	8.0055		
	8.0120		
	7.9742		
	(Av)7.999 (σ=0.017)		
<sup>a</sup> Molalities and standard deviations calculated by the compiler.			
<b>AUXILIARY INFORMATION</b>			
<b>METHOD/APPARATUS/PROCEDURE:</b> An excess of $\text{KClO}_3$ and double distilled water were placed into a shaking bottle. The bottle was agitated in a thermostat for about 10 hours. Equilibrium was established from both undersaturation and supersaturation. The saturated solution and solid phase were separated by filtration. Two analytical methods were used to determine the chlorate content in the saturated solution. (1) An aliquot of saturated solution was concentrated by evaporation, and the residue dried at 110°C. (2) The chlorate in an aliquot of saturated solution was reduced to chloride by addition of sulfuric acid. The solution was evaporated and the KCl heated in an open flame to constant weight.		<b>SOURCE AND PURITY OF MATERIALS:</b> The purest commercial $\text{KClO}_3$ (Kahlbaum, Berlin) was dissolved in distilled water, and the solution decanted three times to remove any impurity. The recrystallized $\text{KClO}_3$ was used for the solubility determinations.	
		<b>ESTIMATED ERROR:</b> Soly: standard deviation is given in the above data table (compiler). Temp: precision $\pm 0.02$ K (author).	
		<b>REFERENCES:</b>	



COMPONENTS:		ORIGINAL MEASUREMENTS:	
(1) Potassium chlorate; KClO <sub>3</sub> ; [3811-04-9]		Benrath, A.; Gjedebo, F.; Schiffers, B.; Wunderlich, H.	
(2) Water; H <sub>2</sub> O; [7732-18-5]		Z. Anorg. Allgem. Chem. <u>1937</u> , 231, 285-97.	
VARIABLES:		PREPARED BY:	
T/K = 450 to 578		Hiroshi Miyamoto	
EXPERIMENTAL VALUES:			
Solubility of KClO <sub>3</sub>			
t/°C	mass %	mol kg <sup>-1</sup> (compiler)	
177	65.1	15.2	
195	70.7	19.7	
203	73.1	22.2	
212	75.8	25.6	
222	78.8	30.3	
242	83.5	41.3	
277	90.7	79.6	
284	92.2	96.5	
305	95.7	181	
AUXILIARY INFORMATION			
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:	
Synthetic method used with visual observation of temperatures of crystallization and solubilization (ref 1). The weighed salt and water were placed in a small tube. The tubes were set in an oven equipped with a mica window. A thermometer was immersed in the oven.		No information was given.	
		ESTIMATED ERROR:	
		Nothing specified.	
		REFERENCES:	
		1. Janencke, E. Z. Physik. Chem. <u>1936</u> , A177, 7.	

<b>COMPONENTS:</b> (1) Potassium chlorate; $\text{KClO}_3$ ; [3811-04-9] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Treadwell, W.D.; Ammann, A. <i>Helv. Chim. Acta.</i> <u>1938</u> , 21, 1249-56.
<b>VARIABLES:</b> One temperature; 293 K	<b>PREPARED BY:</b> Hiroshi Miyamoto
<b>EXPERIMENTAL VALUES:</b> <p>The solubility of potassium chlorate in water at 20°C was given as:</p> $0.58 \text{ mol kg}^{-1}$ <p>The concentration solubility product was also given simply as the square of the solubility:</p> $3.36 \times 10^{-1} \text{ mol}^2 \text{ kg}^{-2}$	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b> No information was given.	<b>SOURCE AND PURITY OF MATERIALS:</b> No information was given.
	<b>ESTIMATED ERROR:</b> Nothing specified.
	<b>REFERENCES:</b>

<b>COMPONENTS:</b> (1) Potassium chlorate; $\text{KClO}_3$ ; [3811-04-9] (2) Water- $\text{d}_2$ ; $\text{D}_2\text{O}$ ; [7789-20-0] (3) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Noonan, E.C. <i>J. Am. Chem. Soc.</i> <u>1948</u> , 70, 2915-8.								
<b>VARIABLES:</b> T/K = 278.15	<b>PREPARED BY:</b> G. Jancso and H. Miyamoto								
<b>EXPERIMENTAL VALUES:</b> <table> <tr> <th>Water-<math>\text{d}_2</math> mass %</th><th>Sodium Chlorate moles/100 moles of solvent</th></tr> <tr> <td>0</td><td>0.5845</td></tr> <tr> <td>91.43</td><td>0.5182</td></tr> <tr> <td>100</td><td>0.5120<sup>a</sup></td></tr> </table> <p><sup>a</sup> Extrapolated by author.</p>		Water- $\text{d}_2$ mass %	Sodium Chlorate moles/100 moles of solvent	0	0.5845	91.43	0.5182	100	0.5120 <sup>a</sup>
Water- $\text{d}_2$ mass %	Sodium Chlorate moles/100 moles of solvent								
0	0.5845								
91.43	0.5182								
100	0.5120 <sup>a</sup>								
<b>AUXILIARY INFORMATION</b>									
<b>METHOD/APPARATUS/PROCEDURE:</b> Solubilities were determined by equilibrating solutions with excess salt, evaporating a filtered weighed portion of solution to dryness, and weighing the remaining salt to $\pm 0.05$ mg. Equilibrium was approached from above. The ampules were rotated end over end twelve to forty-eight hours in a water bath. All solubility determinations were performed in duplicate.	<b>SOURCE AND PURITY OF MATERIALS:</b> C.p. grade potassium chlorate was recrystallized from two to five times. Heavy water was purified by consecutive distillation from alkaline permanganate and then from crystals of potassium dichromate or chromic anhydride. Deuterium content of the heavy water mixture was determined from density measurements.								
	<b>ESTIMATED ERROR:</b> Soly: precision better than 0.5 %. Temp: precision $\pm 0.05$ K (author).								
	<b>REFERENCES:</b>								

COMPONENTS:		ORIGINAL MEASUREMENTS:	
(1) Potassium chlorate; $\text{KClO}_3$ ; [3811-04-9]		Chang, T.L.; Hsieh, Y.Y.	
(2) Water- $\text{d}_2$ ; $\text{D}_2\text{O}$ ; [7789-20-0]		Sci. Repts. Natl. Tsing Hua Univ.	
(3) Water; $\text{H}_2\text{O}$ ; [7732-18-5]		1948, A5, 252-9.	
VARIABLES:		PREPARED BY:	
$T/K = 298.15$		G. Jancso and H. Miyamoto	
EXPERIMENTAL VALUES:			
$t/^{\circ}\text{C}$	Water- $\text{d}_2$ mass %	Potassium Chlorate moles/55.51 moles of $\text{H}_2\text{O}-\text{D}_2\text{O}$ mixture	
25	0	0.7085 0.707 (Av)0.708	
	32.9	0.690 0.690 (Av)0.690	
	68.0	0.679 0.678 (Av)0.679	
	100	0.662 <sup>a</sup>	
<sup>a</sup> The solubility in 100 % $\text{D}_2\text{O}$ was obtained from the solubilities in the $\text{H}_2\text{O}-\text{D}_2\text{O}$ mixtures by linear extrapolation.			
AUXILIARY INFORMATION			
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:	
Saturated solutions of $\text{KClO}_3$ in the $\text{H}_2\text{O}-\text{D}_2\text{O}$ mixture were prepared by the method of supersaturation. The supersaturated solutions were made by agitating the excess salt with the mixture for one hour at $60^{\circ}\text{C}$ ; the time of agitation in the $25^{\circ}\text{C}$ bath was 2 hours. A sample of the clear solution was delivered into a weighing bottle, then the solvent evaporated and the residual pure salt was dried in vacuum at $100^{\circ}\text{C}$ and weighed.		Baker's analyzed c.p. grade potassium chlorate was dried over calcium chloride in a desiccator for several days before use. $\text{D}_2\text{O}$ content of the water mixture was determined by pycnometer both before and after each measurement. The mole percentage was calculated from the specific gravity at $25^{\circ}\text{C}$ (ref 1).	
		ESTIMATED ERROR: Soly: accuracy about 1 % (authors). Temp: precision $\pm 0.03$ K (authors).	
		REFERENCES: 1. Swift, E. Jr. J. Am. Chem. Soc. 1939, 61, 198.	

COMPONENTS:		ORIGINAL MEASUREMENTS:	
(1) Rubidium chlorate; $\text{RbClO}_3$ ; [13446-71-4]		Calzolari, F.	
(2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]		Gazz. Chim. Ital. <u>1912</u> , 42, 85-92.	
VARIABLES:		PREPARED BY:	
T/K = 273 to 372		B. Scrosati	
EXPERIMENTAL VALUES:			
Solubility			
t/°C	g/100g $\text{H}_2\text{O}$	mol $\text{kg}^{-1}$ (compiler)	
0	2.138	0.1265	
8	3.07	0.182	
19.8	5.36	0.317	
30	8.00	0.474	
42.2	12.48	0.739	
50	15.98	0.946	
76	34.12	2.020	
99	62.8	3.72	
AUXILIARY INFORMATION			
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:	
Method of equilibration not specified, but probably the isothermal method was employed. Aliquots of saturated solution for analysis were withdrawn with a pipet. The aliquots were placed in platinum dishes and the water evaporated. The residues were dried at 120°C to constant weight.		Rubidium chlorate was prepared by treating rubidium sulfate with barium chlorate. The product was repeatedly recrystallized until no trace of sulfate and barium were detected. The purity of the salt was checked by volumetrically determining chlorine in the anhydrous chloride dried at 150-160°C.	
		ESTIMATED ERROR:	
		Not possible to estimate due to insufficient data.	
		REFERENCES:	

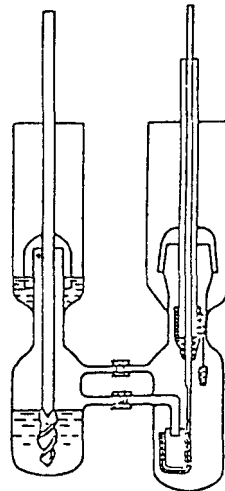
<b>COMPONENTS:</b> (1) Rubidium chlorate; $\text{RbClO}_3$ ; [13446-71-4]  (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Treadwell, W.D.; Ammann, A.  <i>Helv. Chim. Acta.</i> <u>1938</u> , 21, 1249-56.
<b>VARIABLES:</b> One temperature; 293 K	<b>PREPARED BY:</b> Hiroshi Miyamoto
<b>EXPERIMENTAL VALUES:</b>  The solubility of rubidium chlorate in water at 20°C was given as: $0.32 \text{ mol kg}^{-1}$  The concentration solubility product was also given simply as the square of the solubility: $1.02 \times 10^{-1} \text{ mol}^2 \text{ kg}^{-2}$	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b> No information was given.	<b>SOURCE AND PURITY OF MATERIALS:</b> No information was given.
	<b>ESTIMATED ERROR:</b>  Nothing specified.
	<b>REFERENCES:</b>

<b>COMPONENTS:</b>				<b>ORIGINAL MEASUREMENTS:</b>																																																											
(1) Rubidium chlorate; $\text{RbClO}_3$ ; [13446-71-4]				Breusov, O.N.; Kashina, N.I.; Revzina, T.V.; Sobolevskaya, N.G.																																																											
(2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]				<i>Zh. Neorg. Khim.</i> 1967, 12, 2240-3; <i>Russ. J. Inorg. Chem.</i> (Engl. Transl.) 1967, 12, 1179-81.																																																											
<b>VARIABLES:</b>				<b>PREPARED BY:</b>																																																											
$T/K = 273.2$ to $373.2$				Hiroshi Miyamoto																																																											
<b>EXPERIMENTAL VALUES:</b>																																																															
<table><tr><td></td><td colspan="3">Solubility of <math>\text{RbClO}_3</math></td><td></td></tr><tr><td><math>t/^{\circ}\text{C}</math></td><td>mass %</td><td>mol %</td><td>mol <math>\text{kg}^{-1}</math> (compiler)</td><td rowspan="13"></td></tr><tr><td>0</td><td>2.12</td><td>0.230</td><td>0.128</td></tr><tr><td>10</td><td>3.44</td><td>0.378</td><td>0.211</td></tr><tr><td>20</td><td>5.02</td><td>0.561</td><td>0.313</td></tr><tr><td>25</td><td>6.17</td><td>0.696</td><td>0.389</td></tr><tr><td>30</td><td>7.47</td><td>0.841</td><td>0.478</td></tr><tr><td>40</td><td>10.34</td><td>1.228</td><td>0.683</td></tr><tr><td>50</td><td>13.74</td><td>1.670</td><td>0.943</td></tr><tr><td>60</td><td>18.10</td><td>2.303</td><td>1.308</td></tr><tr><td>70</td><td>22.51</td><td>3.005</td><td>1.720</td></tr><tr><td>80</td><td>27.72</td><td>3.929</td><td>2.270</td></tr><tr><td>90</td><td>32.91</td><td>4.972</td><td>2.904</td></tr><tr><td>100</td><td>38.59</td><td>6.281</td><td>3.720</td></tr></table>							Solubility of $\text{RbClO}_3$				$t/^{\circ}\text{C}$	mass %	mol %	mol $\text{kg}^{-1}$ (compiler)		0	2.12	0.230	0.128	10	3.44	0.378	0.211	20	5.02	0.561	0.313	25	6.17	0.696	0.389	30	7.47	0.841	0.478	40	10.34	1.228	0.683	50	13.74	1.670	0.943	60	18.10	2.303	1.308	70	22.51	3.005	1.720	80	27.72	3.929	2.270	90	32.91	4.972	2.904	100	38.59	6.281	3.720
	Solubility of $\text{RbClO}_3$																																																														
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<b>AUXILIARY INFORMATION</b>																																																															
<b>METHOD/APPARATUS/PROCEDURE:</b> Isothermal method. Equilibrium reached in 4-5 h. From 90-100°C, soly detd in apparatus shown in figure. At equilibrium, the apparatus was tilted to allow satd sln to filter through connecting tube into weighed test tubes. The test tube was closed with a stopper, withdrawn, and weighed. Condensation on the walls of the apparatus and loss of water by evaporation was thus prevented. At the lower temperatures, ordinary soly vessels were used, and pipets with glass filters were used for sampling (no other details given). Above 50°C, the pipets were preheated in the thermostat. Saturated solutions analyzed for chlorate by addition of excess ammonium iron(II) sulfate and back-titration of the excess $\text{Fe(II)}$ with potassium permanganate.				<b>SOURCE AND PURITY OF MATERIALS:</b> Results of analysis of $\text{RbClO}_3$ ; Content of $\text{RbClO}_3$ 100.2 %. Impurities, %, K <0.05 %; Cs 0.05; Na <0.05.																																																											
				<b>ESTIMATED ERROR:</b> Soly: nothing specified. Temp: precision $\pm 0.1$ K.																																																											
				<b>REFERENCES:</b>																																																											

COMPONENTS:		ORIGINAL MEASUREMENTS:	
(1) Cesium chlorate; CsClO <sub>3</sub> ; [13763-67-2]		Calzolari, F.	
(2) Water; H <sub>2</sub> O; [7732-18-5]		Gazz. Chim. Ital. <u>1912</u> , 42, 85-92.	
VARIABLES:		PREPARED BY:	
T/K = 273 to 372		B. Scrosati	
EXPERIMENTAL VALUES:			
Solubility			
t/°C	g/100g H <sub>2</sub> O	mol kg <sup>-1</sup> (compiler)	
0	2.46	0.114	
8	3.50	0.162	
19.8	6.28	0.290	
30	9.53	0.440	
42.2	14.94	0.667	
50	19.40	0.897	
77	41.65	1.925	
99	76.5	3.54	
AUXILIARY INFORMATION			
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:	
Method of equilibration not specified, but probably the isothermal method was employed. Aliquots of saturated solution for analysis were withdrawn with a pipet. The aliquots were placed in platinum dishes and the water evaporated. The residues were dried at 120°C to constant weight.		Cesium chlorate was prepared by treating cesium sulfate with barium chlorate. The product was repeatedly recrystallized until no trace of sulfate and barium were detected. The purity of the salt obtained was checked by volumetrically determining chlorine in the anhydrous chloride dried at 150-160°C. The result was not given.	
		ESTIMATED ERROR:	
		Not possible to estimate due to insufficient data.	
		REFERENCES:	



<b>COMPONENTS:</b> (1) Cesium chlorate; $\text{CsClO}_3$ ; [13763-67-2]  (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Treadwell, W.D.; Ammann, A.  <i>Helv. Chim. Acta.</i> <u>1938</u> , 21, 1249-56.
<b>VARIABLES:</b> One temperature: 293 K	<b>PREPARED BY:</b> Hiroshi Miyamoto
<b>EXPERIMENTAL VALUES:</b>  The solubility of cesium chlorate in water at 20°C was given as: $0.29 \text{ mol kg}^{-1}$  The concentration solubility product was also given simply as the square of the solubility: $8.41 \times 10^{-2} \text{ mol}^2 \text{ kg}^{-2}$	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b>  No information was given.	<b>SOURCE AND PURITY OF MATERIALS:</b>  No information was given.
	<b>ESTIMATED ERROR:</b> Nothing specified.
	<b>REFERENCES:</b>

<b>COMPONENTS:</b> (1) Cesium chlorate; CsClO <sub>3</sub> ; [13763-67-2] (2) Water; H <sub>2</sub> O; [7732-18-5]				<b>ORIGINAL MEASUREMENTS:</b> Breusov, O.N.; Kashina, N.I.; Revzina, T.V.; Sovolevskaya, N.G.  Zh. Neorg. Khim. 1967, 12, 2240-3; Russ. J. Inorg. Chem. (Engl. Transl.) 1967, 12, 1179-81.	
<b>VARIABLES:</b> T/K = 273.2 to 373.2				<b>PREPARED BY:</b>  Hiroshi Miyamoto	
<b>EXPERIMENTAL VALUES:</b>					
t/°C	Solubility of CsClO <sub>3</sub>		mol kg <sup>-1</sup> (compiler)		
	mass %	mol %			
0	2.42	0.206	0.115		
10	3.98	0.344	0.192		
20	5.92	0.521	0.291		
25	7.27	0.649	0.362		
30	8.63	0.780	0.437		
40	12.25	1.149	0.645		
50	16.42	1.609	0.908		
60	21.09	2.177	1.235		
70	26.37	2.896	1.655		
80	31.74	3.872	2.149		
90	37.91	4.838	2.822		
100	43.71	6.073	3.589		
					
High temperature apparatus					
<b>AUXILIARY INFORMATION</b>					
<b>METHOD/APPARATUS/PROCEDURE:</b> Isothermal method. Equilibrium reached in 4-5 h. From 90-100°C, soly detd in apparatus shown in figure. At equilibrium, the apparatus was tilted to allow satd sln to filter through connecting tube into weighed test tubes. The test tube was closed with a stopper, withdrawn, and weighed. Condensation on the walls of the apparatus and loss of water by evaporation was thus prevented. At the lower temperatures, ordinary soly vessels were used, and pipets with glass filters were used for sampling (no other details given). Above 50°C, the pipets were preheated in the thermostat. Satd slns analyzed for chlorate by addition of excess ammonium iron (II) sulfate and back-titration of the excess Fe(II) with potassium permanganate.			<b>SOURCE AND PURITY OF MATERIALS:</b> Results of analysis of CsClO <sub>3</sub> ; Content of CsClO <sub>3</sub> 100.0 % Impurities, %, K <0.05 %; Rb <0.25; Na <0.05.  <b>ESTIMATED ERROR:</b> Soly: nothing specified. Temp: precision ± 0.1 K.		
			<b>REFERENCES:</b>		

<b>COMPONENTS:</b> (1) Lithium bromate; $\text{LiBrO}_3$ ; [13550-28-2] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Mylius, F.; Funk, R. <i>Ber. Dtsch. Chem. Ges.</i> <u>1897</u> , 30, 1716-25.						
<b>VARIABLES:</b> $T/K = 291$	<b>PREPARED BY:</b> Hiroshi Miyamoto						
<b>EXPERIMENTAL VALUES:</b> <p>The solubility of <math>\text{LiBrO}_3</math> in water at <math>18^\circ\text{C}</math> was given as follows:</p> <table> <tr> <td>60.4 mass %</td><td>(authors)</td></tr> <tr> <td>153.7 g/100g <math>\text{H}_2\text{O}</math></td><td>(authors)</td></tr> <tr> <td>11.40 mol <math>\text{kg}^{-1}</math></td><td>(compiler)</td></tr> </table> <p>Authors state that the solid phase is the anhydrous salt.</p> <p>The density of the saturated solution was also given as:</p> <p>1.833 g <math>\text{cm}^{-3}</math>.</p>		60.4 mass %	(authors)	153.7 g/100g $\text{H}_2\text{O}$	(authors)	11.40 mol $\text{kg}^{-1}$	(compiler)
60.4 mass %	(authors)						
153.7 g/100g $\text{H}_2\text{O}$	(authors)						
11.40 mol $\text{kg}^{-1}$	(compiler)						
<b>AUXILIARY INFORMATION</b>							
<b>METHOD/APPARATUS/PROCEDURE:</b> The salt and water were placed in a bottle. The bottle was agitated in a constant temperature bath for an unspecified time. After the saturated solution settled, an aliquot for analyses was withdrawn with a pipet, and $\text{LiBrO}_3$ was determined by evaporation to dryness. The density of the saturated solution was also determined.	<b>SOURCE AND PURITY OF MATERIALS:</b> The salt was purchased as a "pure chemical", and trace impurities were not present.  "The purity sufficed for the solubility determination."						
	<b>ESTIMATED ERROR:</b> Soly: precision within 1 %. Temp: nothing specified.						
	<b>REFERENCES:</b>						

<b>COMPONENTS:</b>  (1) Lithium bromate; LiBrO <sub>3</sub> ; [13550-28-2]  (2) Water; H <sub>2</sub> O; [7732-18-5]		<b>ORIGINAL MEASUREMENTS:</b>  Simmons, J.P.; Waldeck, W.F.  <i>J. Am. Chem. Soc.</i> <u>1931</u> , 53, 1725-7.																																													
<b>VARIABLES:</b>  T/K = 278 - 373		<b>PREPARED BY:</b>  Hiroshi Miyamoto and Mark Salomon																																													
<b>EXPERIMENTAL VALUES:</b>  <div>Solubility of LiBrO<sub>3</sub></div> <table><thead><tr><th>t/°C</th><th>mass %</th><th>mol % (compiler)</th><th>mol kg<sup>-1</sup> (compiler)</th></tr></thead><tbody><tr><td>5</td><td>61.6</td><td>17.6</td><td>11.9</td></tr><tr><td>15</td><td>63.3</td><td>18.7</td><td>12.8</td></tr><tr><td>25</td><td>65.4</td><td>20.2</td><td>14.0</td></tr><tr><td>35</td><td>67.5</td><td>21.7</td><td>15.4</td></tr><tr><td>50</td><td>71.5</td><td>25.1</td><td>18.6</td></tr><tr><td>53</td><td>72.4</td><td>26.0</td><td>19.5</td></tr><tr><td>56</td><td>72.6</td><td>26.1</td><td>19.6</td></tr><tr><td>70.5</td><td>74.3</td><td>27.9</td><td>21.4</td></tr><tr><td>85</td><td>76.2</td><td>30.0</td><td>23.7</td></tr><tr><td>100</td><td>78.0</td><td>32.1</td><td>26.3</td></tr></tbody></table> <p><sup>a</sup>Monohydrate → anhydrous salt transition temperature determined graphically is about 52°C, and 50.8°C as determined by cooling studies.</p>				t/°C	mass %	mol % (compiler)	mol kg <sup>-1</sup> (compiler)	5	61.6	17.6	11.9	15	63.3	18.7	12.8	25	65.4	20.2	14.0	35	67.5	21.7	15.4	50	71.5	25.1	18.6	53	72.4	26.0	19.5	56	72.6	26.1	19.6	70.5	74.3	27.9	21.4	85	76.2	30.0	23.7	100	78.0	32.1	26.3
t/°C	mass %	mol % (compiler)	mol kg <sup>-1</sup> (compiler)																																												
5	61.6	17.6	11.9																																												
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<b>AUXILIARY INFORMATION</b>																																															
<b>METHOD/APPARATUS/PROCEDURE:</b> Isothermal method used. Water and excess salt were placed in small Pyrex glass-stoppered tubes and agitated until equilibrium was reached (about 3 h). Equilibrium was approached from below because of the tendency to form supersaturated solutions when approaching saturation from above. Samples from 0.5 to 1.5 cm <sup>3</sup> were drawn off by means of pipets into 15 cm <sup>3</sup> weighing bottles. Duplicate samples were evaporated to dryness, and the residues heated to constant mass at 110°C.  Iodometric analyses of the solid phase at "room temperature" showed the solid phase to be the monohydrate. Analyses of the solid phase at 55°C showed it to be the anhydrous salt.		<b>SOURCE AND PURITY OF MATERIALS:</b> Lithium bromate was prepared by mixing solutions of lithium sulfate and barium bromate by titrating one solution against the other until a drop of either gave no precipitate. The filtrate from the barium sulfate was concentrated, and upon cooling lithium bromate crystallized out. Duplicate iodometric analyses of the dried salt gave results of 99.50 % and 100 % lithium bromate.  <b>ESTIMATED ERROR:</b> Soly: authors state experimental inaccuracies are negligible. Compilers estimate a precision of ± 0.1 mass % units. Temp: precision ± 0.02 K to ± 0.1K																																													
		<b>REFERENCES:</b>																																													

COMPONENTS:			ORIGINAL MEASUREMENTS:	
(1) Lithium bromate; LiBrO <sub>3</sub> ; [13550-28-2]			Averko-Antonovich, I.N.	
(2) Water; H <sub>2</sub> O; [7732-18-5]			Zh. Obshch. Khim. 1943, 13, 272-8.	
VARIABLES:			PREPARED BY:	
Temperature: 228-416 K			Hiroshi Miyamoto	
EXPERIMENTAL VALUES:				
t/°C	LiBrO <sub>3</sub> Solubility		mol kg <sup>-1</sup> (compiler)	Nature of the solid phase
	mass %	mol % (compiler)		
- 1.05	10.3	1.51	0.852	Ice
- 4.8	20.3	3.29	1.89	"
- 9.8	30.6	5.56	3.27	"
- 20.2	40.0	8.18	4.94	"
- 40.0	52.0	12.6	8.03	"
- 45.0	54.9	14.0	9.03	LiBrO <sub>3</sub> ·H <sub>2</sub> O
- 40.0	55.4	14.2	9.21	"
- 36.7	56.2	14.6	9.52	"
- 31.5	56.8	14.9	9.75	"
- 26.5	57.3	15.2	9.95	"
- 21.0	58.2	15.7	10.3	"
- 16.5	58.5	15.8	10.5	"
- 10.8	59.4	16.4	10.9	"
- 6.8	60.2	16.8	11.2	"
0	61.23	17.42	11.71	LiBrO <sub>3</sub> ·H <sub>2</sub> O
20.1	64.51	19.54	13.48	"
24.9	65.54	20.26	14.10	"
35.9	67.78	21.94	15.60	"
45.0	70.4	24.1	17.6	"
50.0	71.8	25.4	18.9	"
4	66.8	21.2	14.9	LiBrO <sub>3</sub> (m)
17.5	68.2	22.3	15.9	"
45	71.8	25.4	18.9	"
continued.....				
AUXILIARY INFORMATION				
METHOD/APPARATUS/PROCEDURE:			SOURCE AND PURITY OF MATERIALS:	
<p>Solubilities above 0°C were studied isothermally. Aliquots of satd sln were withdrawn with a pipet and LiBrO<sub>3</sub> detd iodometrically. The satd sln in equilibrium with metastable salt was prep'd as follows: the sln satd at 52°C or above was slowly cooled, stirred for 3-5 h at 45°C, and then allowed to settle for 4 h at 45°C.</p> <p>A satd sln at the boiling point (143°C) was prep'd by gently heating an unsaturated sln at about 143°C, and excess salt was added to the sln. The resulting satd sln was allowed to settle at the boiling point, and clear sln was withdrawn into a capillary glass tube and allowed to solidify. The tube was cut into three pieces, weighed, and the LiBrO<sub>3</sub> content detd iodometrically.</p> <p>Below 0°C a mixture of LiBrO<sub>3</sub> and water was placed in a tube equipped with a stirrer, and the tube cooled in a Dewar flask (acetone and solid CO<sub>2</sub>). The satd sln was allowed to settle for a few hours, and aliquots withdrawn with a glass tube equipped with a glass-wool or asbestos filter. A water jet-pump was used to filter off the sln, and the slns were analyzed iodometrically. (contd)</p>			No information given.	
			ESTIMATED ERROR:	
			Nothing specified.	
			REFERENCES:	

## COMPONENTS:

- (1) Lithium bromate;  $\text{LiBrO}_3$ ; [13550-28-2]  
 (2) Water;  $\text{H}_2\text{O}$ ; [7732-18-5]

## ORIGINAL MEASUREMENTS:

Averko-Antonovich, I.N.  
*Zh. Obshch. Khim.* 1943, 13, 272-8.

## EXPERIMENTAL VALUES: (Continued)

t/°C	KBrO <sub>3</sub> Solubility		mol kg <sup>-1</sup> (compiler)	Nature of the solid phase
	mass %	mol % (compiler)		
45	70.4	24.1	17.6	$\text{LiBrO}_3$
55	72.72	26.26	19.77	"
65	73.86	27.40	20.95	"
80	75.84	29.55	23.28	"
100.5	78.6	32.9	27.2	"
111	79.6	34.3	28.9	"
121	81.2	36.6	32.0	"
143	84.6	42.3	40.8	"

METHOD/APPARATUS/PROCEDURE (Continued)

The synthetic method was also used with visual observation of temperatures of crystallization. The content of  $\text{LiBrO}_3$  in solution was previously determined by iodometry.

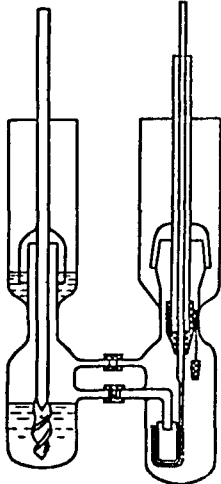
COMPONENTS:			ORIGINAL MEASUREMENTS:		
(1) Sodium bromate; NaBrO <sub>3</sub> ; [7789-38-0]			Ricci, J.E.		
(2) Water; H <sub>2</sub> O; [7732-18-5]			J. Am. Chem. Soc. <u>1934</u> , 56, 299-303.		
VARIABLES:			PREPARED BY:		
T/K = 278 to 323			Hiroshi Miyamoto		
EXPERIMENTAL VALUES:					
Solubility of NaBrO <sub>3</sub>					
t/°C	mass %	mol % (compiler)	mol kg <sup>-1</sup> (compiler)	Density g cm <sup>-3</sup>	Nature of the solid phase
5	21.42	3.152	1.807	1.194	NaBrO <sub>3</sub>
10	23.24	3.489	2.006	1.211	"
15	24.94	3.816	2.202	1.232	"
20	26.69	4.166	2.413	1.248	"
25	28.29	4.498	2.614	1.257	"
30	29.85	4.835	2.820	1.284	"
35	31.35	5.170	3.026	1.288	"
40	32.80	5.507	3.235	1.310	"
45	34.22	5.848	3.448	-	"
50	35.55	6.179	3.656	-	"
AUXILIARY INFORMATION					
METHOD/APPARATUS/PROCEDURE:			SOURCE AND PURITY OF MATERIALS:		
Mixtures of NaBrO <sub>3</sub> and water were placed in a bottle, and rotated in a large water thermostat for two days which was found to be sufficient for attainment of equilibrium. Samples of the saturated solution were withdrawn by means of a calibrated pipet provided with a folded filter paper at the tip. The bromate content was determined by titration with standard sodium thiosulfate solution.			C.p. grade NaBrO <sub>3</sub> was recrystallized, dried to the anhydrous state, and then kept constantly in a 100°C oven.		
			ESTIMATED ERROR:		
			Soly: accuracy within 0.2 %. Temp: precision ± 0.01 K. Densities: precision about 0.1 %.		
			REFERENCES:		

COMPONENTS:		ORIGINAL MEASUREMENTS:	
(1) Sodium bromate; NaBrO <sub>3</sub> ; [7789-38-0]		Noonan, E.C.	
(2) Water-d <sub>2</sub> ; D <sub>2</sub> O; [7789-20-0]		J. Am. Chem. Soc. <u>1948</u> , 70, 2915-8.	
(3) Water; H <sub>2</sub> O; [7732-18-5]			
VARIABLES:		PREPARED BY:	
T/K = 278.15		W.A. Van Hook	
EXPERIMENTAL VALUES:			
	t/°C	water-d <sub>2</sub>	Soly NaBrO <sub>3</sub> moles/100 moles solvent
	5	0	3.253 <sup>a</sup>
		91.59	2.899
		100.0	2.867 <sup>b</sup>
<sup>a</sup> Solubility in H <sub>2</sub> O taken from ref (1).			
<sup>b</sup> Extrapolated by the author assuming a linear dependence between solubility and mass % D <sub>2</sub> O.			
AUXILIARY INFORMATION			
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:	
Appropriate excess of purified salts were placed in ampoules, and heavy water was distilled in under vacuum and the ampoules sealed. Equilibrium was approached from the high temperature side only by rotating the ampoules for 12 to 48 hours in a water-bath. After settling one hour, 2-5 ml samples of solution were removed with pipets fitted with glass wool filters. The pipets were kept at the same temperature as the solutions. Samples of the solution were transferred to tared 30 ml platinum crucibles contained in suitable weighing bottles, and evaporated to dryness. All solubility determinations were performed in duplicate.		Commercial reagent grade salt was recrystallized at least twice. Heavy water was treated by distillation from alkaline permanganate and then from crystals of potassium dichromate or chromic anhydride. The product was found to have a conductivity of 2 x 10 <sup>-6</sup> S cm <sup>-1</sup> or better.	
		ESTIMATED ERROR: Soly: precision 0.5 % or better (author). Temp: precision ± 0.01 K (author).	
		REFERENCES: 1. Ricci, A. J. Am. Chem. Soc. <u>1934</u> , 56, 230.	



COMPONENTS:				ORIGINAL MEASUREMENTS:	
(1) Potassium bromate; KBrO <sub>3</sub> ; [7758-01-2]				Ricci, J.E.	
(2) Water; H <sub>2</sub> O; [7732-18-5]				J. Am. Chem. Soc. 1934, 56, 299-303.	
VARIABLES:				PREPARED BY:	
T/K = 278 - 323				Hiroshi Miyamoto	
EXPERIMENTAL VALUES: Solubility of KBrO <sub>3</sub>					
t/°C	mass %	mol % (compiler)	mol kg <sup>-1</sup> (compiler)	Density g cm <sup>-3</sup>	Solid phase
5	3.642	0.4061	0.2263	1.024	KBrO <sub>3</sub>
10	4.510	0.5069	0.2828	1.035	"
15	5.397	0.6117	0.3416	1.042	"
20	6.460	0.7395	0.4135	1.048	"
25	7.533	0.8712	0.4878	1.054	"
30	8.785	1.028	0.5767	1.062	"
35	10.13	1.201	0.6750	1.074	"
40	11.58	1.393	0.7842	1.083	"
45	13.08	1.597	0.9011	-	"
50	14.69	1.824	1.031	-	"
AUXILIARY INFORMATION					
METHOD/APPARATUS/PROCEDURE: Mixtures of KBrO <sub>3</sub> and water were placed in bottles and rotated in a large water thermostat for two days, a time found to be sufficient for attaining equilibrium. Samples of the saturated solution were withdrawn by means of a calibrated pipet provided with a folded filter paper at the tip. The bromate was determined by titration with standard sodium thiosulfate solution.			SOURCE AND PURITY OF MATERIALS: C.p. grade KBrO <sub>3</sub> was recrystallized, dried to the anhydrous state, and stored in a 100°C oven.		
			ESTIMATED ERROR: Soly: accuracy within 0.2 %. Temp: precision ± 0.01 K. Densities: precision about 0.1 %.		
			REFERENCES:		

COMPONENTS:		ORIGINAL MEASUREMENTS:	
(1) Potassium bromate; KBrO <sub>3</sub> ; [7758-01-2]		Benrath, A.; Gjedbø, F.; Schiffers, B.; Wunderlich, H.	
(2) Water; H <sub>2</sub> O; [7732-18-5]		Z. Anorg. Allg. Chem. <u>1937</u> , 231, 285-97.	
VARIABLES:		PREPARED BY:	
T/K = 407 to 585		Hiroshi Miyamoto	
EXPERIMENTAL VALUES:			
	t/°C	mass %	Solubility mol kg <sup>-1</sup> (compiler)
	134	43.6	4.63
	149	48.4	5.62
	160	51.1	6.26
	167	53.5	6.89
	170	54.1	7.06
	172	57.3	8.04
	186	59.9	8.94
	193	63.2	10.3
	204	64.2	10.7
	211	67.4	12.4
	226	70.6	14.4
	230	72.6	15.9
	249	72.6	15.9
	254	74.4	17.4
	265	77.2	20.3
	274	79.1	22.7
	279	81.1	25.7
	286	81.4	26.2
	297	83.1	29.4
	312	86.4	38.0
AUXILIARY INFORMATION			
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:	
Synthetic method used with visual observation of temperature of crystallization and solubilization (ref 1). The weighed salt and water were placed in a small tube. The tubes were set in an oven equipped with a mica window. A thermometer was immersed in the oven.		No information was given.	
		ESTIMATED ERROR:	
		Nothing specified.	
		REFERENCES:	
		1. Jaenecke, E. Z. Physik. Chem. <u>1936</u> , A177, 7.	

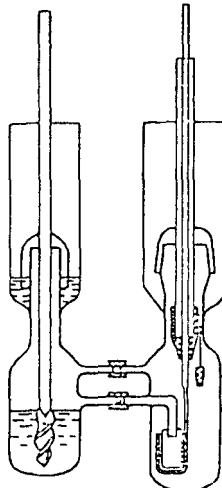
<b>COMPONENTS:</b> (1) Potassium bromate; KBrO <sub>3</sub> ; [7758-01-2] (2) Water; H <sub>2</sub> O; [7732-18-5]		<b>ORIGINAL MEASUREMENTS:</b> Breusov, O. N.; Kashina, N. I.; Revzina, T. V.; Sobolevskaya, N. G.  Zh. Neorg. Khim. 1967, 12, 2240-3; Russ. J. Inorg. Chem. (Engl. Transl.) 1967, 12, 1179-81.																																																									
<b>VARIABLES:</b>  T/K = 273 to 373		<b>PREPARED BY:</b>  M. Salomon and H. Miyamoto																																																									
<b>EXPERIMENTAL VALUES:</b>																																																											
<table><tr><td></td><td colspan="3">Solubility of KBrO<sub>3</sub><sup>a</sup></td></tr><tr><td>t/°C</td><td>mass %</td><td>mol %</td><td>mol kg<sup>-1</sup></td></tr><tr><td>0</td><td>2.98</td><td>0.3303</td><td>0.1839</td></tr><tr><td>10</td><td>4.54</td><td>0.5104</td><td>0.2848</td></tr><tr><td>20</td><td>6.42</td><td>0.7346</td><td>0.4108</td></tr><tr><td>25</td><td>7.55</td><td>0.8733</td><td>0.4890</td></tr><tr><td>30</td><td>8.84</td><td>1.035</td><td>0.5806</td></tr><tr><td>40</td><td>11.67</td><td>1.405</td><td>0.7911</td></tr><tr><td>50</td><td>14.82</td><td>1.842</td><td>1.042</td></tr><tr><td>60</td><td>18.08</td><td>2.325</td><td>1.322</td></tr><tr><td>70</td><td>21.76</td><td>2.913</td><td>1.665</td></tr><tr><td>80</td><td>25.35</td><td>3.534</td><td>2.033</td></tr><tr><td>90</td><td>29.40</td><td>4.299</td><td>2.494</td></tr><tr><td>100</td><td>33.31</td><td>5.113</td><td>2.991</td></tr></table>					Solubility of KBrO <sub>3</sub> <sup>a</sup>			t/°C	mass %	mol %	mol kg <sup>-1</sup>	0	2.98	0.3303	0.1839	10	4.54	0.5104	0.2848	20	6.42	0.7346	0.4108	25	7.55	0.8733	0.4890	30	8.84	1.035	0.5806	40	11.67	1.405	0.7911	50	14.82	1.842	1.042	60	18.08	2.325	1.322	70	21.76	2.913	1.665	80	25.35	3.534	2.033	90	29.40	4.299	2.494	100	33.31	5.113	2.991
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<b>AUXILIARY INFORMATION</b>																																																											
<b>METHOD/APPARATUS/PROCEDURE:</b> Isothermal method. Equilibrium reached in 4-5 h. From 90-100°C, the solubility was determined in the apparatus shown in the figure. At equilibrium the apparatus was tilted to allow saturated solution to filter through connecting tube into weighed test tubes. The test tubes were closed with a stopper, withdrawn and weighed. Condensation on the walls of the apparatus and loss of water by evaporation was thus prevented. At the lower temperatures, ordinary solubility vessels were used, and pipets with glass filters were used for sampling (no other details given). Above 50°C, the pipets were preheated in the thermostat.  Bromate was determined iodometrically.		<b>SOURCE AND PURITY OF MATERIALS:</b> Results of analysis of KBrO <sub>3</sub> : content of KBrO <sub>3</sub> = 99.3 %, and impurities are Rb (0.1 %), Cs (0.01 %), Na (0.016 %), SO <sub>4</sub> (0.005 %), and Fe (0.0001 %).  The alkali metal impurities were dtd by flame photometry, the iron colorimetrically, and sulfate nephelometrically.																																																									
		<b>ESTIMATED ERROR:</b> Soly: nothing specified.  Temp: precision ± 0.1 K.																																																									
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COMPONENTS:		ORIGINAL MEASUREMENTS:	
(1) Potassium bromate; KBrO <sub>3</sub> ; [7758-01-2]		Chang, T.L.; Hsieh, Y.Y.	
(2) Water-d <sub>2</sub> ; D <sub>2</sub> O; [7789-20-0]		Sci. Repts. Natl. Tsing Hua Univ.	
(3) Water; H <sub>2</sub> O; [7732-18-5]		1948, A5, 252-9.	
VARIABLES:		PREPARED BY:	
T/K = 298.15		G. Jansco and H. Miyamoto	
EXPERIMENTAL VALUES:			
t/°C	Water-d <sub>2</sub> mol %	Potassium Bromate mole/55.51 moles of H <sub>2</sub> O-D <sub>2</sub> O mixture	
25	0	0.494	
		0.495	
		(Av)0.495 <sup>a</sup>	
	32.5	0.479	
		0.479	
		(Av)0.479	
	66.2	0.460	
		0.458	
		(Av)0.459	
	100	0.443 <sup>b</sup>	
<sup>a</sup> Average values calculated by compiler.			
<sup>b</sup> The solubility in 100 % D <sub>2</sub> O was obtained from the solubilities in the H <sub>2</sub> O-D <sub>2</sub> O mixtures by linear extrapolation.			
AUXILIARY INFORMATION			
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:	
Saturated solutions of KBrO <sub>3</sub> in the H <sub>2</sub> O-D <sub>2</sub> O mixtures were prepared by the method of supersaturation. The supersaturated solutions were prepared by agitating excess salt with the water mixture for one hour at 60°C; the time of agitation in the 25°C bath was 3 hours. A sample of the clear solution was delivered into a weighing bottle, the solvent evaporated and the residual pure salt was dried in vacuum at 100°C and weighed.		Potassium bromate was purified by recrystallization from conductivity water and found to be free from bromide. The salt was dried over calcium chloride in a desiccator for several days before use. D <sub>2</sub> O content of the water mixture was determined by pycnometer both before and after each measurement. The mole percentage was calculated from the specific gravity at 25°C (ref 1).	
		ESTIMATED ERROR:	
		Soly: accuracy about 1 % (authors). Temp: precision ± 0.03 K.	
		REFERENCES:	
		1. Swift, E. Jr. J. Am. Chem. Soc. 1939, 61, 198.	

<b>COMPONENTS:</b> (1) Rubidium bromate; RbBrO <sub>3</sub> ; [13446-70-3] (2) Water; H <sub>2</sub> O; [7732-18-5]		<b>ORIGINAL MEASUREMENTS:</b> Buell, H.D.; McCrosky, C.R.  J. Am. Chem. Soc. <u>1923</u> , 43, 2031-4.																																																
<b>VARIABLES:</b>  T/K = 298, 303, 308 and 313		<b>PREPARED BY:</b>  Hiroshi Miyamoto and Mark Salomon																																																
<b>EXPERIMENTAL VALUES:</b>  Solubility of RbBrO <sub>3</sub> <table><tr><th>t/°C</th><th>g/100g H<sub>2</sub>O</th><th>mol kg<sup>-1</sup> (compiler)</th></tr><tr><td rowspan="5">25</td><td>2.994</td><td>0.1403</td></tr><tr><td>2.895</td><td>0.1357</td></tr><tr><td>2.917</td><td>0.1367</td></tr><tr><td>2.917</td><td>0.1367</td></tr><tr><td>(Av) 2.93 (σ = 0.04)</td><td>0.137</td></tr><tr><td rowspan="5">30</td><td>3.584</td><td>0.1680</td></tr><tr><td>3.578</td><td>0.1677</td></tr><tr><td>3.509</td><td>0.1645</td></tr><tr><td>3.559</td><td>0.1667</td></tr><tr><td>(Av) 3.56 (σ = 0.03)</td><td>0.166</td></tr><tr><td rowspan="5">35</td><td>4.310</td><td>0.2020</td></tr><tr><td>4.247</td><td>0.1990</td></tr><tr><td>4.295</td><td>0.2013</td></tr><tr><td>4.269</td><td>0.2001</td></tr><tr><td>(Av) 4.28 (σ = 0.03)</td><td>0.201</td></tr><tr><td rowspan="5">40</td><td>5.104</td><td>0.2392</td></tr><tr><td>5.116</td><td>0.2398</td></tr><tr><td>5.021</td><td>0.2353</td></tr><tr><td>5.092</td><td>0.2386</td></tr><tr><td>(Av) 5.08 (σ = 0.02)</td><td>0.238</td></tr></table>				t/°C	g/100g H <sub>2</sub> O	mol kg <sup>-1</sup> (compiler)	25	2.994	0.1403	2.895	0.1357	2.917	0.1367	2.917	0.1367	(Av) 2.93 (σ = 0.04)	0.137	30	3.584	0.1680	3.578	0.1677	3.509	0.1645	3.559	0.1667	(Av) 3.56 (σ = 0.03)	0.166	35	4.310	0.2020	4.247	0.1990	4.295	0.2013	4.269	0.2001	(Av) 4.28 (σ = 0.03)	0.201	40	5.104	0.2392	5.116	0.2398	5.021	0.2353	5.092	0.2386	(Av) 5.08 (σ = 0.02)	0.238
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<b>AUXILIARY INFORMATION</b>																																																		
<b>METHOD/APPARATUS/PROCEDURE:</b> The method for determining the solubility is similar to that described in ref 1. Mixtures of rubidium bromate and water were shaken in a thermostat. About 5 hours were required to attain equilibrium. Two methods of analysis were used. In the first method, aliquots of the saturated solutions were weighed, carefully evaporated to dryness, and dried at 115°C to constant weight. In the second method, the iodometric method was used to determine the bromate concentration. Both methods were of equal precision.		<b>SOURCE AND PURITY OF MATERIALS:</b> RbCl of "doubtful purity" was converted to the alum, recrystallized, and digested with excess BaCO <sub>3</sub> on a hot plate. The sln was filtered, treated with Ba(OH) <sub>2</sub> and CO <sub>2</sub> , and filtered again. The salt was then treated with excess "pure" bromic acid and allowed to crystallize. The resulting RbBrO <sub>3</sub> was recrystallized three times.  Source and purity of water not specified.																																																
		<b>ESTIMATED ERROR:</b> Soly: precision in analyses about ± 0.3 % (compilers), standard deviations for solubility measurements given in table calculated by the compilers. Temp: nothing specified.																																																
		<b>REFERENCES:</b> 1. McCrosky, C.R.; Buell, H.D. J. Am. Chem. Soc. <u>1920</u> , 42, 1786.																																																

<b>COMPONENTS:</b> (1) Rubidium bromate; $\text{RbBrO}_3$ ; [13446-70-3] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]		<b>ORIGINAL MEASUREMENTS:</b> Breusov, O.N.; Kashina, N.I.; Revzina, T.V.; Sobolevskaya, N.G.  <i>Zh. Neorg. Khim.</i> 1967, 12, 2240-3; <i>Russ. J. Inorg. Chem.</i> (Engl. Transl.) 1967, 12, 1179-81.	
<b>VARIABLES:</b>  T/K = 273 to 373		<b>PREPARED BY:</b>  Hiroshi Miyamoto	
<b>EXPERIMENTAL VALUES:</b>			
t/°C	Solubility of $\text{RbBrO}_3^a$		
	mass %	mol %	mol kg <sup>-1</sup> (compiler)
0	0.98	0.0835	0.0464
10	1.53	0.131	0.0728
20	2.37	0.205	0.1138
25	2.93	0.254	0.1415
30	3.45	0.301	0.1675
40	4.92	0.435	0.2425
50	6.72	0.608	0.3376
60	8.90	0.818	0.4579
70	11.17	1.051	0.5893
80	14.06	1.367	0.7667
90	17.15	1.718	0.9701
100	20.96	2.177	1.243

<sup>a</sup> The nature of the solid phase was not specified.



High temp. apparatus

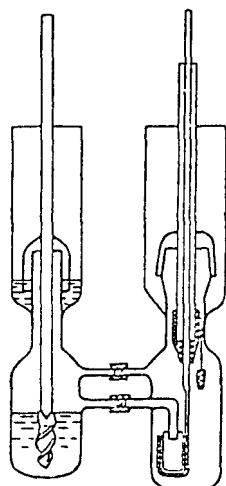
**AUXILIARY INFORMATION**			
**METHOD/APPARATUS/PROCEDURE:** Isothermal method. Equilibrium reached in 4-5 h. From 90-100°C, soly detd in apparatus shown in figure. At equilibrium, the apparatus was tilted to allow saturated solution to filter through connecting tube into weighed test tubes. The test tube was closed with a stopper, withdrawn, and weighed. Condensation on the walls of the apparatus and loss of water by evaporation was thus prevented. At the lower temperatures, ordinary soly vessels were used, and pipets with glass filters were used for sampling (no other details given). Above 50°C, the pipets were preheated in the thermostat. Bromate was determined iodometrically.		**SOURCE AND PURITY OF MATERIALS:** Results of analysis of  $\text{RbBrO}_3$ ; Content of  $\text{RbBrO}_3$  = 98.6 %. Impurities (mass %): K 0.12; Cs 0.1; Na 0.014;  $\text{SO}_4$  0.1; Fe < 0.0025.	
		**ESTIMATED ERROR:** Soly: nothing specified. Temp: precision  $\pm 0.1$  K.	
		**REFERENCES:**	

<b>COMPONENTS:</b> (1) Cesium bromate; CsBrO <sub>3</sub> ; [13454-75-6] (2) Water; H <sub>2</sub> O; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> McCrosky, C.R.; Buell, H.D. <i>J. Am. Chem. Soc.</i> <u>1920</u> , 42, 1786-9.																
<b>VARIABLES:</b> T/K = 303.2	<b>PREPARED BY:</b> Hiroshi Miyamoto																
<b>EXPERIMENTAL VALUES:</b> <p style="text-align: center;">Solubility of cesium bromate in water at 30°C<sup>a</sup></p> <table> <thead> <tr> <th style="text-align: center;">g/100g H<sub>2</sub>O</th><th style="text-align: center;">mol kg<sup>-1</sup></th></tr> </thead> <tbody> <tr><td style="text-align: center;">4.484</td><td style="text-align: center;">0.1800</td></tr> <tr><td style="text-align: center;">4.573</td><td style="text-align: center;">0.1837</td></tr> <tr><td style="text-align: center;">4.525</td><td style="text-align: center;">0.1817</td></tr> <tr><td style="text-align: center;">4.549</td><td style="text-align: center;">0.1827</td></tr> <tr><td style="text-align: center;">4.483</td><td style="text-align: center;">0.1800</td></tr> <tr><td style="text-align: center;">4.577</td><td style="text-align: center;">0.1837</td></tr> <tr><td style="text-align: center;">(Av)4.53</td><td style="text-align: center;">0.182</td></tr> </tbody> </table> <p><sup>a</sup> Molalities calculated by the compiler.</p>		g/100g H <sub>2</sub> O	mol kg <sup>-1</sup>	4.484	0.1800	4.573	0.1837	4.525	0.1817	4.549	0.1827	4.483	0.1800	4.577	0.1837	(Av)4.53	0.182
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<b>AUXILIARY INFORMATION</b>																	
<b>METHOD/APPARATUS/PROCEDURE:</b> Mixtures of cesium bromate and water were shaken in a thermostat. About 5 hours were allowed for the salt to come into equilibrium with the solvent before the saturated solution was withdrawn for analysis. Aliquots of the saturated solution were weighed and then carefully evaporated to dryness until constant in weight.	<b>SOURCE AND PURITY OF MATERIALS:</b> Cesium bromate was prepared by neutralization of CsOH with bromic acid followed by addition of excess bromic acid. The solution was evaporated somewhat and allowed to crystallize. The product was recrystallized from water and then dried.																
	<b>ESTIMATED ERROR:</b> Soly: standard deviation( $\sigma$ ) 0.04 for g/100g H <sub>2</sub> O units. Temp: precision $\pm$ 0.3 K.																
	<b>REFERENCES:</b>																

COMPONENTS:		ORIGINAL MEASUREMENTS:	
(1) Cesium bromate; CsBrO <sub>3</sub> ; [13454-75-6]		Buell, H.D.; McCrosky, C.R.	
(2) Water; H <sub>2</sub> O; [7732-18-5]		J. Am. Chem. Soc. <u>1921</u> , 43, 2031-4.	
VARIABLES:		PREPARED BY:	
T/K = 298, 303 and 308		Hiroshi Miyamoto and Mark Salomon	
EXPERIMENTAL VALUES:			
Solubility of CsBrO <sub>3</sub>			
t/°C	g/100g H <sub>2</sub> O	mol kg <sup>-1</sup> (compiler)	
25	3.627	0.1444	
	3.664	0.1458	
	3.710	0.1477	
	(Av)3.68 (σ = 0.04)	0.146	
30	4.484	0.1800	
	4.573	0.1837	
	4.525	0.1817	
	(Av)4.53 (σ = 0.04)	0.182	
35	5.357	0.2170	
	5.410	0.2193	
	5.215	0.2110	
	(Av)5.32 (σ = 0.10)	0.216	
AUXILIARY INFORMATION			
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:	
The method for determining the solubility is similar to that described in ref 1. Mixtures of cesium bromate and water were agitated in a thermostat. About 5 hours were required to attain equilibrium. Two methods of analysis were used. In the first method, aliquots of the saturated solutions were weighed, carefully evaporated to dryness, and dried at 115°C to constant weight. In the second method, the iodometric method was used to determine the bromate concentration. Both methods were of equal precision.		Nothing specified, but the compiler assumes that the preparation of cesium bromate was similar to that described in ref 1.	
		ESTIMATED ERROR:	
		Soly: precision in analyses about ± 0.3 % (compilers). Standard deviations for solubility measurements given in table calculated by compilers. Temp: nothing specified.	
REFERENCES:			
		1. McCrosky, C.R.; Buell, H.D. J. Am. Chem. Soc. <u>1920</u> , 42, 1786.	



<b>COMPONENTS:</b> (1) Cesium bromate; CsBrO <sub>3</sub> ; [13454-75-6] (2) Water; H <sub>2</sub> O; [7732-18-5]		<b>ORIGINAL MEASUREMENTS:</b> Breusov, O.N.; Kashina, N.I.; Revzina, T.V.; Sobolevskaya, N.G.  Zh. Neorg. Khim. 1967, 12, 2240-3; Russ. J. Inorg. Chem. (Engl. Transl.) 1967, 12, 1179-81.	
<b>VARIABLES:</b>  T/K = 273 to 373		<b>PREPARED BY:</b>  Hiroshi Miyamoto	
<b>EXPERIMENTAL VALUES:</b>			
t/°C	Solubility of CsBrO <sub>3</sub>		mol kg <sup>-1</sup> (compiler)
	mass %	mol %	
0	1.17	0.0817	0.0454
10	1.90	0.134	0.0743
20	2.09	0.212	0.0818
25	3.75	0.268	0.149
30	4.46	0.321	0.179
40	6.28	0.461	0.257
50	8.56	0.642	0.359
60	11.32	0.874	0.489
70	14.48	1.156	0.649
80	17.99	1.493	0.841
90	22.01	1.912	1.082
100	25.96	2.365	1.344



High Temp. Apparatus

<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b> Isothermal method. Equilibrium reached in 4-5 h. From 90-100°C, soly detd in apparatus shown in figure. At equilibrium, the apparatus was tilted to allow satd sln to filter through connecting tube into weighed test tubes. The test tube was closed with a stopper, withdrawn, and weighed. Condensation on the walls of the apparatus and loss of water by evaporation was thus prevented. At the lower temperatures, ordinary soly vessels were used, and pipets with glass filters were used for sampling (no other details given). Above 50°C, the pipets were preheated in the thermostat. Bromate was determined iodometrically.	<b>SOURCE AND PURITY OF MATERIALS:</b> Results of analysis of CsBrO <sub>3</sub> ; Content of CsBrO <sub>3</sub> = 99.3 % Impurities(mass %): K <0.002; Rb 0.09; Na 0.0025; SO <sub>4</sub> 0.05; Fe 0.005.  <b>ESTIMATED ERROR:</b> Soly: nothing specified. Temp: precision ± 0.1 K.  <b>REFERENCES:</b>

<b>COMPONENTS:</b> (1) Lithium iodate; $\text{LiIO}_3$ ; [13765-03-2] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Mylius, F.; Funk, R. <i>Ber. Dtsch. Chem. Ges.</i> <u>1897</u> , <i>80</i> , 1716-25.						
<b>VARIABLES:</b> $T/K = 291$	<b>PREPARED BY:</b> Hiroshi Miyamoto						
<b>EXPERIMENTAL VALUES:</b> <p>The solubility of <math>(\text{LiIO}_3)_2</math> in water at <math>18^\circ\text{C}</math> was given as:</p> <table> <tr> <td>44.6 mass %</td><td>(authors)</td></tr> <tr> <td>80.3 g/100 g <math>\text{H}_2\text{O}</math></td><td>(authors)</td></tr> <tr> <td>4.42 mol <math>\text{kg}^{-1}</math></td><td>(compiler)</td></tr> </table> <p>The density of the saturated solution was given as <math>1.568 \text{ gm}^{-3}</math>.</p>		44.6 mass %	(authors)	80.3 g/100 g $\text{H}_2\text{O}$	(authors)	4.42 mol $\text{kg}^{-1}$	(compiler)
44.6 mass %	(authors)						
80.3 g/100 g $\text{H}_2\text{O}$	(authors)						
4.42 mol $\text{kg}^{-1}$	(compiler)						
<b>AUXILIARY INFORMATION</b>							
<b>METHOD/APPARATUS/PROCEDURE:</b> The salt and water were placed in a bottle and the bottle agitated in a constant temperature bath for a long time (time not specified). After the saturated solution settled, an aliquot for analyses was removed with a pipet. $\text{LiIO}_3$ was determined by evaporation to dryness. The density of the saturated solution was also determined.	<b>SOURCE AND PURITY OF MATERIALS:</b> The salt used was purchased as a "pure chemical" and trace impurities were absent.  <b>ESTIMATED ERROR:</b> Soly: precision $\pm 1 \%$ . Temp: nothing specified.  <b>REFERENCES:</b>						

COMPONENTS:		ORIGINAL MEASUREMENTS:		
(1) Lithium iodate; $\text{LiIO}_3$ ; [13765-03-2]		Ricci, J.E.; Amron, I.		
(2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]		J. Am. Chem. Soc. <u>1951</u> , 73, 3613-8.		
VARIABLES:		PREPARED BY:		
Temperature: 9.93 to 95.1°C		Hiroshi Miyamoto		
EXPERIMENTAL VALUES:				
Solubility of $\text{LiIO}_3$				
t/°C	mass %	mol % (compiler)	mol kg <sup>-1</sup> (compiler)	Approach from
9.93	47.19(m)	8.133	4.914	U
20.24	45.96(m)	7.742	4.658	S
24.95	45.33(m)	7.591	4.560	U&S
29.94	44.89(m)	7.467	4.479	U
34.95	44.45(m)	7.345	4.400	U
40.00	44.12(m)	7.255	4.342	U
45.00	43.84(m)	7.178	4.293	U&S
50.06	43.51(m)	7.090	4.236	S
55.1	43.35(?)	7.047	4.208	U
60.2	43.10	6.980	4.165	U
65.3	43.00	6.954	4.149	U
75.5	42.82	6.907	4.118	U
85.5	42.76	6.891	4.108	S
95.1	42.85	6.914	4.123	U
m = metastable				
U: undersaturation;                      S: supersaturation				
AUXILIARY INFORMATION				
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:		
Isothermal method. Many measurements were made in an attempt to determine the stable solubility curve of the forms of $\text{LiIO}_3$ from 10 to 95°C. The solubility curve was determined with some points approached from undersaturation, some from supersaturation, and a few from both directions. The values obtained represent measurements agreeing on repeated analysis with continued stirring at each temperature. For each point, the solid phase was examined microscopically.		Some of the lithium iodate was made by purification of two samples of commercial c.p. material which assayed ~97% $\text{LiIO}_3$ . One sample contained insoluble $\text{Ba}(\text{IO}_3)_2$ and gave an acid reaction. Part of it was simply recrystallized twice, and part was neutralized with Kahlbaum $\text{LiOH}$ before the second crystallization. The other sample contained insoluble $\text{Li}_2\text{CO}_3$ and gave an alkaline reaction; this was neutralized with iodic acid and $\text{LiOH}$ before two recrystallizations. The rest of the salt used was made from Kahlbaum $\text{Li}_2\text{CO}_3$ and c.p. iodic acid using $\text{LiOH}$ for final neutralization. The final product was obtained by slow evaporation with stirring on a hot-plate. After decantation, the crystals were filtered by suction and washed with water. Ground and dried at 110-180°C, the product was found to be 99.9 to 100.1% pure by determination of lithium as $\text{Li}_2\text{SO}_4$ , and iodate by titration with $\text{Na}_2\text{S}_2\text{O}_3$ solution.		
ESTIMATED ERROR:				
Soly: precision about 0.1 % (compiler).				
Temp: precision about ± 0.05 K (compiler).				

<b>COMPONENTS:</b>  (1) Lithium iodate; $\text{LiIO}_3$ ; [13765-03-2]  (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b>  Umezawa, T.; Tatuoka, S.  <i>Jpn. J. Appl. Phys.</i> <u>1972</u> , 11, 408.																											
<b>VARIABLES:</b>  Two crystal forms: hexagonal and tetragonal  Temperature: $T/K = 278-253$	<b>PREPARED BY:</b>  Hiroshi Miyamoto and Mark Salomon																											
<b>EXPERIMENTAL VALUES:</b>  The solubilities of solutions in equilibrium with hexagonal and tetragonal solid phases were reported in graphical form. The polytherms are reproduced in the figure below.																												
<div><table><caption>Estimated data points from the solubility graph</caption><thead><tr><th>Temperature (°C)</th><th>Grams <math>\text{LiIO}_3</math> per 100 g Water (Tetragonal, T)</th><th>Grams <math>\text{LiIO}_3</math> per 100 g Water (Hexagonal, H)</th></tr></thead><tbody><tr><td>10</td><td>89</td><td>83</td></tr><tr><td>20</td><td>86</td><td>81</td></tr><tr><td>30</td><td>83</td><td>80</td></tr><tr><td>40</td><td>80</td><td>80</td></tr><tr><td>50</td><td>78</td><td>80</td></tr><tr><td>60</td><td>77</td><td>80</td></tr><tr><td>70</td><td>77</td><td>80</td></tr><tr><td>80</td><td>-</td><td>80</td></tr></tbody></table></div>		Temperature (°C)	Grams $\text{LiIO}_3$ per 100 g Water (Tetragonal, T)	Grams $\text{LiIO}_3$ per 100 g Water (Hexagonal, H)	10	89	83	20	86	81	30	83	80	40	80	80	50	78	80	60	77	80	70	77	80	80	-	80
Temperature (°C)	Grams $\text{LiIO}_3$ per 100 g Water (Tetragonal, T)	Grams $\text{LiIO}_3$ per 100 g Water (Hexagonal, H)																										
10	89	83																										
20	86	81																										
30	83	80																										
40	80	80																										
50	78	80																										
60	77	80																										
70	77	80																										
80	-	80																										
<b>AUXILIARY INFORMATION</b>																												
<b>METHOD/APPARATUS/PROCEDURE:</b> Saturated solutions starting with hexagonal or tetragonal crystals prepared at room temperature. Solutions were then stirred for 4-5 hours at the desired temperature.  About 10 ml of the saturated solution were placed in a weighing bottle using a pipet with a filter at its tip. The solvent was evaporated in an oven, and the lithium iodate solubility determined gravimetrically.  The pH of the saturated solutions varied between 8.3 and 8.7. The hexagonal $\rightarrow$ tetragonal transition temperature is around 40°C.  As reported in an earlier publication (1), the solubility of hexagonal $\text{LiIO}_3$ is nearly constant over the temperature range studied. Note that reference (1) has not been rejected, and therefore this paper has not been compiled.	<b>SOURCE AND PURITY OF MATERIALS:</b> Nothing specified.  <b>ESTIMATED ERROR:</b> Nothing specified.  <b>REFERENCES:</b> 1. Umezawa, T.; Ninomiya, Y.; Tatuoka, S. <i>J. Appl. Crystallogr.</i> <u>1970</u> , 3, 417.																											

COMPONENTS:			ORIGINAL MEASUREMENTS:		
(1) Sodium iodate; NaIO <sub>3</sub> ; [7681-55-2]			Foote, H.W.; Vance, J.E.		
(2) Water; H <sub>2</sub> O; [7732-18-5]			Am. J. Sci. 1928, 16, 68-72.		
VARIABLES:			PREPARED BY:		
T/K = 272.8 to 363.5			Hiroshi Miyamoto		
EXPERIMENTAL VALUES:					
Solubility as approached from:					
t/°C	supersaturation mass %	undersaturation mass %	average mass %	mol kg <sup>-1</sup> (compiler)	Nature of the solid phase <sup>a</sup>
- 0.35	-	-	2.38	0.123	Ice + A
0.0	2.39	2.46	2.42	0.125	A
+10.0	4.39	4.40	4.39	0.232	"
15.0	5.87	5.88	5.88	0.316	"
19.85	-	-	7.83	0.429	A+B
20.0	7.87	7.82	7.84	0.430	B
25.0	8.65	8.66	8.66	0.479	"
30.0	9.63	9.63	9.63	0.538	"
35.0	10.58	10.55	10.57	0.597	"
40.0	11.70	11.71	11.71	0.670	"
49.9	14.13	13.99	14.06	0.827	"
57.8	15.97	15.86	15.91	0.9560	"
69.6	19.05	19.00	19.03	1.188	"
73.4	-	-	20.00	1.263	B+C
79.0	21.91	21.74	21.82	1.41	B(m)
67.0	18.98	19.10	19.04	1.188	C(m)
70.6	19.55	19.57	19.56	1.229	"
75.8	20.48	20.49	20.49	1.302	C
80.6	21.22	21.26	21.24	1.363	"
87.6	22.12	22.32	22.22	1.444	"
90.3	23.02	23.02	23.03	1.512	"
<sup>a</sup> A = NaIO <sub>3</sub> ·5H <sub>2</sub> O; B = NaIO <sub>3</sub> ·H <sub>2</sub> O; C = NaIO <sub>3</sub> ; (m) = metastable					
The authors reported the smoothing equation as follows:					
log (soly/mass %) = 3.6344 - 802.8/(T/K) (T/K = 293-322.9)					
log (soly/mass %) = 7.7793 - 2019/(T/K) (T/K = 273-288)					
AUXILIARY INFORMATION					
METHOD/APPARATUS/PROCEDURE:			SOURCE AND PURITY OF MATERIALS:		
Binary mixts agitated in a thermostat for 4-6 hours. Equil was approached from both the supersatd and undersatd solutions, and analysis was determined in duplicate. Iodate was detd by adding excess KI, acidifying with H <sub>2</sub> SO <sub>4</sub> , and titrating with standard sodium thiosulfate sln.			Sodium iodate was a very pure commercial product having a composition closely approximating the monohydrate. The salt was recrystallized before use.		
Solid phases analyzed as follows: Below 19.85 °C where the pentahydrate is stable, the solid was separated from sln in a cold room and quickly dried, and presumably analyzed for iodate. Over the temp range where the monohydrate is stable, numerous analyses were made of the solid phase, presumably by a method similar to that described above. For the region where the anhydr salt is stable, the solid was separated, washed quickly with alcohol, and dried between filter paper.			ESTIMATED ERROR:		
			Nothing specified.		

COMPONENTS:			ORIGINAL MEASUREMENTS:		
(1) Sodium iodate; NaIO <sub>3</sub> ; [7681-55-2]			Hill, A.E.; Donovan, J.E.		
(2) Water; H <sub>2</sub> O; [7732-18-5]			J. Am. Chem. Soc. <u>1931</u> , 53, 934-41.		
VARIABLES:			PREPARED BY:		
Temperature: 278.15 to 323.15			Hiroshi Miyamoto		
EXPERIMENTAL VALUES: Solubility in the binary system					
t/°C	mass %	Solubility mol % (compiler)	mol kg <sup>-1</sup> (compiler)	Density g cm <sup>-3</sup>	Nature of the solid phase <sup>a</sup> :
5	3.30	0.310	0.172	1.028	A
15	5.85	0.562	0.314	1.051	"
20	7.81	0.765	0.428	-	A+B
22	8.11	0.797	0.446	1.071	B
25	8.67	0.857	0.480	1.077	"
35	10.58	1.066	0.5979	1.093	"
40	11.70	1.192	0.6696	-	"
50	13.95	1.454	0.8192	-	"
<sup>a</sup> A = NaIO <sub>3</sub> ·5H <sub>2</sub> O;      B = NaIO <sub>3</sub> ·H <sub>2</sub> O					
AUXILIARY INFORMATION					
METHOD/APPARATUS/PROCEDURE: Recrystallized and dehydrated excess sodium iodate was placed in 40 ml glass-stoppered Pyrex test-tubes with water and rotated in a water thermostat for about two weeks. Equilibrium was reached from super-saturation. After the tubes were allowed to settle, samples were withdrawn into a calibrated pipet fitted with a small cotton filter. One sample was weighed and evaporated in a platinum dish to constant weight at 110°C. From this the water content of the saturated solution was determined. To determine the NaIO <sub>3</sub> content, a second weighed sample was treated with KI and sulfuric acid and titrated with sodium thiosulfate. The densities of the solutions were also determined.			SOURCE AND PURITY OF MATERIALS: "Good grade" sodium iodate was purified by recrystallization. No other information given.		
			ESTIMATED ERROR: Soly: the error for the analysis of iodate by iodometry was within 0.2 %. Temp: precision ± 0.05 K.		
			REFERENCES:		

COMPONENTS:				ORIGINAL MEASUREMENTS:	
(1) Sodium iodate; NaIO <sub>3</sub> ; [7681-55-2]				Cornec, M.E.; Spack, A.	
(2) Water; H <sub>2</sub> O; [7732-18-5]				Bull. Soc. Chim. Fr. <u>1931</u> , 49, 582-94.	
VARIABLES:				PREPARED BY:	
T/K = 273 to 373				Hiroshi Miyamoto	
EXPERIMENTAL VALUES:					
t/°C	Solubility of Sodium Iodate			Density	Nature of the
	mass %	g <sub>1</sub> /100 g H <sub>2</sub> O	mol kg <sup>-1</sup> (compiler)	g cm <sup>-3</sup>	solid phase <sup>a</sup>
0	2.45	2.51	0.127	1.024	A
10	4.44	4.65	0.235	1.041	"
15	5.93	6.31	0.318	1.054	"
19.9 <sup>i</sup>	7.7	8.35	0.422	1.070	A+B
20	7.77	8.43	0.426	1.071	B
30	9.63	10.65	0.538	1.085	"
40	11.64	13.17	0.6657	1.102	"
50	13.90	16.15	0.8158	1.119	"
60	16.65	20.0	1.010	1.142	"
70	19.24	23.8	1.204	1.164	"
80 <sup>m</sup>	22.18	28.5	1.440	1.190	"
73.4 <sup>i</sup>	20.2	25.3	1.28	1.172	B+C
80	21.25	27.0	1.364	1.180	C
90	22.87	29.65	1.498	1.192	"
100	24.70	32.8	1.658	1.204	"
<sup>a</sup> A = NaIO <sub>3</sub> ·5H <sub>2</sub> O;      B = NaIO <sub>3</sub> ·H <sub>2</sub> O;      C = NaIO <sub>3</sub>					
<sup>i</sup> Interpolated data					
<sup>m</sup> Metastable					
AUXILIARY INFORMATION					
METHOD/APPARATUS/PROCEDURE:			SOURCE AND PURITY OF MATERIALS:		
The details of procedure were not given. The iodate content was determined by titration with thiosulfate solution.			Sodium iodate used was purchased as a "pure chemical". The salt was recrystallized four times. The product obtained was the monohydrate.		
			ESTIMATED ERROR:		
			Nothing specified.		
			REFERENCES:		

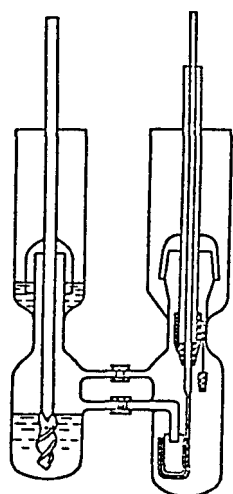
COMPONENTS:		ORIGINAL MEASUREMENTS:		
(1) Potassium iodate; $\text{KIO}_3$ ; [7758-05-6]		Flottmann, F.		
(2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]		Z. Anal. Chem. <u>1928</u> , 73, 1-39.		
VARIABLES:		PREPARED BY:		
T/K = 288, 293 and 298		Hiroshi Miyamoto		
EXPERIMENTAL VALUES:				
t/°C	Solubility of potassium iodate		Density	Refractive index
	mass %	mol kg <sup>-1</sup> <sup>a</sup>	g cm <sup>-3</sup>	n <sub>D</sub>
15	6.6894			
	6.6802			
	6.6827			
	(Av) 6.684 (σ=0.005)	0.335	1.0584	1.33831
20	7.4765			
	7.4825			
	7.4755			
	(Av) 7.478 (σ=0.004)	0.378	1.0648	1.33873
25	8.3386			
	8.3445			
	8.3452			
	(Av) 8.343 (σ=0.004)	0.425	1.0708	1.33911
<sup>a</sup> Molalities calculated by the compiler using 1977 IUPAC recommended atomic masses.				
AUXILIARY INFORMATION				
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:		
An excess potassium iodate was added to distilled water, and the mixture was shaken in a thermostat for about 10 hours. Equilibrium was established from both under-saturation and supersaturation.		The purest commercial potassium iodate (Kahlbaum) was dissolved in distilled water, the solution was decanted three times to remove the impurity. The recrystallized potassium iodate was used for the solubility determination.		
The sample of the saturated solution was filtered off, and the solution was evaporated to dryness.				
		ESTIMATED ERROR:		
		Soly: standard deviation is given in the table described above (compiler calculated)		
		Temp: ± 0.02°C (author)		
		REFERENCES:		



<b>COMPONENTS:</b> (1) Potassium iodate; KIO <sub>3</sub> ; [7758-05-6] (2) Water; H <sub>2</sub> O; [7732-18-5]		<b>ORIGINAL MEASUREMENTS:</b> Benrath, A.; Gjedebo, F.; Schiffer, B.; Wunderlich, H.  Z. Anorg. Allgem. Chem. <u>1937</u> , 231, 285-97.																																																																	
<b>VARIABLES:</b> T/K = 390 to 573		<b>PREPARED BY:</b> Hiroshi Miyamoto and Mark Salomon																																																																	
<b>EXPERIMENTAL VALUES:</b> <div>Solubility of KIO<sub>3</sub><sup>a,b</sup></div> <table><tr><th>t/°C</th><th>mass %</th><th>mol kg<sup>-1</sup></th><th>mole %</th></tr><tr><td>117</td><td>26.1</td><td>1.65</td><td>2.89</td></tr><tr><td>126</td><td>27.4</td><td>1.76</td><td>3.08</td></tr><tr><td>147</td><td>31.4</td><td>2.14</td><td>3.71</td></tr><tr><td>160</td><td>34.1</td><td>2.42</td><td>4.17</td></tr><tr><td>177</td><td>37.4</td><td>2.79</td><td>4.79</td></tr><tr><td>201</td><td>41.6</td><td>3.33</td><td>5.66</td></tr><tr><td>206</td><td>42.6</td><td>3.47</td><td>5.88</td></tr><tr><td>220</td><td>44.1</td><td>3.69</td><td>6.23</td></tr><tr><td>231</td><td>46.8</td><td>4.11</td><td>6.89</td></tr><tr><td>243</td><td>48.6</td><td>4.42</td><td>7.37</td></tr><tr><td>253</td><td>50.5</td><td>4.77</td><td>7.91</td></tr><tr><td>265</td><td>51.6</td><td>4.98</td><td>8.24</td></tr><tr><td>269</td><td>53.1</td><td>5.29</td><td>8.70</td></tr><tr><td>291</td><td>56.5</td><td>6.07</td><td>9.86</td></tr><tr><td>300</td><td>58.0</td><td>6.45</td><td>10.41</td></tr></table> <div><sup>a</sup> Molalities and mole % calculated by the compilers. <sup>b</sup> Nature of the solid phases not specified.</div>				t/°C	mass %	mol kg <sup>-1</sup>	mole %	117	26.1	1.65	2.89	126	27.4	1.76	3.08	147	31.4	2.14	3.71	160	34.1	2.42	4.17	177	37.4	2.79	4.79	201	41.6	3.33	5.66	206	42.6	3.47	5.88	220	44.1	3.69	6.23	231	46.8	4.11	6.89	243	48.6	4.42	7.37	253	50.5	4.77	7.91	265	51.6	4.98	8.24	269	53.1	5.29	8.70	291	56.5	6.07	9.86	300	58.0	6.45	10.41
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<b>AUXILIARY INFORMATION</b>																																																																			
<b>METHOD/APPARATUS/PROCEDURE:</b> Synthetic method used with visual observation of temperature of crystallization and solubilization (ref 1). The weighed salt and water were placed in a small tube. The tubes were set in an oven equipped with a mica window. A thermometer was immersed in the oven.		<b>SOURCE AND PURITY OF MATERIALS:</b> No information is given.																																																																	
		<b>ESTIMATED ERROR:</b> Nothing specified.																																																																	
		<b>REFERENCES:</b> 1. Jaenecke, E. Z. Physik. Chem. <u>1936</u> , A177, 7.																																																																	

<b>COMPONENTS:</b>  (1) Potassium iodate; $\text{KIO}_3$ ; [7758-05-6]  (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]		<b>ORIGINAL MEASUREMENTS:</b> Bresusov, O.N.; Kashina, N.I.; Revzina, T.V.; Sobolevskaya, N.G.  <i>Zh. Neorg. Khim.</i> 1967, 12, 2240-3; <i>Russ. J. Inorg. Chem.</i> (Engl. Transl.) 1967, 12, 1179-81.	
<b>VARIABLES:</b>  Temperature: 273.2 to 373.2 K		<b>PREPARED BY:</b>  Hiroshi Miyamoto	
<b>EXPERIMENTAL VALUES:</b>			
$t/^{\circ}\text{C}$	mass %	Solubility of $\text{KIO}_3^a$ mol % mol $\text{kg}^{-1}$ (compiler)	
0	4.57	0.402	0.224
10	6.04	0.538	0.300
20	7.68	0.695	0.389
25	8.57	0.783	0.438
30	9.35	0.861	0.482
40	11.13	1.043	0.585
50	13.07	1.250	0.703
60	15.30	1.498	0.844
70	17.41	1.744	0.985
80	19.55	2.005	1.136
90	21.85	2.300	1.306
100	23.99	2.588	1.475

<sup>a</sup> The nature of the solid phase was not specified.



High temp. apparatus

AUXILIARY INFORMATION	
<b>METHOD/APPARATUS/PROCEDURE:</b> Isothermal method. Equilibrium reached in 4-5 h. From 90-100°C, soly detd in apparatus shown in figure. At equilibrium, the apparatus was tilted to allow satd sln to filter through connecting tube into weighed test tubes. The test tube was closed with a stopper, withdrawn, and weighed. Condensation on the walls of the apparatus and loss of water by evaporation was thus prevented. At the lower temperatures, ordinary soly vessels were used, and pipets with glass filters were used for sampling (no other details given). Above 50°C, the pipets were preheated in the thermostat. The iodate content was determined iodometrically.	<b>SOURCE AND PURITY OF MATERIALS:</b> Results of analysis of $\text{KIO}_3$ :  $\text{KIO}_3$ content; 99.5 % Impurities, %, Rb 0.01; Cs 0.01; Na 0.005; $\text{SO}_4$ <0.01; Fe 0.005.  <b>ESTIMATED ERROR:</b> Soly: nothing specified. Temp: precision $\pm 0.1$ K.  <b>REFERENCES:</b>

<b>COMPONENTS:</b> (1) Potassium iodate; $\text{KIO}_3$ ; [7758-05-6] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Kolthoff, I.M.; Chantooni, M.K. <i>J. Phys. Chem.</i> <u>1973</u> , <i>77</i> , 523-6.
<b>VARIABLES:</b> $T/K = 298$	<b>PREPARED BY:</b> Hiroshi Miyamoto
<b>EXPERIMENTAL VALUES:</b> (1) Volumetric determination: <p>The solubility of <math>\text{KIO}_3</math> in water at <math>25^\circ\text{C}</math> was found to be</p> $0.44 \text{ mol dm}^{-3}.$ (2) Potentiometric determination: <p>The solubility product of <math>\text{KIO}_3</math> in water is given:</p> $pK_{s0} = 1.6 \text{ (authors)}$ $K_{s0} = 2.5 \times 10^{-2} \text{ mol}^2 \text{ dm}^{-6} \text{ (compiler)}$ <p>The solubility product of <math>\text{KIO}_3</math> was calculated from EMF data using the following equation:</p> $E_{\text{II}} - E_{\text{I}} = 0.0591 [ pK_{s0}(\text{AgCl}) - pK_{s0}(\text{AgIO}_3) + pK_{s0}(\text{KIO}_3) + 2 \log[c(\text{KCl}) y_{\pm}(\text{KCl})] ]$ <p>where <math>E_{\text{I}}</math> and <math>E_{\text{II}}</math> are Emfs of Cell I and II, respectively. With a particular cation glass electrode <math>E_{\text{I}} = +0.051\text{V}</math> and <math>E_{\text{II}} = +0.213\text{V}</math>, which combined with the accepted values in water <math>pK_{s0}(\text{AgCl}) = 9.7</math>, <math>pK_{s0}(\text{AgIO}_3) = 7.5</math>, and the mean activity coefficient <math>y_{\pm}(\text{KCl})</math> in <math>0.44 \text{ mol dm}^{-3}</math> KCl solution of 0.65 (ref 1) yield the value for <math>pK_{s0}(\text{KIO}_3)</math>.</p>	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b> (1) The solubility product of $\text{KIO}_3$ in water was estimated from the difference in emf of Cell I and II without liquid junction $\text{Ag, AgIO}_3/\text{salt}(c_1) / \text{K}(\text{gl}) \quad \text{I}$ $\text{Ag, AgCl}/\text{salt}(c_2) / \text{K}(\text{gl}) \quad \text{II}$ <p>where <math>c_1</math> is the concentration of <math>\text{IO}_3</math> in saturated solution, and <math>c_2</math> is the concentration of <math>\text{Cl}^-</math> saturated in <math>0.44 \text{ mol dm}^{-3}</math> <math>\text{KIO}_3</math> solution.</p> (2) The details of the isothermal method are not given. The iodate content was determined iodometrically.	<b>SOURCE AND PURITY OF MATERIALS:</b> $\text{KIO}_3$ was dried in <i>vacuo</i> at $70^\circ\text{C}$ for 3 hours. Electrodes were prepared electrolytically (ref 2). <b>ESTIMATED ERROR:</b> The uncertainty in $pK_{s0}$ is $\pm 0.05$ . Temp: not given. <b>REFERENCES:</b> 1. Bates, R.G.; Staples, B.G.; Robinson, R.A. <i>Anal. Chem.</i> <u>1970</u> , <i>42</i> , 867. 2. Ives, D.J.; Janz, G.J. <i>Reference Electrodes</i> . Academic Press. N.Y. <u>1961</u> , p179; Kolthoff, I.M.; Chantooni, M.K. <i>J. Am. Chem. Soc.</i> <u>1965</u> , <i>87</i> , 4428.

<b>COMPONENTS:</b> (1) Potassium iodate; $\text{KIO}_3$ ; [7758-05-6] (2) Water- $\text{d}_2$ ; $\text{D}_2\text{O}$ ; [7789-20-0] (3) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Chang, T.L.; Hsieh, Y.Y.  <i>J. Chinese Chem. Soc. Peking,</i> <u>1949</u> , 16, 10-2.										
<b>VARIABLES:</b>  T/K = 298	<b>PREPARED BY:</b>  G. Jancso										
<b>EXPERIMENTAL VALUES:</b>  <table> <thead> <tr> <th>Water-<math>\text{d}_2</math> mol %</th><th>Potassium Iodate of solubilities mole/55.51 moles of solvent</th></tr> </thead> <tbody> <tr> <td>0</td><td>0.431</td></tr> <tr> <td>99.3</td><td>0.3586 0.3597</td></tr> <tr> <td></td><td>(Av)0.359</td></tr> <tr> <td>100<sup>a</sup></td><td>0.358</td></tr> </tbody> </table> <p><sup>a</sup> Solubility in 100 mole % <math>\text{D}_2\text{O}</math> calculated by the compiler using linear extrapolation.</p>		Water- $\text{d}_2$ mol %	Potassium Iodate of solubilities mole/55.51 moles of solvent	0	0.431	99.3	0.3586 0.3597		(Av)0.359	100 <sup>a</sup>	0.358
Water- $\text{d}_2$ mol %	Potassium Iodate of solubilities mole/55.51 moles of solvent										
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99.3	0.3586 0.3597										
	(Av)0.359										
100 <sup>a</sup>	0.358										
<b>AUXILIARY INFORMATION</b>											
<b>METHOD/APPARATUS/PROCEDURE:</b> Saturated solutions of potassium iodate were prepared by the method of supersaturation. The saturated solutions were made by agitating the excess salt with water for one hour at 70°C and then for several hours in a 25°C bath. A sample of the clear solution was delivered in a weighing bottle, then the solvent evaporated and the residual pure salt was dried in vacuum at 100°C and weighed. Two duplicate determinations were made on the same sample of prepared solution.	<b>SOURCE AND PURITY OF MATERIALS:</b> Baker's analyzed "chemically pure" reagent grade $\text{KIO}_3$ was used. Heavy water was obtained from Norsk Hydro-Electrisk Kvalitetsfaktieselskab in Oslo, and had a deuterium concentration of 99.7 mol %. The $\text{D}_2\text{O}$ content of the water mixture was determined by pycnometer both before and after each measurement. The mole percentage was calculated from the specific gravity at 25°C (ref 1).  <b>ESTIMATED ERROR:</b> Soly: precision better than 1 %. Temp: nothing specified.  <b>REFERENCES:</b> 1. Swift, E. Jr. <i>J. Am. Chem. Soc.</i> <u>1939</u> , 61, 198.										

<b>COMPONENTS:</b> (1) Rubidium iodate; $\text{RbIO}_3$ ; [13446-76-9] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Wheeler, H.L. <i>Am. J. Sci.</i> <u>1892</u> , 44, 123-33.
<b>VARIABLES:</b> T/K = 296	<b>PREPARED BY:</b> Hiroshi Miyamoto
<b>EXPERIMENTAL VALUES:</b> <p>The solubility of <math>\text{RbIO}_3</math> in water was given as</p> <p style="text-align: center;">100 parts of water dissolve 2.1 parts of <math>\text{RbIO}_3</math>.</p> <p>The compiler's conversions to mass % and <math>\text{mol kg}^{-1}</math> are:</p> <p style="text-align: center;">2.05 mass %</p> <p style="text-align: center;">0.0806 <math>\text{mol kg}^{-1}</math></p>	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b> No information was given.	<b>SOURCE AND PURITY OF MATERIALS:</b> Rubidium iodate was prepared by stoichiometric mixing of iodine pentoxide, in either strong or dilute aqueous solution, with a solution of rubidium carbonate. The precipitate, after vacuum filtering, was washed with a little water and dried on paper. Found: Rb 32.17; I 48.50; O 20.59. Calcd for $\text{RbIO}_3$ ; Rb 32.83, I 48.72, O 18.43.
<b>ESTIMATED ERROR:</b> Nothing specified.	
<b>REFERENCES:</b>	

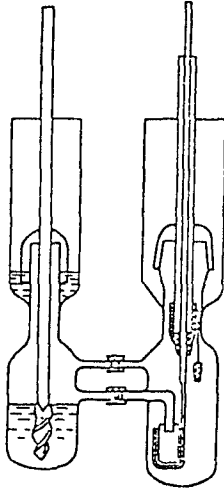
<b>COMPONENTS:</b> (1) Rubidium iodate; $\text{RbIO}_3$ ; [13446-76-9] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Barker, T.V. <i>J. Chem. Soc.</i> <u>1908</u> , 93, 15-6.
<b>VARIABLES:</b> $T/K = 296$	<b>PREPARED BY:</b> Hiroshi Miyamoto
<b>EXPERIMENTAL VALUES:</b> <p>The solubility of <math>\text{RbIO}_3</math> in water at <math>23^\circ\text{C}</math> is given as follows:</p> <p>100 parts of water dissolve 2.1 parts of <math>\text{RbIO}_3</math>.</p> <p>This is equivalent to <math>0.081 \text{ mol kg}^{-1}</math> (compiler).</p> <p>The specific gravity of the saturated solution at <math>14^\circ\text{C}</math> was reported as 4.559.</p> <p>The compiler assumes that precipitation occurred upon cooling the saturated solution at <math>23^\circ\text{C}</math> to <math>14^\circ\text{C}</math>.</p>	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/Apparatus/Procedure:</b> The iodine content was estimated by the Carius method (the reference was not given in the original paper), but the compiler assumes that the total solubility was determined by evaporation and heating to constant mass. The heating was carried out in two operations lasting four hours: the first to $150^\circ\text{C}$ , and the second to $250^\circ\text{C}$ . The rubidium content was determined by the usual sulfate method. No other information was given in the original paper.	<b>SOURCE AND PURITY OF MATERIALS:</b> Rubidium iodate was prepared by adding aqueous $\text{HIO}_3$ solution to aqueous rubidium carbonate solution. Another method was also used to prepare rubidium iodate: a good yield was obtained by passing chlorine into a hot concentrated solution of a mixture of rubidium iodide and hydroxide. No other information given.
	<b>ESTIMATED ERROR:</b> Nothing specified.
	<b>REFERENCES:</b>

<b>COMPONENTS:</b> (1) Rubidium iodate; RbIO <sub>3</sub> ; [13446-76-9] (2) Water; H <sub>2</sub> O; [7732-18-5]		<b>ORIGINAL MEASUREMENTS:</b> Breusov, O.N.; Kashina, N.I.; Revzina, T.V.; Sobolevskaya, N.G.  Zh. Neorg. Khim. 1967, 12, 2240-3; Russ. J. Inorg. Chem. (Engl. Transl.) 1967, 12, 1179-81.	
<b>VARIABLES:</b>  Temperature: 273.2 to 323.2 K		<b>PREPARED BY:</b>  Hiroshi Miyamoto	
<b>EXPERIMENTAL VALUES:</b>			
t/°C	Solubility of RbIO <sub>3</sub> mass %                      mol %                      mol kg <sup>-1</sup> 		

<b>COMPONENTS:</b> (1) Cesium iodate; $\text{CsIO}_3$ ; [13454-81-4] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Wheeler, H.L. <i>Am. J. Sci.</i> <u>1892</u> , [3] 44, 123-33.
<b>VARIABLES:</b> $T/K = 297$	<b>PREPARED BY:</b> Hiroshi Miyamoto
<b>EXPERIMENTAL VALUES:</b> <p>The solubility of <math>\text{CsIO}_3</math> in water is given as</p> <p>100 parts water dissolve 2.6 parts of <math>\text{CsIO}_3</math>.</p> <p>The compiler's conversions to mass % and <math>\text{mol kg}^{-1}</math> are</p> <p>2.53 mass %</p> <p>0.0844 <math>\text{mol kg}^{-1}</math></p>	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b> No information was given.	<b>SOURCE AND PURITY OF MATERIALS:</b> Cesium iodate was prepared by stoichiometric mixing of iodic acid and cesium carbonate. The solution was boiled, and upon cooling small cubic crystals were separated. The product was filtered, washed with cold water, pressed on papers, and then dried at $100^\circ\text{C}$ . Found: Cs 43.08; I 40.84; O 15.74. Calcd for $\text{CsIO}_3$ : Cs 43.18; I 41.23; O 15.59.
	<b>ESTIMATED ERROR:</b> Nothing specified.
	<b>REFERENCES:</b>



<b>COMPONENTS:</b> (1) Cesium iodate; $\text{CsIO}_3$ ; [13454-81-4] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Barker, T.V. <i>J. Chem. Soc.</i> <u>1908</u> , 93, 15-6.
<b>VARIABLES:</b> $T/K = 297$	<b>PREPARED BY:</b> Hiroshi Miyamoto
<b>EXPERIMENTAL VALUES:</b> <p>The solubility of <math>\text{CsIO}_3</math> in water at <math>24^\circ\text{C}</math> was given as</p> <p>100 parts of water dissolves 2.6 parts of salt.</p> <p>This is equivalent to <math>0.084 \text{ mol kg}^{-1}</math> (compiler).</p> <p>The specific gravity of the saturated solution at <math>16^\circ\text{C}</math> was reported as 4.559. The compiler assumes that pptn occurred upon cooling a satd sln at <math>24^\circ\text{C}</math> to <math>16^\circ\text{C}</math>.</p>	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b> The iodine content was estimated by the Carius method (the reference was not given in the original paper), but the compiler assumes that the total solubility was determined by evaporation and heating to constant mass. The heating was carried out in two operations lasting four hours: the first to $150^\circ\text{C}$ , and the second to $250^\circ\text{C}$ . The cesium content was determined by the usual sulfate method. No other information was given in the original paper.	<b>SOURCE AND PURITY OF MATERIALS:</b> Cesium iodate was prepared by adding aqueous $\text{HIO}_3$ solution to aqueous cesium carbonate solution. Another method was also used to prepare cesium iodate: a good yield was obtained by passing chlorine into a hot concentrated solution of a mixture of cesium iodide and hydroxide. No other information given.
	<b>ESTIMATED ERROR:</b> Nothing specified.
	<b>REFERENCES:</b>

<b>COMPONENTS:</b> (1) Cesium iodate; CsIO <sub>3</sub> ; [13454-81-4] (2) Water; H <sub>2</sub> O; [7732-18-5]				<b>ORIGINAL MEASUREMENTS:</b> Breusov, O.N.; Kashina, N.I.; Revzina, T.V.; Sobolevskaya, N.G.  Zh. Neorg. Khim. 1967, 12, 2240-3; Russ. J. Inorg. Chem. (Engl. Transl.) 1967, 12, 1179-81.																																																					
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<div>Solubility of CsIO<sub>3</sub></div> <table><thead><tr><th>t/°C</th><th>mass %</th><th>mol %</th><th>mol kg<sup>-1</sup> (compiler)</th></tr></thead><tbody><tr><td>0</td><td>1.07</td><td>0.0633</td><td>0.0351</td></tr><tr><td>10</td><td>1.57</td><td>0.0933</td><td>0.0518</td></tr><tr><td>20</td><td>2.29</td><td>0.137</td><td>0.0761</td></tr><tr><td>25</td><td>2.62</td><td>0.157</td><td>0.0874</td></tr><tr><td>30</td><td>2.99</td><td>0.180</td><td>0.100</td></tr><tr><td>40</td><td>4.00</td><td>0.243</td><td>0.135</td></tr><tr><td>50</td><td>4.05</td><td>0.310</td><td>0.173</td></tr><tr><td>60</td><td>6.20</td><td>0.385</td><td>0.215</td></tr><tr><td>70</td><td>7.62</td><td>0.481</td><td>0.268</td></tr><tr><td>80</td><td>9.08</td><td>0.581</td><td>0.324</td></tr><tr><td>90</td><td>10.85</td><td>0.707</td><td>0.395</td></tr><tr><td>100</td><td>12.58</td><td>0.835</td><td>0.468</td></tr></tbody></table>				t/°C	mass %	mol %	mol kg <sup>-1</sup> (compiler)	0	1.07	0.0633	0.0351	10	1.57	0.0933	0.0518	20	2.29	0.137	0.0761	25	2.62	0.157	0.0874	30	2.99	0.180	0.100	40	4.00	0.243	0.135	50	4.05	0.310	0.173	60	6.20	0.385	0.215	70	7.62	0.481	0.268	80	9.08	0.581	0.324	90	10.85	0.707	0.395	100	12.58	0.835	0.468		
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AUXILIARY INFORMATION																																																									
<b>METHOD/APPARATUS/PROCEDURE:</b> Isothermal method. Equilibrium reached in 4-5 h. From 90-100°C, soly detd in apparatus shown in figure. At equilibrium, the apparatus was tilted to allow satd sln to filter through connecting tube into weighed test tubes. The test tube was closed with a stopper, withdrawn, and weighed. Condensation on the walls of the apparatus and loss of water by evaporation was thus prevented. At the lower temperatures, ordinary soly vessels were used, and pipets with glass filters were used for sampling (no other details given). Above 50°C, the pipets were preheated in the thermostat. Iodate was determined iodometrically.				<b>SOURCE AND PURITY OF MATERIALS:</b> Results of analysis of CsIO <sub>3</sub> : CsIO <sub>3</sub> content; 99.5 % Impurities, %; K 0.005; Rb 0.20; Na 0.02; SO <sub>4</sub> <0.05; Fe 0.005.																																																					
				<b>ESTIMATED ERROR:</b> Soly: nothing specified. Temp: precision ± 0.1 K.																																																					
				<b>REFERENCES:</b>																																																					

High temperature aparatus

<b>COMPONENTS:</b> (1) Ammonium iodate; NH <sub>4</sub> IO <sub>3</sub> ; [13446-09-8] (2) Water; H <sub>2</sub> O; [7732-18-5]		<b>ORIGINAL MEASUREMENTS:</b> Opalovskii, A.A.; Kuznetsova, Z.M.  Izv. Sib. Otd. Akad. Nauk SSSR <u>1962</u> , No. 3. 64-9.																					
<b>VARIABLES:</b>  T/K = 273 to 358		<b>PREPARED BY:</b>  Hiroshi Miyamoto																					
<b>EXPERIMENTAL VALUES:</b> <table><tr><th>t/°C</th><th>I<sub>2</sub>O<sub>5</sub> mass %</th><th>NH<sub>4</sub>IO<sub>3</sub><sup>a</sup> mol kg<sup>-1</sup></th><th>Nature of the solid phase</th></tr><tr><td>0</td><td>2.03</td><td>2.35</td><td>NH<sub>4</sub>IO<sub>3</sub>·0.75H<sub>2</sub>O</td></tr><tr><td>25</td><td>3.30</td><td>3.81</td><td>"</td></tr><tr><td>50</td><td>6.04</td><td>6.98</td><td>"</td></tr><tr><td>85</td><td>8.86</td><td>10.2</td><td>"</td></tr></table>				t/°C	I <sub>2</sub> O <sub>5</sub> mass %	NH <sub>4</sub> IO <sub>3</sub> <sup>a</sup> mol kg <sup>-1</sup>	Nature of the solid phase	0	2.03	2.35	NH <sub>4</sub> IO <sub>3</sub> ·0.75H <sub>2</sub> O	25	3.30	3.81	"	50	6.04	6.98	"	85	8.86	10.2	"
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<sup>a</sup> Molalities calculated by the compiler using 1977 IUPAC recommended atomic masses.																							
<b>AUXILIARY INFORMATION</b>																							
<b>METHOD/APPARATUS/PROCEDURE:</b> Probably the isothermal method was used. The ammonia content was determined by a distillation method, and iodate was deter- mined iodometrically. The composition of the solid phase was de- termined by thermography and X-ray analysis.		<b>SOURCE AND PURITY OF MATERIALS:</b> Ammonium iodate was prepared by treating ammonium fluoride with iodic acid.																					
		<b>ESTIMATED ERROR:</b> Nothing specified.																					
		<b>REFERENCES:</b>																					

COMPONENTS:				ORIGINAL MEASUREMENTS:
(1) Iodic acid; $\text{HIO}_3$ ; [7782-68-5]				Groschuff, E.
(2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]				Z. Anorg. Alleg. Chem. 1905, 47, 331-52.
VARIABLES:				PREPARED BY:
Temperature: 254.2 - 433.2 K				Michelle C. Uchiyama
EXPERIMENTAL VALUES:				
t/°C	T/K	mass %	mol % <sup>a</sup>	Nature of the solid phase
- 0.30	272.85	1.78	0.185	Ice
- 0.67	272.48	4.35	0.464	"
- 1.01	272.14	7.17	0.785	"
- 1.90	271.25	17.66	2.149	"
- 2.38	270.77	27.65	3.766	"
- 4.72	268.43	54.19	10.81	"
- 6.32	266.83	60.72	13.67	"
-12.25	260.90	71.04	20.08	"
-13.5	259.7	72.2	21.0	"
-14 <sup>b</sup>	259.2	72.8	21.5	Ice + $\text{HIO}_3$
-15	258.2	73.8	22.4	Unstable ice
-19	254.2	76.2	24.7	"
0	273.2	74.1	22.7	$\text{HIO}_3$
13.5 <sup>c</sup>	286.7	74.1	22.7	"
16	289.2	75.6	24.1	"
18 <sup>c</sup>	291.2	74.55	23.08	"
40	313.2	77.7	26.3	"
60	333.2	80.0	29.1	"
80	353.2	82.5	32.6	"
85	358.2	83.0	33.3	"
101	374.2	85.2	37.1	"
110	383.2	86.5	39.6	$\text{HIO}_3 + \text{HI}_3\text{O}_8$
125	398.2	87.2	41.1	$\text{HI}_3\text{O}_8$
140	413.2	88.3	43.6	"
160	433.2	90.5	49.4	"
AUXILIARY INFORMATION				
METHOD/APPARATUS/PROCEDURE:			SOURCE AND PURITY OF MATERIALS:	
<u>Below 0°C.</u> Synthetic method. Solutions of known concn cooled to ppt ice, then warmed to determine the temperature of disappearance of ice.			Nothing specified.	
<u>0°C to 100°C.</u> Isothermal method. Excess powdered $\text{HIO}_3$ and water sealed in glass tube and agitated for several hours (several days at 0°C). After settling, aliquots analyzed by thiosulfate titration.				
<u>Above 100°C.</u> Isothermal as for 0-100°C. Satd slns rapidly cooled to 0°C before aliquots taken for analyses. Author states no pptn occurs in this process of cooling before analyses.				
Solid phases analyzed gravimetrically. Solid dried between filter paper, washed with alcohol, dried at the experimental temperature. Weight loss determined by heating to 190-195°C.			ESTIMATED ERROR:	
Footnotes to data table:			Author stated solubilities 1-2% higher by isothermal method. Nothing else specified.	
<sup>a</sup> compiler's calculation				
<sup>b</sup> extrapolated eutectic point			REFERENCES:	
<sup>c</sup> Synthetic method used for these two points				