

COMPONENTS: (1) Magnesium chlorate; $\text{Mg}(\text{ClO}_3)_2$; [10326-21-3] (2) Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Mylius, F.; Funk, R. <i>Ber. Dtsch. Chem. Ges.</i> 1897, 30, 1716-25.
VARIABLES: $T/K = 291$	PREPARED BY: Hiroshi Miyamoto
EXPERIMENTAL VALUES: <p>The solubility of $\text{Mg}(\text{ClO}_3)_2 \cdot 6\text{H}_2\text{O}$ in water at 18°C is given below:</p> <p>56.3 mass % (authors) 128.6 g/100g^a H_2O (authors) 6.726 mol kg^{-1} (compiler)</p> <p>The density of the saturated solution is given:</p> <p>1.594 g cm^{-3}</p> <p>Based on this density, the compiler calculated the solubility in volume units as</p> <p>4.690 mol dm^{-3}</p> <p>^a The compiler presumes that the first word in the fifth line from the end of page 1717 should read 100g.</p>	
AUXILIARY INFORMATION	
METHOD/Apparatus/Procedure: The salt and water were placed in a bottle and the bottle was shaken in a thermostat for a long time. After the saturated solution settled, an aliquot of solution was removed with a pipet. Magnesium chlorate was determined by evaporation of the solution to dryness. The density of the saturated solution was also determined.	SOURCE AND PURITY OF MATERIALS: The salt used was purchased as a "pure" chemical, and traces of impurities were not present. The purity sufficed for the solubility determination. ESTIMATED ERROR: Soly: precision within 1 % Temp: nothing specified REFERENCES:

COMPONENTS:		ORIGINAL MEASUREMENTS:		
(1) Magnesium chlorate; $\text{Mg}(\text{ClO}_3)_2$; [10326-21-3]		Meusser, A.		
(2) Water; H_2O ; [7732-18-5]		<i>Ber. Dtsch. Chem. Ges.</i> 1902, 35, 1414-24.		
VARIABLES:		PREPARED BY:		
$T/K = 255$ to 366		Hiroshi Miyamoto		
EXPERIMENTAL VALUES:				
$t/^\circ\text{C}$	Magnesium Chlorate ^a			Nature of the solid phase
	mass %	mol/100 mol H_2O (compiler)	$m_1/\text{mol kg}^{-1}$ (compiler)	
-12	26.35	3.371	1.871	Ice
- 8	22.24	2.695	1.496	"
-18	51.64	10.061	5.585	$\text{Mg}(\text{ClO}_3)_2 \cdot 6\text{H}_2\text{O}$
0	53.27	10.740	5.962	"
18	56.50	12.238	6.793	"
29	60.23	16.269	7.920	"
35	63.65	16.498	9.158	"
42	63.82	16.620	9.225	$\text{Mg}(\text{ClO}_3)_2 \cdot 4\text{H}_2\text{O}$
65.5	69.12	21.089	11.71	"
39.5	65.37	17.785	9.872	$\text{Mg}(\text{ClO}_3)_2 \cdot 2\text{H}_2\text{O}$
61	69.46	21.429	11.89	"
68	70.69	22.724	12.61	"
93	(73.71) ^b	26.416	14.66	"
^a Molalities and mol/100 mol H_2O calculated by compiler using 1977 IUPAC recommended atomic weights.				
^b No explanation for parenthesis is given.				
AUXILIARY INFORMATION				
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:		
The salt and water were placed into a test tube and agitated for one hour. The saturated solutions were withdrawn with a pipet, and Mg content of the solution was weighed as sulfate.		Pure $\text{Mg}(\text{ClO}_3)_2 \cdot 6\text{H}_2\text{O}$ was recrystallized. The product was used in solubility determination. No other information was given.		
		ESTIMATED ERROR:		
		Nothing specified.		
		REFERENCES:		

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Magnesium bromate; $\text{Mg}(\text{BrO}_3)_2$; [14519-17-6]	Linke, W. F.
(2) Water; H_2O ; [7732-18-5]	<i>J. Am. Chem. Soc.</i> <u>1955</u> , <u>77</u> , 866-7.

EXPERIMENTAL VALUES:

t/°C	Magnesium Bromate			Density $\rho/\text{g cm}^{-3}$	Nature of the Solid Phase ^a
	mass %	mol % (compiler)	$m/\text{mol kg}^{-1}$ (compiler)		
- 1.6	9.34	0.658	0.368	--	I
- 4.2	20.94	1.675	0.9456	--	"
-10.1	34.66	3.299	1.894	--	"
-13.0	38.5 ^b	3.87	2.23	1.448	I + A
0	42.3 ₄	4.51 ₀	2.62 ₁	1.512	A
10	45.58	5.11 ₁	2.99 ₀	1.562	"
20	48.6 ₆	5.74 ₆	3.38 ₄	1.609	"
30	51.4	6.37	3.78	1.662	"
40	54.5	7.15	4.28	1.722	"
50	57.3	7.94	4.79	1.787	"
65	62.5	9.68	5.95	1.900	"
75	66.8	11.5	7.18	2.013	"
78	68.3	12.2	7.69	2.070	"
80.5 ^b	70.15	13.13	8.390	--	"
80.0 ^b	70.1 ^b	13.1	8.37	--	A + B
81	70.1	13.1	8.37	--	B
90	70.8	13.5	8.66	--	"
100	71.9	14.1	9.13	--	B
117	72.6	14.6	9.46	--	"
130	73.3	15.0	9.80	--	"
134 ^{b,c}	73.6 ^c	15.2	9.95	--	"

^a I = Ice; A = $\text{Mg}(\text{BrO}_3)_2 \cdot 6\text{H}_2\text{O}$; B = $\text{Mg}(\text{BrO}_3)_2 \cdot 2\text{H}_2\text{O}$

^b Estimated graphically; c: Boiling point.

The solubility (S) of $\text{Mg}(\text{BrO}_3)_2 \cdot 6\text{H}_2\text{O}$ increases linearly from the eutectic (-13.0°C) to 65°C, and the relation was given as follows:

$$S = 4.24 + 0.300t$$

over this range with an average deviation 0.1 from the experimental values. The relation between the solubility (S') of $\text{Mg}(\text{BrO}_3)_2 \cdot 2\text{H}_2\text{O}$ and the temperature (from 80°C to boiling point) is given as follows:

$$S' = 65.1 + 0.064t$$

with an accuracy of ± 0.1 .

COMPONENTS: (1) Magnesium bromate; $\text{Mg}(\text{BrO}_3)_2$; [14519-17-6] (2) Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Linke, W. F. <i>J. Am. Chem. Soc.</i> <u>1955</u> , <i>77</i> , 866-7.
VARIABLES: T/K = 260.2 to 407	PREPARED BY: Hiroshi Miyamoto
EXPERIMENTAL VALUES:	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: Isothermal method used. Below 80°C solutions were equilibrated in a water thermostat, and above 80°C a vapor bath (1) was used. All samples were stirred internally. Repeated analysis showed that equilibrium was attained within an hour in every case. In a few cases equilibrium was checked by approach from supersaturation. Each reported value is the average of at least two independent determinations. The bromate content was determined by iodometry. Analysis for magnesium by precipitation of the oxime was done by reducing the bromate ions prior to the addition of the oxime; KBr or KI plus HCl were added, and the solution was boiled to expel the liberated halogens. The densities of solutions in equilibrium with the hexahydrate were determined in a small pycnometer.	SOURCE AND PURITY OF MATERIALS: Magnesium bromate hexahydrate was prepared by the addition of MgSO_4 solution to a hot suspension of $\text{Ba}(\text{BrO}_3)_2 \cdot \text{H}_2\text{O}$. The precipitate was allowed to digest overnight and then separated by filtration. The solution was evaporated by boiling until it became rather sirupy. Upon cooling the mass solidified completely. The salt was recrystallized twice and then air-dried. Found: $\text{Mg}(\text{BrO}_3)_2$, 72.03%. Calcd. for $\text{Mg}(\text{BrO}_3)_2 \cdot 6\text{H}_2\text{O}$: $\text{Mg}(\text{BrO}_3)_2$, 72.15%. Magnesium bromate dihydrate was prepared by heating the hexahydrate to 50-60°C. Found: $\text{Mg}(\text{BrO}_3)_2$, 88.67%. Calcd. for $\text{Mg}(\text{BrO}_3)_2 \cdot 2\text{H}_2\text{O}$: $\text{Mg}(\text{BrO}_3)_2$, 88.61%. ESTIMATED ERROR: Soly: precision 0.2% Temp: below 80°C, $\pm 0.05^\circ\text{C}$; above 80°C, $\pm 0.5^\circ\text{C}$ REFERENCES: 1. Linke, W. F. <i>J. Chem. Educ.</i> <u>1952</u> , <i>29</i> , 492.

COMPONENTS: (1) Magnesium iodate; $\text{Mg}(\text{IO}_3)_2$; [7790-32-1] (2) Water; H_2O ; [7732-18-5]		ORIGINAL MEASUREMENTS: Mylius, F.; Funk, R. <i>Ber. Dtsch. Chem. Ges.</i> <u>1897</u> , <u>30</u> , 1716-25.		
VARIABLES: $T/K = 273 - 373$		PREPARED BY: Hiroshi Miyamoto		
EXPERIMENTAL VALUES:				
t/°C		Magnesium Iodate		Nature of the solid phase
		mass %	$m_1/\text{mol kg}^{-1a}$	
0		3.1	0.086	$\text{Mg}(\text{IO}_3)_2 \cdot 10\text{H}_2\text{O}$
20		10.2	0.304	
30		17.4	0.563	
35		21.9	0.750	
50		67.5	5.55	
0		6.8	0.20	$\text{Mg}(\text{IO}_3)_2 \cdot 4\text{H}_2\text{O}$
10		6.4	0.18	
18 ^b		6.44	0.184	
20		7.7	0.22	
35		8.9	0.26	
63		12.6	0.385	
100		19.3	0.639	
^a Molalities calculated by compiler				
^b The solubility, 6.88 g/100g H_2O , and the density of the saturated solution, 1.078, were also reported.				
The compiler presumes that the first word in the fifth line from the end of page 1717 should read 100g.				
AUXILIARY INFORMATION				
METHOD/APPARATUS/PROCEDURE: The salt and water were placed in a bottle. The bottle was shaken in a constant temperature bath for a long time. After the saturated solution settled, an aliquot of solution was removed with a pipet. Magnesium iodate was determined by evaporation of the solution to dryness. The density of the saturated solution was also determined.		SOURCE AND PURITY OF MATERIALS: The salt used was purchased as "pure" chemical, and traces of impurities were not present. The purity sufficed for the solubility determination.		
		ESTIMATED ERROR: Soly: precision within 1 %. Temp: nothing specified		
		REFERENCES:		

COMPONENTS:		ORIGINAL MEASUREMENTS:	
(1) Magnesium iodate; $\text{Mg}(\text{IO}_3)_2$; [7790-32-1]		Hill, A. E.; Moskowitz, S.	
(2) Water; H_2O ; [7732-18-5]		<i>J. Am. Chem. Soc.</i> <u>1931</u> , <i>53</i> , 941-6.	
VARIABLES:		PREPARED BY:	
$T/\text{K} = 272.79 - 363$		Hiroshi Miyamoto	
EXPERIMENTAL VALUES:			
$t/^\circ\text{C}$	Magnesium Iodate		Nature of the Solid Phase ^b
	mass %	$m_1/\text{mol kg}^{-1a}$	
- 0.36	3.18	0.0878	A + ice
+ 5	4.39	0.1227	A
10	5.87	0.1667	A
15	7.79	0.2258	A(m)
5	6.09	0.1733	B(m)
10	6.68	0.1913	B(m)
15	7.29	0.2102	B
25	8.55	0.2499	B
35	9.83	0.2914	B
40	10.51	0.3139	B
50	12.05	0.3662	B
57.5	13.1	0.403	B
70	15.7	0.498	B(m)
90	19.6	0.652	B(m)
60	13.2	0.406	C
70	13.3	0.410	C
80	13.4	0.414	C
90	13.5	0.417	C
^a Molalities calculated by compiler.			
^b A = $\text{Mg}(\text{IO}_3)_2 \cdot 10\text{H}_2\text{O}$; B = $\text{Mg}(\text{IO}_3)_2 \cdot 4\text{H}_2\text{O}$; C = $\text{Mg}(\text{IO}_3)_2$ (m) indicates that the solid phase was metastable.			
AUXILIARY INFORMATION			
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:	
Excess magnesium iodate was added to distilled water in glass-stoppered Pyrex tubes. For the lower temperatures the tubes were rotated in a water thermostat. For temperatures above 50°C the tubes were placed in an air thermostat and stirred by means of a brass paddle on a mechanical stirrer. Filtered samples were withdrawn by calibrated pipets at the lower temperatures and weighed to give approximate figures for density. At the higher temperatures the samples were forced through a tube into a weighing bottle by air pressure. At lower temperatures, one to three days were found sufficient to attain equilibrium from undersaturation. The time required for the change from the tetrahydrate to the anhydrate was 4 days at 80°C and 2 days at 90°C. At 70°C the solid phase used was anhydrous salt. Equilibrium at the higher temperatures being reached within one days. The iodate content was determined iodometrically.		Magnesium iodate was prepared by neutralizing an aqueous solution of HIO_3 with MgCO_3 and evaporating the slightly acidified solution at above 40-50°C for 4 days, which gave a copious crystallization of the tetrahydrate. The crystals were washed with water, air-dried, ground and placed in a desiccator.	
		ESTIMATED ERROR:	
		Soly: nothing specified Temp: water thermostat, constant to about 0.03°C	
		REFERENCES:	

COMPONENTS: (1) Calcium chlorate; $\text{Ca}(\text{ClO}_3)_2$; [10137-74-3] (2) Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Mylius, F.; Funk, R. <i>Ber. Dtsch. Chem. Ges.</i> 1897, 30, 1716-25.
VARIABLES: $T/K = 291$	PREPARED BY: Hiroshi Miyamoto
EXPERIMENTAL VALUES: The solubility of $\text{Ca}(\text{ClO}_3)_2 \cdot 2\text{H}_2\text{O}$ in water at 18°C is given as below: <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div>64 mass %</div> <div>(authors)</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div>177.8 g/100g^a H_2O</div> <div>(authors)</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div>8.589 mol kg⁻¹</div> <div>(compiler)</div> </div> The density of the saturated solution at 18°C is also given: 1.729 g cm^{-3} Based on this density, the compiler calculated the solubility in volume units as $5.346 \text{ mol dm}^{-3}$ <div style="margin-top: 20px;"> ^a The compiler presumes that the first word in the fifth line from the end of page 1717 should read 100g. </div>	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: The salt and water were placed in a bottle and the bottle was shaken in a thermostat for a long time. After the saturated solution settled, an aliquot of solution was removed with a pipet. Calcium chlorate was determined by evaporation of the solution to dryness. The density of the saturated solution was also determined.	<div style="border-bottom: 1px solid black; padding-bottom: 10px;"> SOURCE AND PURITY OF MATERIALS: The salt used was purchased as a "pure" chemical, and the traces of impurities were not present. The purity sufficed for the solubility determination. </div> <div style="border-bottom: 1px solid black; padding-bottom: 10px;"> ESTIMATED ERROR: Soly: precision within 1 % Temp: nothing specified </div> <div style="padding-top: 10px;"> REFERENCES: </div>

COMPONENTS:

(1) Calcium chlorate; $\text{Ca}(\text{ClO}_3)_2$;
[10137-74-3](2) Water; H_2O ; [7732-18-5]

ORIGINAL MEASUREMENTS:

Egorov, V. S.

J. Gen. Chem. (U.S.S.R.) **1931**, 1,
1266-70.

EXPERIMENTAL VALUES:

t/°C	Calcium Chlorate			Nature of the Solid Phase
	mass %	mol % (compiler)	$m_1/\text{mol kg}^{-1}$ (compiler)	
-1.0	4.67	0.425	0.237	Ice
-2.2	9.3	0.88	0.50	"
-4.2	13.9	1.39	0.780	"
-6.3	18.6	1.95	1.10	"
-9.1	23.2	2.56	1.46	"
-12.9	27.9	3.26	1.87	"
-17.1	32.5	4.02	2.33	"
-24.0	37.2	4.90	2.86	"
-32.9	42.0	5.93	3.50	"
-34.2	43.0	6.16	3.64	"
-37.0	44.0	6.40	3.80	"
-39.6	45.0	6.65	3.95	"
-41.	45.5	6.77	4.03	Ice + $\text{Ca}(\text{ClO}_3)_2 \cdot 6\text{H}_2\text{O}$
-37.5	46.0	6.90	4.12	$\text{Ca}(\text{ClO}_3)_2 \cdot 6\text{H}_2\text{O}$
-30.2	48.0	7.44	4.46	"
-28	51.2	8.37	5.07	"
-26.8	55	9.6	5.9	$\text{Ca}(\text{ClO}_3)_2 \cdot 6\text{H}_2\text{O} + \text{Ca}(\text{ClO}_3)_2 \cdot 4\text{H}_2\text{O}$
-26.3	55.0	9.62	5.90	$\text{Ca}(\text{ClO}_3)_2 \cdot 4\text{H}_2\text{O}$
-16.2	58.0	10.7	6.67	"
-12.3	60.0	11.5	7.25	"
-7.8	62.7	12.8	8.12	$\text{Ca}(\text{ClO}_3)_2 \cdot 4\text{H}_2\text{O} + \text{Ca}(\text{ClO}_3)_2 \cdot 2\text{H}_2\text{O}$
-5.0	63.0	12.9	8.23	$\text{Ca}(\text{ClO}_3)_2 \cdot 2\text{H}_2\text{O}$
19.5	66.2	14.6	9.46	"
73.5	76.3	21.9	15.6	"
76	77	23	16	$\text{Ca}(\text{ClO}_3)_2 \cdot 2\text{H}_2\text{O} + \text{Ca}(\text{ClO}_3)_2$
93	78.0	23.6	17.1	$\text{Ca}(\text{ClO}_3)_2$
127	80.1	25.9	19.4	"
156.5 ^a	82.3	28.8	22.5	"
203	85.0	33.0	27.4	"
290	92	50	56	"

^a

The compiler assumes that 56.5 in the original paper should read 156.5.

COMPONENTS:			ORIGINAL MEASUREMENTS:																																																									
(1) Calcium iodate; $\text{Ca}(\text{IO}_3)_2$; [7789-80-2]			Mylius, F.; Funk, R.																																																									
(2) Water; H_2O ; [7732-18-5]			Ber. Dtsch. Chem. Ges. 1897, 30, 1716-25.																																																									
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<table><tr><th rowspan="2">t/°C</th><th colspan="2">Calcium Iodate</th><th rowspan="2">Nature of the Solid Phase</th></tr><tr><th>mass %</th><th>$m_1/\text{mol kg}^{-1}$ (compiler)</th></tr><tr><td>0</td><td>0.1</td><td>0.003</td><td rowspan="8">$\text{Ca}(\text{IO}_3)_2 \cdot 6\text{H}_2\text{O}$</td></tr><tr><td>10</td><td>0.17</td><td>0.0044</td></tr><tr><td>18^a</td><td>0.25</td><td>0.0064</td></tr><tr><td>30</td><td>0.42</td><td>0.011</td></tr><tr><td>40</td><td>0.61</td><td>0.016</td></tr><tr><td>50</td><td>0.89</td><td>0.023</td></tr><tr><td>54</td><td>1.04</td><td>0.0270</td></tr><tr><td>60</td><td>1.36</td><td>0.0354</td></tr><tr><td>21</td><td>0.37</td><td>0.0095</td><td rowspan="8">$\text{Ca}(\text{IO}_3)_2 \cdot \text{H}_2\text{O}$</td></tr><tr><td>35</td><td>0.48</td><td>0.012</td></tr><tr><td>40</td><td>0.52</td><td>0.013</td></tr><tr><td>45</td><td>0.54</td><td>0.014</td></tr><tr><td>50</td><td>0.59</td><td>0.015</td></tr><tr><td>60</td><td>0.65</td><td>0.017</td></tr><tr><td>80</td><td>0.79</td><td>0.020</td></tr><tr><td>100</td><td>0.94</td><td>0.024</td></tr></table>					t/°C	Calcium Iodate		Nature of the Solid Phase	mass %	$m_1/\text{mol kg}^{-1}$ (compiler)	0	0.1	0.003	$\text{Ca}(\text{IO}_3)_2 \cdot 6\text{H}_2\text{O}$	10	0.17	0.0044	18 ^a	0.25	0.0064	30	0.42	0.011	40	0.61	0.016	50	0.89	0.023	54	1.04	0.0270	60	1.36	0.0354	21	0.37	0.0095	$\text{Ca}(\text{IO}_3)_2 \cdot \text{H}_2\text{O}$	35	0.48	0.012	40	0.52	0.013	45	0.54	0.014	50	0.59	0.015	60	0.65	0.017	80	0.79	0.020	100	0.94	0.024
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METHOD/APPARATUS/PROCEDURE: Ca(IO_3) ₂ crystals and water were placed in bottles. The bottles were shaken in a constant temperature bath for a long time. After the saturated solution settled, an aliquot of solution was removed with a pipet. Calcium iodate was determined by evaporation of the solution to dryness. The density of the saturated solution was also determined.			SOURCE AND PURITY OF MATERIALS: The salt used was purchased as "pure" chemical, and traces of impurities were not present. The purity sufficed for the solubility determination.																																																									
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COMPONENTS:			ORIGINAL MEASUREMENTS:		
(1) Calcium iodate; $\text{Ca}(\text{IO}_3)_2$; [7789-80-2]			Hill, A. E.; Brown, S. F.		
(2) Water; H_2O ; [7732-18-5]			<i>J. Am. Chem. Soc.</i> <u>1931</u> , 53, 4316-20.		
VARIABLES: $T/K = 278$ to 363			PREPARED BY: Hiroshi Miyamoto		
EXPERIMENTAL VALUES:					
$t/^\circ\text{C}$	Solubility of Calcium Iodate in Water				Nature of the Solid Phase ^b
	From under-saturation mass %	From super-saturation mass %	Average mass %	Average Molality ^a $10^2 m_1/\text{mol kg}^{-1}$	
5	0.118	0.120	0.119	0.306	A
15	0.194	0.196	0.195	0.501	A
25	0.306	0.307	0.306	0.787	A
30	0.384	0.384	0.384	0.989	A
35	0.475	0.477	0.476	1.227	A + B
40	0.584	---	0.584	1.507	A(m)
25	---	0.405	0.405	1.043	B(m)
40	0.514	0.519	0.517	1.333	B
50	0.589	0.590	0.590	1.522	B
57.5	0.621	---	0.621	1.603	B + C
60	0.652	---	0.652	1.683	B(m)
70	0.811	---	0.811	2.097	B(m)
60	---	0.617	0.617	1.592	C
70	0.643	0.645	0.644	1.662	C
80	0.665	0.665	0.665	1.717	C
90	0.668	0.668	0.668	1.725	C
^a molalities calculated by compiler.					
^b A = $\text{Ca}(\text{IO}_3)_2 \cdot 6\text{H}_2\text{O}$; B = $\text{Ca}(\text{IO}_3)_2 \cdot \text{H}_2\text{O}$; C = $\text{Ca}(\text{IO}_3)_2$; (m) = metastable.					
AUXILIARY INFORMATION					
METHOD/APPARATUS/PROCEDURE: In carrying out the solubility determinations, the specified hydrate in each temperature range was used. The time allowed for equilibrium varied from one day at the highest temperatures to two or three weeks at the lower temperatures. By using metastable phases, several points for metastable equilibrium were obtained, and in which the solubility of the metastable hydrate remained constant for as long a period as two weeks. The equilibrium between the liquid and solid phases was approached from the side of supersaturations and/or undersaturation. The concentration of calcium iodate in liquid phases was determined iodometrically.			SOURCE AND PURITY OF MATERIALS: Calcium iodate was prepared by double decomposition of $\text{Ca}(\text{NO}_3)_2$ and KIO_3 in water, washed, and purified by recrystallization. The hexahydrate obtained by slow cooling within the temperature range below 30°C , the monohydrate below 100°C . Each sample was dried in a desiccator over the next lower hydrate as desiccant, and was analyzed verifying the correct composition within a few tenths of a percent. The anhydrate was prepared by dehydration in an oven at 100°C .		
			ESTIMATED ERROR: nothing specified		
			REFERENCES:		

COMPONENTS:

(1) Calcium iodate; $\text{Ca}(\text{IO}_3)_2$;
[7789-80-2](2) Water; H_2O ; [7732-18-5]

ORIGINAL MEASUREMENTS:

Bousquet, J.; Mathurin, D.;
Vermande, P.*Bull. Soc. Chim. Fr.* 1969, 1111-5.

EXPERIMENTAL VALUES:

t/°C	Calcium Iodate Activity Product $10^7 K_{s0}^\circ / \text{mol}^3 \text{ dm}^{-9}$	Nature of the Solid Phase
14	2.11	hexahydrate
18	3.24	"
22	5.21	"
25	6.98	"
28	9.71	"
30	12.71	"
32	15.42	"
35	20.05	"
38	28.32	"
40	27.2	monohydrate ^a
44.4	31.0	"
47	32.8	"
50	35.4	"
55	40.5	"
60	41.2	anhydrate ^a
70	44.4	"
79	51.7	"
86	55.1	"

^a There are apparent misprintings of these values in the original article, but the correct values as printed here can be calculated from other data in Table in original article.

The solubility product, K_{s0}° of $\text{Ca}(\text{IO}_3)_2 \cdot x\text{H}_2\text{O}$ was defined as

$$K_{s0}^\circ = (\text{C}_{\text{Ca}^{2+}} \times \text{C}_{\text{IO}_3^-}^2) (\gamma_{\text{Ca}^{2+}} \times \gamma_{\text{IO}_3^-}^2) \\ = 4S^3 \gamma_{\pm}^3 \quad (1)$$

where S represents the solubility, γ_{\pm} the activity coefficient given by the modified Debye-Hückel equation

$$-\log \gamma_{\pm} = Z_+ Z_- A \sqrt{I} - BI \quad (2)$$

From (1) and (2)

$$Y = -BI + 1/3 \log K_{s0}^\circ \quad (3)$$

where $Y = 1/3 \log (4S^3) - Z_+ Z_- A \sqrt{I}$, and $A = 0.5115$ at 25°C .

The solubility product (K_{s0}°) and constant B were evaluated from the intercept and the slope of Y vs I plots. The solubilities of $\text{Ca}(\text{IO}_3)_2$ in NaCl aqueous solutions were determined in order to obtain Y vs I plots, but these data were not given in the paper.

COMPONENTS: (1) Calcium iodate; $\text{Ca}(\text{IO}_3)_2$; [7789-80-2] (2) Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Bousquet, J.; Mathurin, D.; Vermande, P. <i>Bull. Soc. Chim. Fr.</i> <u>1969</u> , 1111-5.
VARIABLES: $T/K = 287 - 359$	PREPARED BY: Hiroshi Miyamoto
EXPERIMENTAL VALUES:	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: Aqueous NaCl solutions and the specified hydrate crystals were placed into glass-stoppered Erlenmeyer flasks. The flasks were stirred in a thermostat for 1-15 hours. The iodate content was determined iodometrically.	SOURCE AND PURITY OF MATERIALS: $\text{Ca}(\text{IO}_3)_2 \cdot 6\text{H}_2\text{O}$ was prepared by mixing aqueous solutions of calcium nitrate and HIO_3 . The product was washed. The monohydrate and anhydrate were prepared from the hexahydrates, which were furnished from BDH and prepared by authors, by hydration.
	ESTIMATED ERROR: Soly: nothing specified Temp: $\pm 0.05^\circ\text{C}$ (authors)
	REFERENCES:

COMPONENTS: (1) Strontium chlorate; $\text{Sr}(\text{ClO}_3)_2$; [7791-10-8] (2) Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Mylius, F.; Funk, R. <i>Ber. Dtsch. Chem. Ges.</i> <u>1897</u> , 30, 1716-25.
VARIABLES: $T/K = 291$	PREPARED BY: Hiroshi Miyamoto
EXPERIMENTAL VALUES: The solubility of $\text{Sr}(\text{ClO}_3)_2$ in water at 18°C is given as below: <div style="display: flex; justify-content: space-between;"> <div>63.6 mass %</div> <div>(authors)</div> </div> <div style="display: flex; justify-content: space-between;"> <div>174.9 g/100g^a H_2O</div> <div>(authors)</div> </div> <div style="display: flex; justify-content: space-between;"> <div>174.7 g/100g H_2O</div> <div>(the compiler recalculated)</div> </div> <div style="display: flex; justify-content: space-between;"> <div>6.865 mol kg⁻¹</div> <div>(compiler)</div> </div> The density of the saturated solution at 18°C is also given: 1.839 g cm^{-3} Based on this density, the compiler calculated the solubility in volume units as $4.597 \text{ mol dm}^{-3}$ ^a The compiler presumes that the first word in the fifth line from the end of page 1717 should read 100g.	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: The salt and water were placed in a bottle and the bottle was shaken in a constant temperature bath for a long time. After the saturated solution settled, an aliquot of solution was removed with a pipet. Strontium chlorate was determined by evaporation of the solution by dryness. The density of the saturated solution was also determined.	SOURCE AND PURITY OF MATERIALS: The salt used was purchased as a "pure" chemical and traces of impurities were not present. The purity sufficed for the solubility determination.
	ESTIMATED ERROR: Soly: precision within 1 % Temp: nothing specified
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Strontium chlorate; $\text{Sr}(\text{ClO}_3)_2$; [7791-10-8]	Linke, W. F.
(2) Water; H_2O ; [7732-18-5]	<i>J. Am. Chem. Soc.</i> <u>1953</u> , <u>75</u> , 5797-800.

EXPERIMENTAL VALUES:

t/°C	Strontium Chlorate			Density $\rho/\text{g cm}^{-3}$	Nature of the Solid Phase ^a
	mass %	mol % (compiler)	$m_1/\text{mol kg}^{-1}$ (compiler)		
- 38.1 ^b	55.0 ^b	7.96	4.80	--	Ice ^c
- 29.4	49.87	6.578	3.909	--	"
- 22.2	45.11	5.497	3.229	--	"
- 14.2	37.46	4.067	2.353	--	"
- 9.4	29.94	2.936	1.679	--	"
- 4.0	17.92	1.522	0.8578	--	"
- 1.8	9.29	0.720	0.402	--	"
- 37.0 ± 0.5	54.5 ^d	7.82	4.71	--	Ice + A
- 28	57.1	8.61	5.23	--	A
- 16.7	57.9	8.87	5.40	--	"
- 7	59.9	9.56	5.87	--	"
0	61.4	10.1	6.25	--	"
9	63.47	10.95	6.826	--	"
10 ± 1	63.4 ^d	10.9	6.81	1.829	A + B
0 ^a	63.23 ^b	10.85	6.756	1.828	B
15	63.55	10.98	6.850	1.830	"
25	63.78	11.08	6.918	1.831	"
35	64.17	11.25	7.037	1.833	"
45	64.55	11.42	7.154	1.835	B
50	64.65	11.46	7.185	1.837	"
55	64.95	11.60	7.281	1.838	"
65	65.32	11.76	7.400	1.842	"
75	66.0	12.08	7.627	1.845	"
80	66.07	12.11	7.651	1.847	"
85	66.41	12.28	7.768	1.849	"
95	67.08	12.60	8.006	1.853	"
110	67.8	13.0	8.27	1.861	"
121 ± 1	68.7 ^d	13.4	8.62	1.867	"

^a A = $\text{Sr}(\text{ClO}_3)_2 \cdot 3\text{H}_2\text{O}$; B = $\text{Sr}(\text{ClO}_3)_2$

^b Metastable system

^c Nature of solid phase not specified by author, but assumed by compiler based upon shape of the polytherm plotted in the source paper.

^d Determined graphically

COMPONENTS: (1) Strontium chlorate; $\text{Sr}(\text{ClO}_3)_2$; [7791-10-8] (2) Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Linke, W. F. <i>J. Am. Chem. Soc.</i> <u>1953</u> , <i>75</i> , 5797-800.
VARIABLES: $T/K = 235.1 \text{ to } 394$	PREPARED BY: Hiroshi Miyamoto
EXPERIMENTAL VALUES:	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: Temperatures between 0 and 100°C were maintained in water-baths, and at 110°C an acetic acid vapor bath was used (1). At 0°C and below, baths of melting ice and of melting mono-, di- and triethylene glycol were employed. Freezing points were determined from the cooling curves of known mixtures and reproducible to $\pm 0.05^\circ\text{C}$. Equilibrium in saturated solutions was established by repeated analysis after several hours of stirring. Representative points were checked by approach from supersaturation. Each reported value is the average of at least two closely agreeing determinations. Filtered samples of the solution were withdrawn with preheated calibrated pipets, and approximate densities were calculated. Analysis for chlorate was made by reduction to chloride with nitrite and subsequent Volhard titration.	SOURCE AND PURITY OF MATERIALS: Strontium chlorate anhydrate was prepared as follows: a chloric acid solution was prepared from roughly equivalent quantities of c.p. grade $\text{Ba}(\text{ClO}_3)_2$ and H_2SO_4 , and small amounts of BaO and H_2SO_4 were then added until no significant tests for Ba^{2+} or SO_4^{2-} were obtained. Excess c.p. grade SrCO_3 (previously leached with a large volume of boiling water) was then added to the chloric acid solution. The mixture was filtered, and evaporation by boiling yielded pure anhydrous $\text{Sr}(\text{ClO}_3)_2$. The solid was recrystallized from water, air-dried, and stored at room temperature. A qualitative flame test showed that no sodium, and only traces of calcium present. Analysis by reduction to chloride and Volhard titration showed 99.6% $\text{Sr}(\text{ClO}_3)_2$. Loss in weight upon drying at 110°C was 0.26%. $\text{Sr}(\text{ClO}_3)_2 \cdot 3\text{H}_2\text{O}$ was prepared by cooling a concentrated solution of the anhydrous salt in an acetone-dry-ice bath. When the solution had become very viscous, vigorous scratching produced the trihydrate. The excess solution was removed by suction, and the moist solid was stored at 7°C.
ESTIMATED ERROR: Soly: nothing specified Temp: the maximum variation between 0 and 100°C never exceed $\pm 0.1^\circ\text{C}$, and was usually much less.	REFERENCES: 1. Linke, W. F. <i>J. Chem. Educ.</i> <u>1952</u> , <i>29</i> , 429.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Strontium bromate; $\text{Sr}(\text{BrO}_3)_2$; [14519-18-7]	Linke, W. F.
(2) Water; H_2O ; [7732-18-5]	<i>J. Am. Chem. Soc.</i> <u>1953</u> , <i>75</i> , 5797-800.

EXPERIMENTAL VALUES:

t/°C	Strontium Bromate			Density $\rho/\text{g cm}^{-3}$	Nature of the Solid Phase ^a
	mass %	mol % (compiler)	$m_1/\text{mol kg}^{-1}$ (compiler)		
- 2.28 ^b	18.48 ^b	1.175	0.6601	--	Ice
- 2.10	16.85	1.052	0.5901	--	"
- 2.03	16.15	1.000	0.5608	--	"
- 1.84	14.94	0.9130	0.5114	--	"
- 1.14	9.38	0.540	0.301	--	"
- 2.18	17.50 ^c	1.100	0.6177	1.165 ^c	Ice + A
0	18.32	1.163	0.6531	1.177	A
4.4	20.11	1.303	0.7330	1.199	"
15	23.97	1.627	0.9180	1.241	"
25	27.25	1.927	1.091	1.285	"
35	30.03	2.202	1.250	1.320	"
45	32.69	2.484	1.414	1.356	"
55	35.15	2.765	1.578	1.384	"
65	37.57	3.060	1.752	1.422	"
72	39.15	3.265	1.873	--	"
75	39.75	3.345	1.921	1.458	"
75.5 ± 0.5	39.9 ^c	3.365	1.933	1.458 ^c	A + B
76	39.9	3.37	1.93	--	B
77	39.9	3.37	1.93	1.457	"
79	40.1	3.39	1.95	--	"
80	40.1	3.39	1.95	1.461	"
82	40.37	3.430	1.971	--	"
85	40.60	3.461	1.990	1.462	"
90	40.75	3.482	2.003	1.465	"
95	40.89	3.502	2.014	1.465	"
104 ± 1	41.0 ^c	3.517	2.023	1.470 ^c	"

^a A = $\text{Sr}(\text{BrO}_3)_2 \cdot \text{H}_2\text{O}$; B = $\text{Sr}(\text{BrO}_3)_2$

^b metastable

^c determined graphically

COMPONENTS: (1) Strontium bromate; $\text{Sr}(\text{BrO}_3)_2$; [14519-18-7] (2) Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Linke, W. F. <i>J. Am. Chem. Soc.</i> <u>1953</u> , 75, 5797-800.
VARIABLES: $T/K = 270.8$ to 377	PREPARED BY: Hiroshi Miyamoto
EXPERIMENTAL VALUES:	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: Temperatures between 0 and 100°C were maintained in water-baths, and at 110°C an acetic acid vapor bath was used (1). At 0°C and below, baths of melting ice and of melting mono-, di- and triethylene glycol were employed. Freezing points were determined from the cooling curves of known mixtures. Equilibrium in saturated solutions was established by repeated analysis after several hours of internal stirring. Representative points were checked by approach from super-saturation. Each reported value is the average of at least two closely agreeing determinations. Filtered samples of the solution were withdrawn with preheated calibrated pipets, and approximate densities were calculated. The bromate content was determined iodometrically.	SOURCE AND PURITY OF MATERIALS: Strontium bromate monohydrate was prepared as follows: A bromic acid was prepared from roughly equivalent quantities c.p. grade $\text{Ba}(\text{BrO}_3)_2$ and H_2SO_4 . Excess c.p. grade SrCO_3 (previously leached with a large volume of boiling water) was then added to the bromic acid solution. The mixture was filtered, and then the solution of $\text{Sr}(\text{BrO}_3)_2$ was evaporated. The salt was recrystallized from water and air-dried. Iodometry showed 95.2% $\text{Sr}(\text{BrO}_3)_2$ (Calcd. for $\text{Sr}(\text{BrO}_3)_2 \cdot \text{H}_2\text{O}$ 95.0%). Loss in weight at 110°C was 4.89% (Calcd. 4.99%). ESTIMATED ERROR: Soly: accuracy 0.1 - 0.2% Temp: $\pm 0.1^\circ\text{C}$ (compiler assumes) REFERENCES: 1. Linke, W. F. <i>J. Chem. Educ.</i> <u>1952</u> , 29, 492.

COMPONENTS:			ORIGINAL MEASUREMENTS:			
(1) Strontium iodate; $\text{Sr}(\text{IO}_3)_2$; [13470-01-4]			Linke, W. F.			
(2) Water; H_2O ; [7732-18-5]			<i>J. Am. Chem. Soc.</i> <u>1953</u> , <i>75</i> , 5797-800.			
VARIABLES:			PREPARED BY:			
$T/K = 273 - 368$			Hiroshi Miyamoto			
EXPERIMENTAL VALUES:						
$t/^{\circ}\text{C}$		Strontium Iodate				
	Anhydrate ^a		Monohydrate ^a		Hexahydrate ^a	
	mass % $10^3 m_1/\text{mol kg}^{-1}$ (compiler)		mass % $10^3 m_1/\text{mol kg}^{-1}$ (compiler)		mass % $10^3 m_1/\text{mol kg}^{-1}$ (compiler)	
0	0.098m	2.243	0.1453m	3.327	0.0861	1.970
t 6±1g	0.117g	2.678	--	--	0.117g	2.678
7	0.120	2.747	0.1763m	4.038	0.1230m	2.815
11	0.130	2.976	--	--	0.1505m	3.446
15	0.138	3.159	0.2115m	4.845	0.1822m	4.173
18	--	--	--	--	0.2135m	4.891
20	0.161	3.687	0.2369m	5.429	0.2302m	5.274
t 20.8						
±0.5g	--	--	0.241m,g	5.523	0.241m	5.523
25	0.165	3.778	0.2606m	5.973	0.2914m	6.681
35	--	--	0.3116m	7.146	--	--
40	0.203	4.650	0.3399m	7.797	--	--
45	--	--	0.3657m	8.391	--	--
55	0.242	5.545	0.4216m	9.679	--	--
65	0.267	6.120	0.4769m	10.955	--	--
75	0.296	6.787	0.5344m	12.283	--	--
85	0.315	7.224	--	--	--	--
95	0.340	7.799	--	--	--	--
100	0.350g	8.029	0.68m,g	15.651	--	--
^a Nature of the solid phase. m = metastable; g = determined graphically; t = transition temperature.						
AUXILIARY INFORMATION						
METHOD/APPARATUS/PROCEDURE: Equilibrium was attained after 1-2 hours of stirring when either hexahydrate or monohydrate was the saturating phase. The anhydrous salt reached equilibrium much more slowly, and in one case at a low temperature had not reached equilibrium after 6 hours of stirring. Representative points were checked by approach from supersaturation. Each reported value is the average of at least two closely agreeing determinations. Filtered samples of the solution were withdrawn with preheated calibrated pipets, and approximate densities were calculated. The iodate content was determined iodometrically.			SOURCE AND PURITY OF MATERIALS: $\text{Sr}(\text{IO}_3)_2 \cdot \text{H}_2\text{O}$ was prepared by adding solns containing equivalent quantities of c.p. grade $\text{SrCl}_2 \cdot 6\text{H}_2\text{O}$ and HIO_3 in a large volume of water at 24°C. White finely crystalline $\text{Sr}(\text{IO}_3)_2 \cdot \text{H}_2\text{O}$ settled rapidly and was washed by decantation until no test for Cl^- ions was obtained. The salt air-dried to a fluffy white powder, and analysis by iodometry and loss in weight at 110°C showed 96.0% $\text{Sr}(\text{IO}_3)_2$ in $\text{Sr}(\text{IO}_3)_2 \cdot \text{H}_2\text{O}$. $\text{Sr}(\text{IO}_3)_2 \cdot 6\text{H}_2\text{O}$ was prepared in the same manner as the monohydrate, except that all solutions and washed water were cooled with ice. Drying with acetone produced a fluffy powder which contained 79.85% $\text{Sr}(\text{IO}_3)_2$ (calcd for $\text{Sr}(\text{IO}_3)_2 \cdot 6\text{H}_2\text{O}$ 80.18%). Anhydrous $\text{Sr}(\text{IO}_3)_2$ was obtained by heating either the mono- or hexahydrate to 110°C for a few hours, or by boiling them with water.			
ESTIMATED ERROR: Soly: the estimated accuracy is ± 0.005 mass % for solns saturated with the anhydrous salt, and ± 0.0005 mass% when the hydrates were present. Temp: the maximum variation never exceed ± 0.1°C, and was usually much less.						

COMPONENTS:		ORIGINAL MEASUREMENTS:			
(1) Barium chlorate; Ba(ClO ₃) ₂ ; [13477-00-4]		Trautz, M.; Anschütz, A.			
(2) Water; H ₂ O; [7732-18-5]		Z. Phys. Chem. 1906, 56, 236-42.			
EXPERIMENTAL VALUES:					
t/°C	Shaking time t/h	Barium Chlorate			Nature of the Solid Phase
		mass %	mol % (compiler)	m ₁ /mol kg ⁻¹ (compiler)	
-2.749 ± 0.004	4	15.32			
	4	15.24			
		(Av) 15.28	1.057	0.5928	--
0	7	16.88			
	7	16.91			
		(Av) 16.90	1.190	0.6685	--
10	14	21.24			
	14	21.22			
		(Av) 21.23	1.571	0.8859	--
20	40	25.54			
	14	25.57			
		(Av) 25.56	1.993	1.129	--
25	22	27.53			
	12	27.52			
		(Av) 27.53	2.200	1.249	Ba(ClO ₃) ₂ ·H ₂ O
30	24	29.45			
	24	29.40			
		(Av) 29.43	2.410	1.371	--
40	36	33.16			
	36	33.15			
		(Av) 33.16	2.854	1.631	--
50	14	36.68			
	14	36.70			
		(Av) 36.69	3.318	1.905	--
60	14	40.07			
	14	40.02			
		(Av) 40.05	3.805	2.196	Ba(ClO ₃) ₂ ·H ₂ O
70	14	43.04			
	14	43.05			
		(Av) 43.04	4.283	2.484	--
80	7	45.93			
	7	45.88			
		(Av) 45.90	4.784	2.789	--
90	8	48.67			
	8	48.73			
		(Av) 48.70	5.322	3.120	--
99.1	6	51.15			
	6	51.18			
		(Av) 51.17	5.843	3.444	--
104.6/740 mmHg (ca. 105.0 /760 mmHg)	4	52.63			
	4	52.70			
		(Av) 52.67	6.182	3.658	--

COMPONENTS: (1) Barium chlorate; $\text{Ba}(\text{ClO}_3)_2$; [13477-00-4] (2) Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Trautz, M.; Anschütz, A. <i>Z. Phys. Chem.</i> <u>1906</u> , 56, 236-42.
VARIABLES: $T/K = 270.401 \text{ to } 377.8$	PREPARED BY: Hiroshi Miyamoto
EXPERIMENTAL VALUES:	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: <p>$\text{Ba}(\text{ClO}_3)_2$ crystals and water were shaken in a thermostat at 10-90°C for 14 hours. Equilibrium at 100°C was established in a vapor of boiling water for 6-7 hours, (the temperature was checked the boiling point of pure water). Aliquots of saturated solution were removed by means of a pipet fitted with cotton wool. The solution was placed in a stoppered tube, and the sample was weighed. $\text{Ba}(\text{ClO}_3)_2$ was determined gravimetrically by evaporation of the solvent. After the solution saturated with the barium chlorate was frozen at near 0°C, the melted part of the solution was analyzed for the chlorate content, and the melting point of the frozen part was measured by using a Beckman thermometer. The chlorate content of solid phases at both 25 and 60°C was also determined.</p>	SOURCE AND PURITY OF MATERIALS: Barium chlorate was purchased, and recrystallized several times. ESTIMATED ERROR: Nothing specified REFERENCES:

COMPONENTS:		ORIGINAL MEASUREMENTS:	
(1) Barium bromate; Ba(BrO ₃) ₂ ; [13967-90-3]		Trautz, M.; Anschütz, A.	
(2) Water; H ₂ O; [7732-18-5]		Z. Phys. Chem. <u>1906</u> , 56, 236-42.	
VARIABLES:		PREPARED BY:	
T/K = 273.116 to 372.80		Hiroshi Miyamoto	
EXPERIMENTAL VALUES:			
t/°C		Barium Bromate	
		mass %	m ₁ /mol kg ^{-1b}
-0.034 ± 0.002 ^a		0.280	0.00714
0		0.286	0.00730
+10		0.439	0.0112
20		0.652	0.0167
25		0.788	0.0202
30		0.95	0.0244
40		1.31	0.0338
50		1.72	0.0445
60		2.271	0.05911
70		2.922	0.07656
80		3.521	0.09283
90		4.26	0.113
98.7		5.256	0.1411
99.65		5.39	0.145
^a Eutectic point			
^b Molalities calculated by the compiler			
AUXILIARY INFORMATION			
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:	
Ba(BrO ₃) ₂ crystals and water were shaken in a thermostat at 10-90°C for 14 hours. Equilibrium at 100°C was established in a vapor of boiling water for 6-7 hours (the temperature was checked against the boiling point of pure water). The saturated solution was permitted to settle, and the solution was removed by means of a pipet fitted with cotton wool. The solution was placed in a stoppered tube, dried and weighed for determination of the barium bromate content. After the solution saturated with the barium bromate was frozen at near 0°C, the melted part of the solution was analyzed for the bromate content, and the melting point of the frozen part was measured by using a Beckmann thermometer.		Barium bromate was recrystallized from water. The number of hydrated waters was not given.	
		ESTIMATED ERROR:	
		Soly: the deviations from the mean were about ± 5%. Temp: ± 0.04°C except eutectic point (authors)	
		REFERENCES:	

COMPONENTS: (1) Barium bromate; $\text{Ba}(\text{BrO}_3)_2$; [13967-90-3] (2) Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Popiel, W. J.; Rustom, M. S. <i>Chem. Ind. (London)</i> <u>1971</u> , 543.																
VARIABLES: $T/\text{K} = 288 \text{ to } 318$	PREPARED BY: Hiroshi Miyamoto																
EXPERIMENTAL VALUES: <table border="1" data-bbox="584 487 840 725"> <thead> <tr> <th>$t/^\circ\text{C}$</th><th>$10^5 K_{\text{S}0}^\circ$^a</th></tr> </thead> <tbody> <tr><td>15</td><td>0.37</td></tr> <tr><td>20</td><td>0.54</td></tr> <tr><td>25</td><td>0.78</td></tr> <tr><td>30</td><td>1.11</td></tr> <tr><td>35</td><td>1.58</td></tr> <tr><td>40</td><td>2.20</td></tr> <tr><td>45</td><td>3.05</td></tr> </tbody> </table> <p data-bbox="221 745 1169 825">^a From $K_{\text{S}0}^\circ = 4\text{S}^3 y_{\pm}^3$, using $-\log y_{\pm} = Z_1 Z_2 A I^{1/2} - B I$ where A is from ref (1), and B 0.97 at 15°C, 0.85 at 30°C and 0.73 at 45°C.</p> <p data-bbox="248 834 974 874">The $K_{\text{S}0}^\circ$ data were fitted to the following equation</p> $\log(K_{\text{S}0}^\circ/\text{mol}^3 \text{ dm}^{-3}) = -2805/(T/\text{K}) + 4.304$		$t/^\circ\text{C}$	$10^5 K_{\text{S}0}^\circ$ ^a	15	0.37	20	0.54	25	0.78	30	1.11	35	1.58	40	2.20	45	3.05
$t/^\circ\text{C}$	$10^5 K_{\text{S}0}^\circ$ ^a																
15	0.37																
20	0.54																
25	0.78																
30	1.11																
35	1.58																
40	2.20																
45	3.05																
AUXILIARY INFORMATION																	
METHOD/APPARATUS/PROCEDURE: The solubilities of $\text{Ba}(\text{BrO}_3)_2 \cdot \text{H}_2\text{O}$ in water and in solutions of sodium chloride (0.015-0.50 mol dm^{-3}) were measured at twelve temperatures in the range 15-45°C in order to obtain the thermodynamic solubility products. Saturated solutions of barium bromate were prepared by "static" method as described in ref (2), and were analyzed by titrating the barium ion with EDTA.	SOURCE AND PURITY OF MATERIALS: No information.																
	ESTIMATED ERROR: Nothing specified																
	REFERENCES: 1. Robinson, R. A.; Stokes, R. H. <i>Electrolyte Solutions</i> <u>1965</u> , 468, Butterworths, London. 2. Nezzal, G.; Popiel, W. J.; Vermande, P. <i>Chem. Ind. (London)</i> <u>1971</u> , 15, 543.																

COMPONENTS:		ORIGINAL MEASUREMENTS:	
(1) Barium iodate; Ba(IO ₃) ₂ ; [10567-69-8]		Trautz, M.; Anschütz, A.	
(2) Water; H ₂ O; [7732-18-5]		Z. Physik. Chem. 1906, 56, 236-42.	
VARIABLES:		PREPARED BY:	
T/K = 273.10 - 372.4		Hiroshi Miyamoto	
EXPERIMENTAL VALUES:			
t/°C		Barium Iodate	
		mass %	10 ⁴ c ₁ /mol dm ⁻³ (compiler)
-0.046 ± 0.002 (eutectic point)		0.008	1.64
+10		0.014	2.87
20		0.022	4.52
25		0.028	5.75
30		0.031	6.37
40		0.041	8.42
50		0.056	11.5
60		0.074	15.2
70		0.093	19.1
80		0.115	23.63
90		0.141	28.99
99.2/735mm (= ca 100/760mm)		0.197	40.52
AUXILIARY INFORMATION			
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:	
Ba(IO ₃) ₂ crystals and water were shaken in a thermostat at 10-90°C for 14 hours. Equilibrium at 100°C was established in a vapor of boiling water for 6-7 hours, (the temperature was checked against the boiling point of pure water). Aliquots of saturated solutions were removed by means of a pipette fitted with cotton wool. The solution was placed in a stoppered tube and the sample was weighed. Ba(IO ₃) ₂ was determined gravimetrically by evaporation of the solvent. After the solution saturated with the barium iodate was frozen at near 0°C, the melted part of the solution was analyzed for the iodate content, and the melting point of the frozen part was measured by using a Beckmann thermometer.		Barium iodate was recrystallized from water. Other information was not given.	
		ESTIMATED ERROR:	
		Soly: the deviations from the mean were about ± 5 % Temp: ± 0.04°C (authors)	
		REFERENCES:	

COMPONENTS:		ORIGINAL MEASUREMENTS:	
(1) Barium iodate; Ba(IO ₃) ₂ ; [10567-69-8]		Polessitskij, A.	
(2) Water; H ₂ O; [7732-18-5]		C. R. Dokl. Acad. Sci. USSR <u>1935</u> , 4, 193-6.	
VARIABLES:		PREPARED BY:	
T/K = 273 to 373		Hiroshi Miyamoto	
EXPERIMENTAL VALUES:			
	t/°C	Barium Iodate	
		s ₁ /mg dm ⁻³	10 ³ c ₁ /mol dm ⁻³
	0	182	0.374
	15	305	0.626
	25	406.3	0.833
	40	580.0	1.19
	50	727	1.49
	60	873	1.79
	70	1070	2.196
	78	1300	2.669
	100	1840	3.777
AUXILIARY INFORMATION			
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:	
Ba(IO ₃) ₂ crystals were stirred with water in a thermostat for 24 hours. After settling the solutions for one hour, samples were withdrawn with a pipet with cotton-wool. The solubilities at high temperatures were determined in a special apparatus which facilitates to keep the saturated solutions at a constant temperature by the vapor of a boiling liquid (H ₂ O-100°C. C ₂ H ₅ OH-78°C). Three analytical methods were used: (1) Evaporation of 200 cm ³ of the solution and drying at 90°C, (2) Determination of Ba as BaSO ₄ from 200 cm ³ of the solution, (3) Iodometric titration of IO ₃ ⁻ .		Ba(IO ₃) ₂ was prepared by adding recrystallized BaCl ₂ ·2H ₂ O to an equivalent amount of KIO ₃ . The precipitate was filtered off and washed with hot water, or washed by decantation with a large amount of cold water, under strong stirring.	
		ESTIMATED ERROR:	
		Soly: three analytical methods gave the same results within ± 3 %. Temp: not given.	
		REFERENCES:	

COMPONENTS:		ORIGINAL MEASUREMENTS:	
(1) Barium iodate; Ba(IO ₃) ₂ ; [10567-69-8]		Bousquet, J.; Mathurin, D.; Vermande, P.	
(2) Water; H ₂ O; [7732-18-5]		Bull. Soc. Chim. Fr. 1969, 1111-5.	
VARIABLES:		PREPARED BY:	
T/K = 273 to 359		Hiroshi Miyamoto	
EXPERIMENTAL VALUES:			
t/°C	Barium Iodate		
	monohydrate	anhydrate	
	10 ¹⁰ K _{S0} ^o /mol ³ dm ⁻⁹	10 ⁹ K _{S0} ^o /mol ³ dm ⁻⁹	
0	1.828		
8	3.936		
17	8.84		
25	16.0		
30	24.55		
40		4.57	
50		7.77	
60		13.3	
70		22.5	
79		32.9	
86		46.5	
The solubility product, K _{S0} ^o , of Ba(IO ₃) ₂ ·xH ₂ O was given in the following:			
$K_{S0}^o = (C_{Ba^{2+}} \times C_{IO_3^-}^2) (\gamma_{Ba^{2+}} \times \gamma_{IO_3^-}^2)$ $= 4S^3 \gamma_{\pm}^3$			
(1)			
where S represents solubility of iodate, γ _± is an activity coefficient, and is given by modified Debye-Hückel equation			
$- \log \gamma_{\pm} = Z_+ Z_- A \sqrt{I} - BI$			
(2)			
From (1) and (2)			
$Y = -BI + 1/3 \log K_{S0}^o$			
(3)			
where Y = 1/3 log (4S ³) - Z ₊ Z ₋ A√I, and A = 0.5115 at 25°C.			
Solubility product (K _{S0} ^o) and unknown constant (B) are evaluated from the intercept and the slope of Y vs I plots. The solubilities of Ba(IO ₃) ₂ in aqueous NaCl solutions were determined in order to obtain Y vs I plots, but the data of solubilities were not given in the paper.			
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:	
Aqueous NaCl solutions and the specified hydrated crystals were placed into glass-stoppered Erlenmeyer flasks. The flasks were stirred in a thermostat for 1-15 hours. The iodate content was determined iodometrically.		BDH labeled Ba(IO ₃) ₂ ·H ₂ O was used. The anhydrate was prepared from the monohydrate by dehydration at 200°C.	
		ESTIMATED ERROR:	
		Soly: nothing specified	
		Temp: ± 0.05°C (authors)	
		REFERENCES:	

COMPONENTS: (1) Barium iodate; $\text{Ba}(\text{IO}_3)_2$; [10567-69-8] (2) Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Jones, A. L.; Madigan, G. A.; Wilson, I. R. <i>J. Cryst. Growth</i> <u>1973</u> , <i>20</i> , 99-102.
VARIABLES: Four crystal types $T/\text{K} = 275.2, 283.2$ and 298.2	PREPARED BY: Hiroshi Miyamoto

EXPERIMENTAL VALUES:

$t/^\circ\text{C}$	Crystal type ^a	Measurement method ^b	Barium Iodate	
			$10^4 c_1/\text{mol dm}^{-3}$	$10^{10} K_{\text{SO}}^\circ/\text{mol}^3 \text{ dm}^{-9} \text{ }^\circ\text{C}$
2.0	P	I	3.99	
	P	II	4.02	
			(Av) 4.00	2.04
10.0	P	I	5.38	
	P	II	5.38	
			(Av) 5.38	4.79
25.0	A	I	8.22	
	B	I	8.23	
	C	I	8.18	
	C	II	8.18	
	P	I	8.18	
	P	II	8.19	
			(Av) 8.20	15.86

^a The preparations of the crystal types A, B and C are given in (A), (B) and (C) in "Source and purity of materials." The primary precipitate (5-50 μm size) in preparation of barium iodate is named "P".

^b Two series of the conductivity measurements were carried out in this study. The details of the method are described in "Method: I and II."

^c The mean solubilities were transformed to solubility products with values of the mean ionic activity coefficient calculated from Davies modification of the Guntelberg equation (1).

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE: A conductivity method was used. Conductances were measured at 1592 Hz with a Wayne-Kerr conductance bridge accurate to 0.1% full scale. Two series of measurements were made. In those of series I, the conductivity was monitored until a small, constant, rate of increase was found, similar to that expected for glass dissolution from separate experiments. Extrapolation of this constant rate to zero time gave the value taken as the solubility. In series II, the conductivity was followed similarly until within ca. 0.25% of the expected equilibrium value. The temperature was then raised by ca. 2 K until the conductivity rose by ca. 8%, due to the increases in molar conductivity and in solubility. The temperature was then restored to its initial value, continued . . .	SOURCE AND PURITY OF MATERIALS: Finely divided barium iodate (5-50 μm) was prepared by pouring barium chloride solution (200 cm^3 ; 0.05 mol dm^{-3}) and potassium iodate solution (200 cm^3 ; 0.1 mol dm^{-3}) simultaneously into 600 cm^3 distilled water, with continuous stirring. The precipitate was washed many times by decantation, using conductivity water. Large crystals were prepared by the following three methods: (A) The precipitate was dissolved in conductivity water at 80-85 $^\circ\text{C}$ to produce an approximately saturated solution. After filtration, the solution was allowed to cool slowly. The crystals formed appeared to be cubes truncated corners, of linear dimension 50-150 μm . (B) The method was similar to A but used nitric acid (1 mol dm^{-3}) as solvent. The product contained continued . . .
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<p>COMPONENTS:</p> <p>(1) Barium iodate; $\text{Ba}(\text{IO}_3)_2$; [10567-69-8]</p> <p>(2) Water; H_2O; [7732-18-5]</p>	<p>ORIGINAL MEASUREMENTS:</p> <p>Jones, A. L.; Madigan, G. A.; Wilson, I. R.</p> <p><i>J. Cryst. Growth</i> <u>1973</u>, <i>20</i>, 99-102.</p>
AUXILIARY INFORMATION	
<p>METHOD/APPARATUS/PROCEDURE: continued . . and the conductivity began to fall. Extrapolation of measurements after this, to zero rate, again gave an estimate of solubility. In measurements of series II, it was difficult to make an accurate estimate of conductivity changes due to glass dissolution. Blank experiments and comparison of series I and II agree in suggesting that they are almost negligible.</p> <p>The concentration of barium iodate was calculated from conductivity measurements using the method of Righellato and Davies (2).</p>	<p>SOURCE AND PURITY OF MATERIALS: continued crystals up to 0.5 mm in size. (C) $\text{Ba}(\text{IO}_3)_2 \cdot \text{H}_2\text{O}$ in granular form is obtained by the reaction in solution of barium ion with iodate ion formed by the slow reduction of periodic acid by lactic acid at room temperature. In separate preparations this gave truncated cubes of side 0.3 to 0.8 mm, and flattened cubes, 0.8 to 3 mm long and 0.4 to 0.8 mm thick. Before use all crystals were aged for at least 2 weeks under conductivity water, with several changes of water.</p> <p>ESTIMATED ERROR: Soly: Standard deviation 0.02 at 25 °C. Temp.: ± 0.03 K (authors)</p> <p>REFERENCES:</p> <ol style="list-style-type: none"> 1. Robinson, R. W.; Stokes, R. H. <i>Electrolyte Solutions</i> Butterworths. London. <u>1959</u>, 231. 2. Righellato, E. C.; Davies, C. W. <i>Trans. Faraday Soc.</i> <u>1930</u>, <i>26</i>, 592.

COMPONENTS:		ORIGINAL MEASUREMENTS:					
(1) Barium iodate; Ba(IO ₃) ₂ ; [10567-69-8]		Federov, V. A.; Robov, A. M.; Shmyd'ko, I. I.; Vorontsova, N. A.; Mironov, V. E.					
(2) Lithium nitrate; LiNO ₃ ; [7790-69-4]		Zh. Neorg. Khim. 1974, 19, 1746-50; Russ. J. Inorg. Chem. (Engl. Transl.) 1974, 19, 950-3.					
(3) Lithium perchlorate; LiClO ₄ ; [7791-03-9]							
(4) Water; H ₂ O; [7732-18-5]							
VARIABLES:		PREPARED BY:					
T/K = 298 Ionic Strength		Hiroshi Miyamoto					
EXPERIMENTAL VALUES:							
t/°C	Nitrate Ion	Barium Iodate					
	c ₂ /g-ion dm ⁻³	10 ³ c ₁ /mol dm ⁻³					
25		I = 0.5	1.0	2.0	3.0	4.0	
	0	1.63	1.84	2.09	2.28	2.16	
	0.1	1.68	--	--	--	--	
	0.2	1.76	2.04	2.30	--	--	
	0.3	1.88	--	--	--	--	
	0.4	2.04	2.22	--	2.68	2.68	
	0.5	2.22	--	2.62	--	--	
	0.6		2.37	--	--	--	
	0.8		2.59	2.94	3.10	3.20	
	1.0		2.77	3.16	--	--	
	1.2			--	3.56	3.74	
	1.3			3.48	--	--	
	1.5			3.70	--	--	
	1.6			--	4.06	4.30	
	1.8			4.00	--	--	
	2.0			4.20	4.47	4.90	
	2.4				5.17	5.50	
	2.8				5.76	6.15	
	3.0				6.07	--	
	3.2					6.78	
	3.6					7.47	
4.0					8.14		
AUXILIARY INFORMATION							
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:					
Equilibrium between the solid phase and the solution was reached by vigorous agitation with a magnetic stirrer in stoppered vessels in a thermostat. Equilibrium was established after stirring for 4-6 hours and was checked by removing specimens after equal intervals of time. The concentrations for Ba(IO ₃) ₂ in the saturated solutions were determined iodometrically.		The author stated that Ba(IO ₃) ₂ was made by well-known method, but the details of the method were not given. Chemically pure grade LiClO ₄ and LiNO ₃ used were recrystallized from twice-distilled water. Before recrystallization, the solutions were boiled with active carbon.					
		ESTIMATED ERROR: Soly: the reproducibility of the results averages ± 1.5 - 2% Temp: not given					
		REFERENCES:					