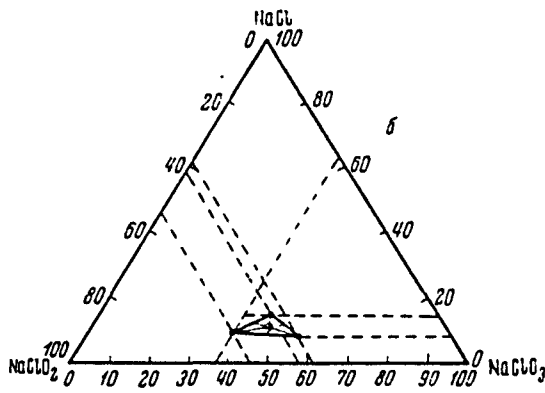
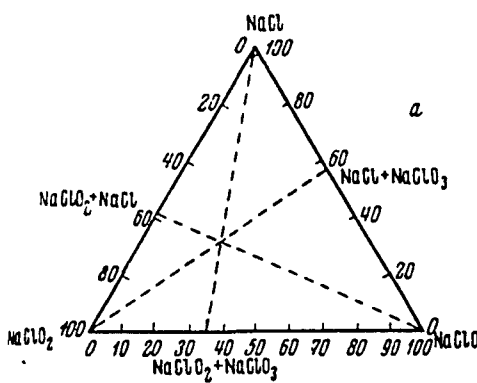


COMPONENTS: (1) Sodium carbonate; Na_2CO_3 ; [497-19-8] (2) Sodium chloride; NaCl ; [7647-14-5] (3) Sodium chlorate; NaClO_3 ; [7775-09-9] (4) Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Perel'man, F.M.; Korzhenyak, N.G. <i>Zh. Neorg. Khim.</i> 1968, 13, 2861-4; <i>Russ. J. Inorg. Chem.</i> (Engl. Transl.) 1968, 13, 1471-2.																																				
VARIABLES: T/K = 298	PREPARED BY: Hiroshi Miyamoto																																				
EXPERIMENTAL VALUES: Composition of saturated solutions at the eutonic points ^a <table border="1" data-bbox="271 520 1149 687"> <thead> <tr> <th colspan="2">Sodium Chlorate</th> <th colspan="2">Sodium Chloride</th> <th colspan="2">Sodium Carbonate</th> </tr> <tr> <th>mass %</th> <th>mol %</th> <th>mass %</th> <th>mol %</th> <th>mass %</th> <th>mol %</th> </tr> </thead> <tbody> <tr> <td>25.0</td> <td>6.52</td> <td>10.5</td> <td>4.99</td> <td>8.5</td> <td>2.23</td> </tr> <tr> <td>34.9</td> <td>9.41</td> <td>11.9</td> <td>5.84</td> <td>-</td> <td>-</td> </tr> <tr> <td>42.0</td> <td>12.6</td> <td>-</td> <td>-</td> <td>10.4</td> <td>3.13</td> </tr> <tr> <td>-</td> <td>-</td> <td>15.4</td> <td>6.32</td> <td>17.2</td> <td>3.89</td> </tr> </tbody> </table> <p>^a Mol % data calculated by the compiler.</p>		Sodium Chlorate		Sodium Chloride		Sodium Carbonate		mass %	mol %	mass %	mol %	mass %	mol %	25.0	6.52	10.5	4.99	8.5	2.23	34.9	9.41	11.9	5.84	-	-	42.0	12.6	-	-	10.4	3.13	-	-	15.4	6.32	17.2	3.89
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METHOD/APPARATUS/PROCEDURE: No information was given.	SOURCE AND PURITY OF MATERIALS: No information was given. ESTIMATED ERROR: Nothing specified. REFERENCES:																																				

COMPONENTS: (1) Sodium chloride; NaCl; [7647-14-5] (2) Sodium chlorite; NaClO ₂ ; [7758-19-2] (3) Sodium chlorate; NaClO ₃ ; [7775-09-9] (4) Water; H ₂ O; [7732-18-5]		ORIGINAL MEASUREMENTS: Nakamori, I.; Nagino, Y.; Hideshima, K.; Hirai, T. <i>Kogyo Kagaku Zasshi</i> <u>1958</u> , 61, 147-9.			
VARIABLES: Composition at 283, 293 and 303 K		PREPARED BY: Hiroshi Miyamoto			
EXPERIMENTAL VALUES:		Composition of saturated solutions			
t/°C	NaCl mole fraction ^a	NaClO ₂ mole fraction ^a	NaClO ₃ mole fraction ^a	Moles H ₂ O ^b	Nature of the solid phase ^c
10	0.445	0.555	0.000	6.87	A+B
	0.392	0.520	0.888	6.35	"
	0.339	0.490	0.171	5.92	"
	0.475	0.000	0.525	6.19	A+C
	0.434	0.074	0.492	6.00	"
	0.318	0.284	0.398	5.52	"
	0.007	0.515	0.478	5.54	B+C
	0.115	0.475	0.410	5.30	"
	0.150	0.457	0.393	5.11	"
	0.239	0.425	0.336	5.08	A+B+C
20	0.248	0.598	0.154	5.19	A+B
	0.191	0.552	0.257	4.60	"
	0.328	0.672	0.000	6.12	"
	0.359	0.106	0.535	5.53	A+C
	0.412	0.000	0.588	5.80	"
	0.246	0.340	0.414	5.04	B+C
	0.068	0.558	0.374	4.42	"
	0.112	0.540	0.348	4.30	"
	0.157	0.527	0.316	4.35	A+B+C
	continued.....				
AUXILIARY INFORMATION					
METHOD/APPARATUS/PROCEDURE: Mixtures were placed in glass bottles and agitated in a thermostat at the desired temperature for 1.5 to 5.5 h. After equilibrium was established the slns were allowed to settle in the thermostat for one h or more. Aliquots were analyzed for Cl ⁻ , ClO ₂ ⁻ , and ClO ₃ ⁻ . The solution was weighed, and chloride detd by pptn using silver nitrate sln. The chlorite concn in slns containing chlorite and chlorate was detd by iodometric titration after addn of dilute acetic acid. To another sample of solution, sulfuric acid and Fe(II) sulfate solution were added and the excess Fe(II) titrd with potassium permanganate sln, and the chlorate content calculated by difference. The weight of NaCl, NaClO ₂ and NaClO ₃ was calculated from the solubility data, and the water content was determined by difference.			SOURCE AND PURITY OF MATERIALS: "Chemically pure" grade sodium chloride and chlorite were used without further purification. Sodium chlorate of purity 85 % or better was recrystallized, and the product NaClO ₃ ·3H ₂ O obtained.		
			ESTIMATED ERROR: Nothing specified.		
			REFERENCES:		

COMPONENTS:		ORIGINAL MEASUREMENTS:				
(1) Sodium chloride; NaCl; [7647-14-5]		Nakamori, I.; Nagino, Y.;				
(2) Sodium chlorite; NaClO ₂ ; [7758-19-2]		Hideshima, K.; Hirai, T.				
(3) Sodium chlorate; NaClO ₃ ; [7775-09-9]		<i>Kogyo Kagaku Zasshi</i> <u>1958</u> , 61, 147-9.				
(4) Water; H ₂ O; [7732-18-5]						
EXPERIMENTAL VALUES: (Continued)						
Composition of saturated solutions						
t/°C	NaCl mole fraction ^a	NaClO ₂ mole fraction ^a	NaClO ₃ mole fraction ^a	Moles H ₂ O ^b	Nature of the solid phase ^c	
30	0.141	0.733	0.126	4.27	A+B	
	0.112	0.688	0.200	3.85	"	
	0.198	0.802	0.000	4.98	"	
	0.350	0.000	0.650	5.38	A+C	
	0.213	0.342	0.445	4.53	"	
	0.142	0.497	0.361	4.12	"	
	0.020	0.679	0.301	3.55	B+C	
	0.085	0.649	0.266	3.57	A+B+C	
	^a Mole fraction based on total moles of solutes.					
	^b Mole of water/1 mol of the solute					
^c A = NaCl; B = NaClO ₂ ; C = NaClO ₃						

COMPONENTS: (1) Sodium carbonate; Na_2CO_3 ; [497-19-8] (2) Sodium chlorite; NaClO_2 ; [7758-19-2] (3) Sodium chlorate; NaClO_3 ; [7775-09-9] (4) Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Perel'man, F.M.; Korzhenyak, N.G. <i>Zh. Neorg. Khim.</i> 1968, 13, 2861-4; <i>Russ. J. Inorg. Chem. (Engl. Transl.)</i> 1968, 13, 1471-2.																																				
VARIABLES: T/K = 298	PREPARED BY: Hiroshi Miyamoto																																				
EXPERIMENTAL VALUES: Composition of saturated solutions at the eutonic points ^a <table border="1" data-bbox="216 552 1153 721" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">Sodium Chlorite</th> <th colspan="2">Sodium Chlorate</th> <th colspan="2">Sodium Carbonate</th> </tr> <tr> <th>mass %</th> <th>mol %</th> <th>mass %</th> <th>mol %</th> <th>mass %</th> <th>mol %</th> </tr> </thead> <tbody> <tr> <td>32.0</td> <td>11.7</td> <td>22.0</td> <td>6.86</td> <td>2.2</td> <td>0.69</td> </tr> <tr> <td>34.8</td> <td>13.22</td> <td>23.7</td> <td>7.65</td> <td>-</td> <td>-</td> </tr> <tr> <td>35.4</td> <td>10.7</td> <td>-</td> <td>-</td> <td>7.0</td> <td>1.81</td> </tr> <tr> <td>-</td> <td>-</td> <td>42.0</td> <td>12.59</td> <td>10.4</td> <td>3.13</td> </tr> </tbody> </table> <p>^aMole % data calculated by the compiler.</p>		Sodium Chlorite		Sodium Chlorate		Sodium Carbonate		mass %	mol %	mass %	mol %	mass %	mol %	32.0	11.7	22.0	6.86	2.2	0.69	34.8	13.22	23.7	7.65	-	-	35.4	10.7	-	-	7.0	1.81	-	-	42.0	12.59	10.4	3.13
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METHOD/APPARATUS/PROCEDURE: No information was given	SOURCE AND PURITY OF MATERIALS: No information was given. ESTIMATED ERROR: Nothing specified. REFERENCES:																																				

COMPONENTS: (1) Sodium chloride; NaCl; [7647-14-5] (2) Sodium chlorite; NaClO ₂ ; [7758-19-2] (3) Sodium chlorate; NaClO ₃ ; [7775-09-9] (4) Water; H ₂ O; [7732-18-5]	ORIGINAL MEASUREMENTS: Perel'man, F.M.; Korzhenyak, I.G. <i>Zh. Neorg. Khim.</i> 1968, 13, 277-80; <i>Russ. J. Inorg. Chem.</i> (Engl. Transl.) 1968, 13, 143-5.
VARIABLES: T/K = 298	PREPARED BY: Hiroshi Miyamoto
EXPERIMENTAL VALUES: The details of solubility data were not described in the original article. The experimental and calculated solubilities were shown in figures only. The phase diagrams of the eutectic point of the quaternary NaClO ₃ -NaClO ₂ -NaCl-H ₂ O system are given as below (based on mass %). <div style="display: flex; justify-content: space-around; align-items: center;">   </div>	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: Probably, the isothermal method was used. The ions ClO ₃ ⁻ , ClO ₂ ⁻ and Cl ⁻ were determined in the presence of one another as follows: the chlorite content was determined iodometrically, the sum of the ClO ₂ ⁻ and ClO ₃ ⁻ ion concentrations by permanganate in a strongly acidic medium. The chlorate content was determined by difference. The chloride ion concentration was determined in a neutral medium by Mohr's method.	SOURCE AND PURITY OF MATERIALS: No information was given in the original paper. ESTIMATED ERROR: Nothing specified. REFERENCES:

COMPONENTS: (1) Sodium chloride; NaCl; [7647-14-5] (2) Sodium chlorite; NaClO ₂ ; [7758-19-2] (3) Sodium chlorate; NaClO ₃ ; [7775-09-9] (4) Water; H ₂ O; [7732-18-5]		ORIGINAL MEASUREMENTS: Oey, T.S.; Cunningham, G.I.; Koopman, D.E. <i>J. Chem. Eng. Data</i> <u>1960</u> , 5, 248-50.							
VARIABLES: Composition at 298, 303 and 318 K		PREPARED BY: Hiroshi Miyamoto							
EXPERIMENTAL VALUES:		Composition of saturated solutions							
t/°C	NaClO ₂		NaClO ₃		NaCl		H ₂ O	sp gr	Nature of the solid phase ^b
	moles	mol % (compiler)	moles	mol % (compiler)	moles	mol % (compiler)	w ^a		
25	0.1763	2.020	0.1361	1.559	0.6885	7.889	7.72	1.273	D
	0.2488	3.001	0.1418	1.710	0.6095	7.351	7.29	1.290	"
	0.3899	4.824	0.1170	1.448	0.4984	6.166	7.04	1.321	"
	0.5340	6.407	0.1351	1.621	0.4091	4.909	6.73	1.356	"
	0.2461	3.141	0.2124	2.711	0.5408	6.903	6.84	1.314	"
	0.3096	4.076	0.2124	2.796	0.4788	6.303	6.59	1.332	"
	0.4210	5.937	0.1928	2.719	0.3863	5.448	6.09	1.361	"
	0.5546	8.631	0.1806	2.811	0.2641	4.110	5.43	1.412	"
	0.1170	1.386	0.1095	1.297	0.7737	9.165	7.44	1.249	"
	0.1252	1.650	0.3680	4.848	0.5068	6.677	6.59	1.338	"
	0.1160	1.278	0.0997	1.098	0.7851	8.649	8.07	1.249	"
	0.1718	2.191	0.2784	3.551	0.5498	7.013	6.84	1.318	"
	0.1752	2.440	0.3798	5.289	0.4451	6.199	6.18	1.358	"
	0.1771	2.020	0.1096	1.250	0.7132	8.133	7.77	1.265	"
	0.1166	1.780	0.6861	10.48	0.1972	3.011	5.55	1.429	C
	0.2304	3.652	0.5743	9.103	0.1951	3.093	5.31	1.443	"
	0.3272	5.490	0.4863	8.159	0.1865	3.129	4.96	1.459	"
	0.4209	7.455	0.4078	7.223	0.1706	3.022	4.65	1.481	"
	0.1270	1.971	0.5899	9.154	0.2837	4.403	5.44	1.424	"
	0.1849	2.930	0.5483	8.689	0.2669	4.229	5.31	1.432	"
continued.....									
AUXILIARY INFORMATION									
METHOD/APPARATUS/PROCEDURE: Method similar to that described in (1) where mixtures of known composition were prepared from the solid salts and distilled H ₂ O. Pyrex solubility tubes used. The mixtures of solid and liquid were equilibrated by rotation in a large thermostated water-bath at various temperatures for periods of 120 hours or longer. The liquid sample was passed through a glass wool filter without taking the solubility tube or the filter out of the thermostated water-bath. Aliquots of saturated solution were removed by means of a calibrated pipet having small stopcocks at each end. Procedures for the analysis of chloride, chlorite, chlorate and alkali were described in ref (2). The Schreinemakers' wet residue method was used to detn solid phase compositions.					SOURCE AND PURITY OF MATERIALS: "Analytical reagent" grade sodium chlorate and chloride were used. Technical grade sodium chlorite (Mathieson Chemical Co.) was recrystallized three times from distilled water as the trihydrate, and then stored in a cool place in amber bottles. Distilled water was used.				
					ESTIMATED ERROR: Soly: nothing specified. Temp: precision ± 0.1 K (authors).				
					REFERENCES: 1. Cunningham, G.L.; Oey, T.S. <i>J. Am. Chem. Soc.</i> <u>1955</u> , 77, 799. 2. White, J.F. <i>Am. Dyestuff Reporter</i> <u>1942</u> , 31, 484.				

COMPONENTS:				ORIGINAL MEASUREMENTS:					
(1) Sodium chloride; NaCl; [7647-14-5]				Oey, T.S.; Cunningham, G.I.;					
(2) Sodium chlorite; NaClO ₂ ; [7758-19-2]				Koopman, D.E.					
(3) Sodium chlorate; NaClO ₃ ; [7775-09-9]				J. Chem. Eng. Data 1960, 5, 248-50.					
(4) Water; H ₂ O; [7732-18-5]									
EXPERIMENTAL VALUES: (Continued)									
t/°C	Composition of saturated solutions						H ₂ O w ^a	sp gr	Nature of the solid phase ^b
	NaClO ₂		NaClO ₃		NaCl				
	moles	mol % (compiler)	moles	mol % (compiler)	moles	mol % (compiler)			
25	0.1980	3.128	0.6149	9.713	0.1872	2.957	5.33	1.439	C
	0.2979	5.050	0.4566	7.740	0.2454	4.160	4.90	1.452	"
	0.1106	1.658	0.7947	11.91	0.0947	1.420	5.67	1.438	"
	0.6970	12.06	0.1921	3.324	0.1109	1.919	4.78	1.451	A
	0.8023	12.07	0.1225	1.842	0.0751	1.129	5.65	1.420	"
	0.7599	12.01	0.1832	2.894	0.0568	0.897	5.33	1.447	"
	0.4781	8.930	0.3395	6.341	0.1831	3.420	4.35	1.481	C+D
	0.3144	5.374	0.4338	7.415	0.2519	4.306	4.85	1.446	"
	0.4209	7.615	0.3728	6.745	0.2058	3.723	4.53	1.468	"
	0.5276	10.05	0.3069	5.846	0.1655	3.152	4.25	1.493	"
	0.0564	0.869	0.5875	9.053	0.3560	5.486	5.49	1.410	"
	0.1645	2.611	0.5306	8.421	0.3050	4.841	5.30	1.427	"
	0.4122	7.436	0.3950	7.126	0.1934	3.489	4.54	1.478	"
	0.4626	8.516	0.3775	6.949	0.1696	3.122	4.38	1.493	"
	0.5952	12.05	0.3296	6.671	0.0754	1.526	3.94	1.532	A+C
	0.6124	12.13	0.3479	6.890	0.0396	0.784	4.05	1.531	"
	0.6469	11.35	0.1782	3.126	0.1749	3.068	4.70	1.466	A+D
	0.6798	11.37	0.1130	1.890	0.2071	3.464	4.98	1.434	"
	0.6336	12.21	0.3664	7.060	0.0000	0.000	4.19	1.533	A+C
	0.5709	11.89	0.3139	6.539	0.1153	2.402	3.80	1.534	A+D+C
30	0.7512	11.63	0.0000	0.000	0.2488	3.851	5.46	1.4150	D
	0.5520	7.132	0.0000	0.000	0.4480	5.788	6.74	1.3245	"
	0.3160	3.575	0.0000	0.000	0.6840	7.738	7.84	1.2642	"
	0.0850	0.876	0.0000	0.000	0.9150	9.433	8.70	1.2152	"
	0.0000	0.000	0.0000	0.000	1.0000	9.990	9.01	1.1955	"
	0.5380	10.15	0.4620	8.717	0.0000	0.000	4.30	1.5142	C
	0.1804	2.953	0.8196	13.41	0.0000	0.000	5.11	1.4621	"
	0.0000	0.000	1.0000	15.41	0.0000	0.000	5.49	1.4560	"
	1.0000	7.364	1.0000	7.364	0.0000	0.000	5.79	1.4120	A
	0.8743	13.64	0.0000	0.000	0.1257	1.961	5.41	1.4310	"
	0.9190	14.68	0.0910	1.453	0.0000	0.000	5.20	1.4444	"
	0.7890	14.75	0.2110	3.944	0.0000	0.000	4.35	1.5075	"
	0.0000	0.000	0.6459	10.08	0.3541	5.524	5.41	1.4091	C+D
	0.0611	0.970	0.6050	9.603	0.3339	5.300	5.30	1.4235	"
	0.1972	3.281	0.5201	8.654	0.2827	4.704	5.01	1.4415	"
	0.3407	6.052	0.4352	7.730	0.2241	3.980	4.63	1.4695	"
	0.5111	10.24	0.3470	6.954	0.1419	2.844	3.99	1.5111	"
	0.8025	13.49	0.0000	0.000	0.1975	3.319	4.95	1.4395	A+D
	0.6790	15.12	0.3210	7.149	0.0000	0.000	3.49	1.5645	A+C
	0.5994	13.29	0.3140	6.962	0.0866	1.920	3.51	1.5360	A+C+D
45	0.1367	1.571	0.1379	1.585	0.7254	8.338	7.70	1.269	D
	0.2425	3.251	0.2658	3.563	0.4917	6.591	6.46	1.338	"
	0.3124	4.889	0.3665	5.736	0.3211	5.025	5.39	1.409	"
	0.7818	12.01	0.0000	0.000	0.2182	3.352	5.51	1.444	"
	0.6712	9.616	0.0000	0.000	0.3288	4.711	5.98	1.378	"
	0.5338	6.888	0.0000	0.000	0.4662	6.015	6.75	1.329	"
	0.2769	3.115	0.0000	0.000	0.7231	8.134	7.89	1.262	"
	0.1476	1.574	0.0000	0.000	0.8524	9.087	8.38	1.234	"
	0.0000	0.000	0.0000	0.000	1.0000	9.990	9.01	1.200	"

continued.....

COMPONENTS: (1) Sodium chloride; NaCl; [7647-14-5] (2) Sodium chlorite; NaClO ₂ ; [7758-19-2] (3) Sodium chlorate; NaClO ₃ ; [7775-09-9] (4) Water; H ₂ O; [7732-18-5]	ORIGINAL MEASUREMENTS: Oey, T.S.; Cunningham, G.I.; Koopman, D.E. <i>J. Chem. Eng. Data</i> <u>1960</u> , 5, 248-50.
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EXPERIMENTAL VALUES: (Continued)

Composition of saturated solutions

t/°C	NaClO ₂		NaClO ₃		NaCl		H ₂ O w ^a	sp gr	Nature of the solid phase ^b
	moles	mol % (compiler)	moles	mol % (compiler)	moles	mol % (compiler)			
45	0.1605	2.821	0.6682	11.74	0.1713	3.011	4.69	1.487	C
	0.3187	6.117	0.6055	11.62	0.0758	1.455	4.21	1.526	"
	0.7340	16.03	0.1842	4.022	0.0818	1.786	3.58	1.561	B
	0.8012	16.59	0.1303	2.698	0.0685	1.418	3.83	1.543	"
	1.0000	18.32	0.0000	0.000	0.0000	0.000	4.46	1.508	"
	0.9244	17.31	0.0000	0.000	0.0756	1.416	4.34	1.504	"
	0.8710	16.28	0.0000	0.000	0.1290	2.411	4.35	1.501	B+D
	0.1382	2.550	0.6375	11.76	0.2243	4.138	4.42	1.487	C+D
	0.2845	5.589	0.5418	10.64	0.1737	3.413	4.09	1.515	"
	0.4932	10.96	0.4013	8.918	0.1055	2.344	3.50	1.574	"
	0.0000	0.000	0.7228	12.57	0.2772	4.821	4.75	1.458	"
	0.6979	15.51	0.2069	4.598	0.0952	2.12	3.50	1.569	B+D
	0.7567	16.03	0.1359	2.879	0.1074	2.275	3.72	1.543	"
	0.8710	16.16	0.0000	0.000	0.1290	2.393	4.39	1.561	"
	0.6107	15.00	0.3412	8.382	0.0483	1.19	3.07	1.621	B+C
	0.6312	15.51	0.3688	9.061	0.0000	0.000	3.07	1.646	"
0.5953	14.70	0.3305	8.162	0.0740	1.83	3.05	1.620	B+C+D	

^a The w function is the moles of water divided by the sum of the moles of sodium chlorate, sodium chlorite and sodium chloride.

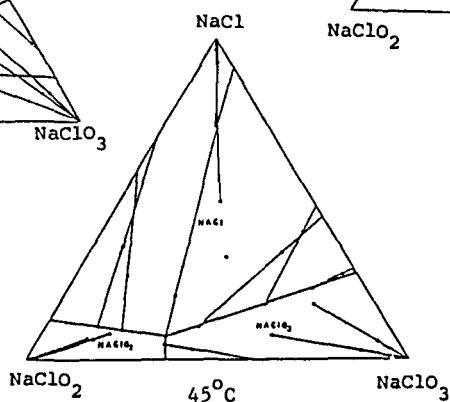
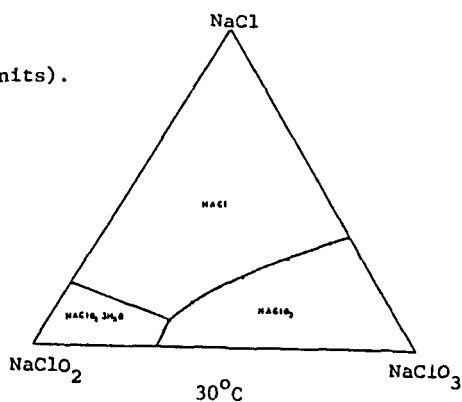
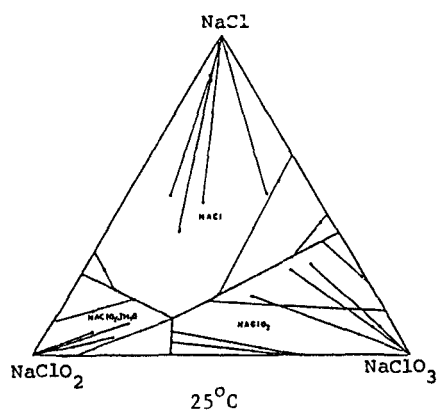
^b A = NaClO₂·3H₂O; B = NaClO₂; C = NaClO₃; D = NaCl

^c For the binary system the compiler computes the following:

soly of NaClO₃ = 1.711 mol kg⁻¹ at 30°C

COMMENTS AND/OR ADDITIONAL DATA:

The phase diagrams are given below (based on mass % units).



COMPONENTS: (1) Sodium chloride; NaCl; [7647-14-5] (2) Sodium chlorate; NaClO ₃ ; [7775-09-9] (3) Potassium chloride; KCl; [7447-40-7] (4) Potassium chlorate; KClO ₃ ; [3811-04-9] (5) Water; H ₂ O; [7732-18-5]	ORIGINAL MEASUREMENTS: Munter, P.A.; Brown, R.L. <i>J. Am. Chem. Soc.</i> <u>1943</u> , <i>65</i> , 2456-7.																																						
VARIABLES: Composition at 273 K and 313 K	PREPARED BY: Hiroshi Miyamoto and Mark Salomon																																						
EXPERIMENTAL VALUES: <p style="text-align: center;">Mass % compositions of saturated solutions at isothermally invariant points</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>t/°C</th> <th>chloride</th> <th>chlorate</th> <th>sodium</th> <th>potassium</th> <th>water</th> <th>density/g cm⁻³</th> <th>solid phase^a</th> </tr> </thead> <tbody> <tr> <td rowspan="2">0</td> <td>16.54</td> <td>0.91</td> <td>8.63</td> <td>3.99</td> <td>69.93</td> <td>1.235</td> <td>A+B+C</td> </tr> <tr> <td>9.52</td> <td>19.64</td> <td>11.39</td> <td>0.34</td> <td>59.11</td> <td>1.349</td> <td>A+B+D</td> </tr> <tr> <td rowspan="2">40</td> <td>17.17</td> <td>2.84</td> <td>7.60</td> <td>7.34</td> <td>65.05</td> <td>1.257</td> <td>A+B+C</td> </tr> <tr> <td>5.60</td> <td>33.41</td> <td>12.02</td> <td>1.39</td> <td>47.58</td> <td>1.450</td> <td>A+B+D</td> </tr> </tbody> </table> <p>^a Solid phases: A = KClO₃; B = NaCl; C = KCl; D = NaClO₃</p>		t/°C	chloride	chlorate	sodium	potassium	water	density/g cm ⁻³	solid phase ^a	0	16.54	0.91	8.63	3.99	69.93	1.235	A+B+C	9.52	19.64	11.39	0.34	59.11	1.349	A+B+D	40	17.17	2.84	7.60	7.34	65.05	1.257	A+B+C	5.60	33.41	12.02	1.39	47.58	1.450	A+B+D
t/°C	chloride	chlorate	sodium	potassium	water	density/g cm ⁻³	solid phase ^a																																
0	16.54	0.91	8.63	3.99	69.93	1.235	A+B+C																																
	9.52	19.64	11.39	0.34	59.11	1.349	A+B+D																																
40	17.17	2.84	7.60	7.34	65.05	1.257	A+B+C																																
	5.60	33.41	12.02	1.39	47.58	1.450	A+B+D																																
AUXILIARY INFORMATION																																							
METHOD/APPARATUS/PROCEDURE: At 0°C mixts were sealed in Pyrex bottles which were fastened to a rotor suspended in a glycerol/water bath. At 40°C mixts were placed in 250 ml 3-neck flasks and thermostated in a water bath. The slns were stirred with glass stirrers provided with mercury seals. Preliminary experiments identified mixtures which result in satd solutions, several of which were used to prepare the solutions reported in the data table above. The compositions of four solutions were reported. Equilibrated slns were sampled by withdrawing aliquots with pipets fitted with cotton plugs. After determining densities the solutions were diluted for analyses. Chloride was detd by a modified Volhard method (1), and chlorate detd by the method of Dietz as described in (2). Sodium was detd by pptn with zinc uranyl nitrate, and potassium was detd by calculation based on stoichiometry. Water was found by difference.	SOURCE AND PURITY OF MATERIALS: C.p. grade salts were used without further purification. The chlorates were found to be 99.9 % pure. ESTIMATED ERROR: Soly: nothing specified but probably poor due to method of analysis of Na. Temp: at 0°C, precision is ± 0.1 K. at 40°C, precision is ± 0.05 K. REFERENCES: 1. Caldwell, J.R.; Moyer, H.V. <i>Ind. Eng. Chem. Anal. Ed.</i> <u>1935</u> , <i>7</i> , 38. 2. Kolthoff, I.M.; Furman, N.H. <i>Volumetric Analysis, Vol. II</i> <u>1929</u> , 388.																																						

t/°C	Mole fraction of ion in mixture of anhydrous salt				gH ₂ O/ mol of mixture of anhydrous salt	Density g cm ⁻³	Nature of the solid phase ^a	COMPONENTS: (1) Sodium chlorate; NaClO ₃ ; [7775-09-9] (2) Sodium chloride; NaCl; [7647-14-5] (3) Potassium chlorate; KClO ₃ ; [3811-04-9] (4) Potassium chloride; KCl; [7447-40-7] (5) Water; H ₂ O; [7732-18-5]	ORIGINAL MEASUREMENTS: Nallet, A.; Paris, R.A. <i>Bull. Soc. Chim. Fr.</i> 1956, 494-7.
	Anion		Cation						
	Cl ⁻	ClO _c ⁻	Na ⁺	K ⁺					
-26.3	0.583	0.417	0.995	0.0047	142.2	1.313	A+C+D+I		
-23.15	0.992	0.0084	0.814	0.1865	173.4	1.208	A+E+C+E		
-19.2	0.991	0.0092	0.708	0.292	198	1.192	E+D+I		
-19.2	0.990	0.0099	0.807	0.1935	167	1.219	A+E+D		
-19.2	0.146	0.854	0.992	0.0078	159.5	1.342	D+C+I		
-19.2	0.579	0.421	0.994	0.0064	134	1.323	A+D+C		
- 9.8	0.574	0.426	0.991	0.0093	124	1.337	A+C+D		
- 9.8	0.986	0.0145	0.804	0.196	154	1.230	A+E+D		
- 5.85	0.572	0.428	0.989	0.0108	119.8	1.342	A+B+C+D		
- 2.55	0.981	0.0191	0.80	0.20	144.8	1.238	A+B+E+D		
+10	0.469	0.531	0.981	0.0187	109.5	1.3731	B+C+D		
+10	0.972	0.0283	0.752	0.248	139.3	1.2414	B+D+E		
30	0.340	0.660	0.965	0.353	93	1.4231	B+D+C		
30	0.949	0.051	0.676	0.324	130	1.2496	B+D+E		
50	0.235	0.765	0.942	0.0585	78.7	1.481	B+D+C		
50	0.916	0.0842	0.602	0.398	118.2	1.263	B+D+E		
70	0.1583	0.842	0.912	0.0885	61.5	1.546	B+D+C		
70	0.867	0.1328	0.534	0.466	105.9	1.281	B+D+E		
100	0.763	0.237	0.453	0.547	87	1.329	B+D+E		
100	0.0904	0.910	0.859	0.141	42.4	1.656	B+E+C		

^a A = NaCl·2H₂O; B = NaCl; C = NaClO₃; D = KClO₃; E = KCl; I = Ice

EXPERIMENTAL VALUES:

VARIABLES:
T/K = 246.9 to 393
Composition

PREPARED BY:
Hiroshi Miyamoto

<p>COMPONENTS:</p> <p>(1) Sodium chlorate; NaClO₃; [7775-09-9]</p> <p>(2) Sodium chloride; NaCl; [7647-14-5]</p> <p>(3) Potassium chlorate; KClO₃; [3811-04-9]</p> <p>(4) Potassium chloride; KCl; [7447-40-7]</p> <p>(5) Water; H₂O; [7732-18-5]</p>	<p>ORIGINAL MEASUREMENTS:</p> <p>Nallet, A.; Paris, R.A.</p> <p><i>Bull. Soc. Chim. Fr.</i> <u>1956</u>, 494-7.</p>
<p>EXPERIMENTAL VALUES:</p>	
<p style="text-align: center;">AUXILIARY INFORMATION</p>	
<p>METHOD/APPARATUS/PROCEDURE:</p> <p>The procedure of equilibration and the method for analysis of the saturated solutions were not described in the original paper, but the compiler assumes that the procedure and the method were similar to that given in ref (1).</p> <p>See the compilations for the NaClO₃ - KClO₃ - H₂O and NaClO₃ - NaCl - H₂O systems for complete descriptions of the experimental method.</p>	<p>SOURCE AND PURITY OF MATERIALS:</p> <p>The source and purity of materials were not given in the original paper, but probably similar to that described in ref (1).</p> <hr/> <p>ESTIMATED ERROR:</p> <p>Nothing specified.</p> <hr/> <p>REFERENCES:</p> <p>1. Nallet, A.; Paris, R.A. <i>Bull. Chem. Soc. Fr.</i> <u>1956</u>, 488.</p>

EXPERIMENTAL VALUES:		Composition of saturated solutions ^a								Nature of the solid phase
t/°C	NaCl		NaClO ₃		RbCl		RbClO ₃			
	mass %	mol %	mass %	mol %	mass %	mol %	mass %	mol %		
25	2	1.08	-	-	48.20	12.63	0.82	0.15	A+B	
	2.25	1.18	-	-	45.80	11.62	0.82	0.15	"	
	4.45	2.31	-	-	43.18	10.83	0.84	0.15	"	
	7.07	3.62	-	-	40.07	9.908	0.85	0.15	"	
	9.74	4.95	-	-	37.33	9.165	0.91	0.16	"	
	13.32	6.634	-	-	33.95	8.172	-	-	C+A	
	13.59	6.807	-	-	33.12	8.018	0.98	0.17	A+B+C	
	13.64	6.862	-	-	33.38	8.116	0.99	0.17	"	
	13.52	6.771	-	-	33.19	8.033	0.95	0.16	"	
	15.98	7.495	-	-	26.08	5.912	1.15	0.187	C+B	
	18.91	8.252	-	-	17.69	3.731	1.37	0.207	"	
	21.31	8.886	-	-	10.77	2.171	2.43	0.351	"	
	23.69	9.637	-	-	5.19	1.02	3.83	0.539	"	
	25.47	10.24	-	-	-	-	6.40	0.890	"	
	24.06	9.727	3.49	0.774	-	-	4.58	0.640	"	
	22.71	9.308	7.80	1.76	-	-	2.91	0.413	"	
	21.00	8.777	11.79	2.706	-	-	2.16	0.312	"	
	18.57	8.092	17.80	4.259	-	-	1.82	0.274	"	
	15.79	7.195	23.95	5.992	-	-	1.71	0.270	"	

continued.....

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

The isothermal method was used. Equilibrium was reached in 30 hours. Samples of solid and liquid phases were analyzed, rubidium being determined as the tetraphenylborate or when at lower concentration, by flame photometry, and chloride determined argentometrically. Chlorate was found by adding an excess of iron(II) sulfate to an aliquot of saturated solution and back-titrating with potassium permanganate. Sodium was determined by difference. The solid phases were identified by the method of residues and by X-ray diffraction.

SOURCE AND PURITY OF MATERIALS:

The NaCl, NaClO₃, RbCl and RbClO₃ had a purity of <99.9 %.

ESTIMATED ERROR:

Soly: nothing specified.
Temp: precision ± 0.1 K.

REFERENCES:

COMPONENTS:

- (1) Sodium chloride; NaCl; [7647-14-5]
- (2) Sodium chlorate; NaClO₃; [7775-09-9]
- (3) Rubidium chloride; RbCl; [7791-11-9]
- (4) Rubidium chlorate; RbClO₃; [13446-71-4]
- (5) Water; H₂O; [7732-18-5]

ORIGINAL MEASUREMENTS:

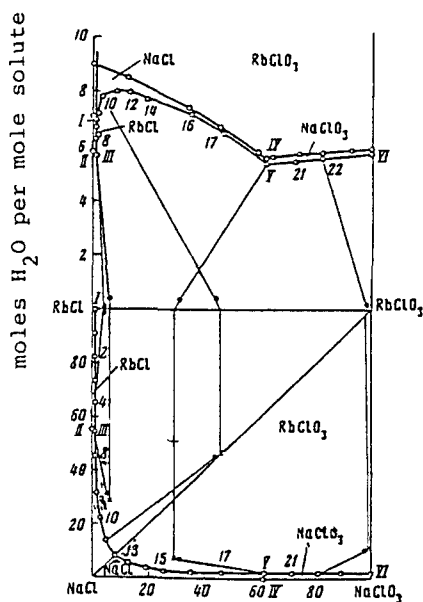
Arkhipov, S.M.; Kashina, N.I.; Kuzina, V.A.
Zh. Neorg. Khim. 1968, 13, 2872-6;
Russ. J. Inorg. Chem. (Engl. Transl.)
 1968, 13, 1476-9.

EXPERIMENTAL VALUES: (Continued)

t/°C	Composition of saturated solutions ^a								Nature of the solid phase ^b
	NaCl		NaClO ₃		RbCl		RbClO ₃		
	mass %	mol %	mass %	mol %	mass %	mol %	mass %	mol %	
11.82	5.793		34.82	9.370	-	-	-	-	C+D
11.79	5.887		34.53	9.466	-	-	1.59	0.275	C+D+B
11.66	5.825		34.61	9.493	-	-	1.65	0.285	"
11.76	5.899		34.85	9.599	-	-	1.64	0.285	"
8.71	4.47		39.07	11.02	-	-	1.68	0.299	D+B
5.66	3.04		44.81	13.22	-	-	1.67	0.310	"
3.15	1.65		45.27	13.04	-	-	1.65	0.300	"
---	---		49.44	14.58	-	-	1.70	0.316	"

^a Mole fractions calculated by the compiler.

^b A = RbCl; B = RbClO₃; C = NaCl; D = NaClO₃



The Na⁺, Rb⁺ || Cl⁻, ClO₃⁻ - H₂O system at 25°C.
 Circles: composition of liquid phase;
 black points: composition of residues;
 crosses: composition of solid phases.

COMPONENTS: (1) Sodium chloride; NaCl; [7647-14-5] (2) Sodium chlorate; NaClO ₃ ; [7775-09-9] (3) Cesium chloride; CsCl; [7647-17-8] (4) Cesium chlorate; CsClO ₃ ; [13763-67-2] (5) Water; H ₂ O; [7732-18-5]	ORIGINAL MEASUREMENTS: Arkhipov, S.M.; Kashina, N.I. <i>Zh. Neorg. Khim.</i> 1970, 15, 760-4; <i>Russ. J. Inorg. Chem. (Engl. Transl.)</i> 1970, 15, 391-2.
VARIABLES: Composition and temperature T/K = 298.2, 323.2 and 348.2 K	PREPARED BY: Hiroshi Miyamoto
EXPERIMENTAL VALUES: The phase diagram is given below, and numerical data follow on the next two pages. <div style="text-align: center;"> </div> <p>The Cs⁺, Na⁺ Cl⁻, ClO₃⁻ - H₂O systems at 25°C (a), 50°C (b) and 75°C (c)</p> <p style="text-align: right;">continued.....</p>	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: Solubility was investigated by the isothermal method by mixing the solid and liquid phases in glass test-tubes in a water thermostat. Samples of liquid and solid phases were analyzed for the anions and cesium. Chloride was titrated with silver nitrate solution by using potassium chromate as indicator. Chlorate was found by adding excess iron(II) sulfate to an aliquot of saturated solution and back-titrating with potassium permanganate solution. Cesium was determined gravimetrically as cesium tetraphenylborate. Sodium was found by difference. The solid phases were identified by the method of residues, and X-ray diffraction.	SOURCE AND PURITY OF MATERIALS: "Chemically pure" grade NaCl, NaClO ₃ , CsCl and CsClO ₃ with a purity of 99.5 % or better were used.
	ESTIMATED ERROR: Soly: nothing specified. Temp: precision ± 0.1 K.
	REFERENCES:

Composition of saturated solutions									
t/°C	Sodium Chloride		Sodium Chlorate		Cesium Chloride		Cesium Chlorate		Nature of the solid phase ^a
	mass %	mol %	mass %	mol %	mass %	mol %	mass %	mol %	
25	--	--	--	--	65.83	17.30	0.54	0.11	A+B
	0.65	0.50	--	--	65.70	17.41	0.54	0.11	B+E
	2.66	1.89	--	--	60.64	14.95	0.65	0.12	"
	3.18	2.26	--	--	60.25	14.85	0.65	0.12	"
	4.75	3.30	--	--	57.88	13.94	0.67	0.13	"
	8.75	5.49	--	--	49.41	10.77	0.80	0.14	"
	9.73	5.97	--	--	47.34	10.09	0.85	0.14	"
	11.10	6.531	--	--	44.72	9.134	--	--	C+E
	11.22	6.695	--	--	44.45	9.208	0.97	0.16	C+B+E
	11.35	6.825	--	--	44.72	9.335	1.04	0.169	"
	13.61	7.708	--	--	39.23	7.713	1.23	0.188	C+B
	15.63	8.098	--	--	31.72	5.705	1.49	0.209	"
	17.32	8.434	--	--	25.81	4.363	1.82	0.239	"
	18.59	8.677	--	--	21.68	3.513	1.90	0.240	"
	20.45	9.097	--	--	15.59	2.408	2.88	0.346	"
	22.03	9.411	--	--	9.76	1.45	4.24	0.489	"
	24.89	10.27	--	--	1.01	0.145	7.81	0.870	"
	24.86	10.24	--	--	--	--	8.71	0.969	"
	23.22	9.545	5.35	1.21	--	--	4.91	0.545	"
	21.39	8.880	9.57	2.18	--	--	3.27	0.367	"
	19.57	8.311	13.38	3.120	--	--	3.01	0.345	"
	17.21	7.771	21.50	5.331	--	--	2.15	0.262	"
	14.15	6.717	28.29	7.373	--	--	1.93	0.247	"
	11.86	5.819	34.87	9.394	--	--	--	--	C+D
	11.75	5.889	34.28	9.433	--	--	2.06	0.279	C+D+B
	11.80	5.914	34.32	9.445	--	--	1.99	0.269	"
	10.54	5.330	35.92	9.973	--	--	2.08	0.284	D+B
	5.16	2.69	42.62	12.18	--	--	1.95	0.274	"
	2.53	1.36	46.84	13.79	--	--	2.02	0.293	"
	---	--	49.60	14.77	--	--	2.13	0.312	"

continued.....

COMPONENTS:
 (1) Sodium chloride; NaCl; [7647-14-5]
 (2) Sodium chlorate; NaClO₃; [7775-09-9]
 (3) Cesium chloride; CsCl; [7647-17-8]
 (4) Cesium chlorate; CsClO₃; [13763-67-2]
 (5) Water; H₂O; [7732-18-5]

ORIGINAL MEASUREMENTS:
 Arkhipov, S.M.; Kashina, N.I.
 Zh. Neorg. Khim. 1970, 15, 760-4;
 Russ. J. Inorg. Chem. (Engl. Transl.)
 1970, 15, 391-2.

EXPERIMENTAL VALUES: (Continued)

Composition of saturated solutions

t/°C	Sodium Chloride		Sodium Chlorate		Cesium Chloride		Cesium Chlorate		Nature of the solid phase ^a
	mass %	mol %	mass %	mol %	mass %	mol %	mass %	mol %	
50	--	--	--	--	68.98	19.90	1.43	0.321	A+B
	8.47	5.69	--	--	54.06	12.61	--	--	C+E
	8.23	5.58	--	--	52.73	12.41	1.93	0.354	B+C+E
	8.54	4.65	45.08	13.47	--	--	--	--	C+D
	8.14	4.61	43.37	13.48	--	--	4.24	0.648	C+D+B
	--	--	53.90	17.78	--	--	4.26	0.691	D+B
75	--	--	--	--	68.94	20.57	2.81	0.652	A+B
	5.93	4.56	--	--	62.50	16.68	--	--	C+E
	6.33	4.92	--	--	58.92	15.89	3.63	0.762	C+B+E
	5.97	3.63	54.36	18.14	--	--	--	--	C+D
	5.45	3.59	50.53	18.27	--	--	8.11	1.44	C+D+B
	--	--	57.99	21.97	--	--	7.79	1.45	D+B

^a A = CsCl; B = CsClO₃; C = NaCl; D = NaClO₃; E = (Na,Cs)Cl solid solution

COMPONENTS:
 (1) Sodium chloride; NaCl; [7647-14-5]
 (2) Sodium chlorate; NaClO₃; [7775-09-9]
 (3) Cesium chloride; CsCl; [7647-17-8]
 (4) Cesium chlorate; CsClO₃; [13763-67-2]
 (5) Water; H₂O; [7732-18-5]

EXPERIMENTAL VALUES: (Continued)

ORIGINAL MEASUREMENTS:
 Arkhipov, S.M.; Kashina, N.I.
 Zh. Neorg. Khim. 1970, 15, 760-4;
 Russ. J. Inorg. Chem. (Engl. Transl.)
 1970, 15, 391-2.