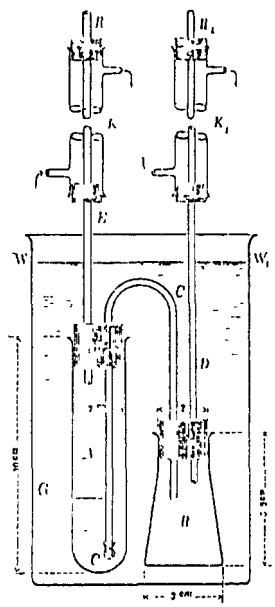
COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Potassium chlorate; $KClO_3$; [3811-04-9]	Pawlewski, B.
(2) Water; H_2O; [7732-18-5]	*Ber. Dtsch. Chem. Ges.* 1899, *32*, 1040-1.
VARIABLES:	**PREPARED BY:**
T/K = 273 to 373	Hiroshi Miyamoto

EXPERIMENTAL VALUES:

Solubility of $KClO_3$ [a]

t/°C	mass %	g/100 gH_2O	mol kg^{-1}
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



[a] Molalities calculated by the compiler.

There are a number of inconsistencies between the experimental g/100 gH_2O solubilities and the author's calculations of mass %. We assume the author made several mistakes in calculation.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

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. $KClO_3$ was determined gravimetrically after evaporation of the solvent.

SOURCE AND PURITY OF MATERIALS:

No information was given.

ESTIMATED ERROR:

Nothing specified.

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Potassium chlorate; $KClO_3$; [3811-04-9] (2) Water; H_2O; [7732-18-5]	Calzolari, F. *Gazz. Chem. Ital.* 1912, *42*, 85-92.
VARIABLES:	**PREPARED BY:**
T/K = 281 to 372	B. Scrosati and H. Miyamoto

EXPERIMENTAL VALUES:

	Solubility	
t/°C	g/100gH_2O	mol kg^{-1} (compiler)
8	4.48	0.366
19.8	7.15	0.583
30	10.27	0.838
99	57.3	4.675

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

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.

SOURCE AND PURITY OF MATERIALS:

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.

ESTIMATED ERROR:

Not possible to estimate due to insufficient data.

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Potassium chlorate; $KClO_3$; [3811-04-9]	Tschugaeff, L.; Chlopin, W.
(2) Water; H_2O; [7732-18-5]	*Z. Anorg. Chem.* 1914, *86*, 154-62.
VARIABLES:	**PREPARED BY:**
T/K = 326 to 341	Hiroshi Miyamoto

EXPERIMENTAL VALUES:

Solubility of $KClO_3$[a]

t/°C	mass %	mol kg^{-1}
53	17.37	1.715
68	23.25	2.472
81	28.53[b]	3.258
86[c]	30.46	3.574

[a] Molalities computed by the compiler.

[b] 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.

[c] Original value of 68°C is obviously a typographical error. Figure 4 shows the correct temperature to be 86°C.

METHOD/APPARATUS/PROCEDURE:

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.

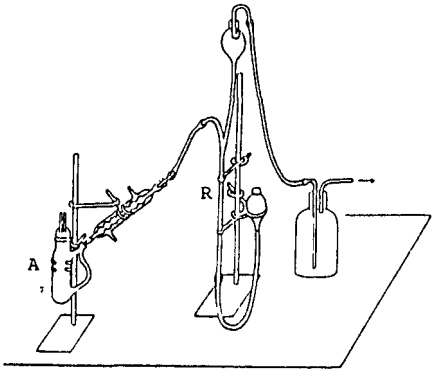


Fig. 1.

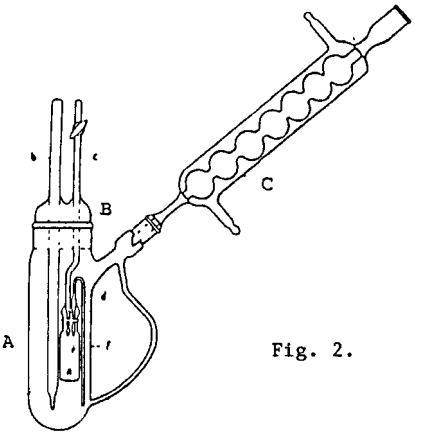


Fig. 2.

SOURCE AND PURITY OF MATERIALS:	ESTIMATED ERROR:
Potassium chlorate was repeatedly recrystallized from distilled water.	Nothing specified.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Potassium chlorate; $KClO_3$; [3811-04-9]	Flottman, F.
(2) Water; H_2O; [7732-18-5]	*Z. Anal. Chem.* 1928, 73, 1-39.
VARIABLES:	**PREPARED BY:**
T/K = 288, 293 and 298	Hiroshi Miyamoto

EXPERIMENTAL VALUES: Solubility of potassium chlorate[a]

t/°C	mass %	mol kg^{-1}	density/g cm^{-3}
15	5.7381		
	5.7390		
	(Av)5.739	0.497	1.0363
20	6.7927		
	6.7963		
	6.7907		
	(Av)6.793 (σ=0.003)	0.595	1.0420
25	8.0046		
	8.0055		
	8.0120		
	7.9742		
	(Av)7.999 (σ=0.017)	0.709	1.0484

[a]Molalities and standard deviations calculated by the compiler.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:
An excess of $KClO_3$ 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.

SOURCE AND PURITY OF MATERIALS:
The purest commercial $KClO_3$ (Kahlbaum, Berlin) was dissolved in distilled water, and the solution decantated three times to remove any impurity. The recrystallized $KClO_3$ was used for the solubility determinations.

ESTIMATED ERROR:
Soly: standard deviation is given in the above data table (compiler).
Temp: precision ± 0.02 K (author).

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Potassium chlorate; $KClO_3$; [3811-04-9] (2) Water; H_2O; [7732-18-5]	Benrath, A.; Gjedebo, F.; Schiffers, B.; Wunderlich, H. *Z. Anorg. Allgem. Chem.* 1937, *231*, 285-97.
VARIABLES: T/K = 450 to 578	**PREPARED BY:** Hiroshi Miyamoto

EXPERIMENTAL VALUES:

Solubility of $KClO_3$

t/°C	mass %	mol kg^{-1} (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:
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.

SOURCE AND PURITY OF MATERIALS:
No information was given.

ESTIMATED ERROR:
Nothing specified.

REFERENCES:
1. Janencke, E. *Z. Physik. Chem.* 1936, *A177*, 7.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Potassium chlorate; $KClO_3$; [3811-04-9] (2) Water; H_2O; [7732-18-5]	Treadwell, W.D.; Ammann, A. *Helv. Chim. Acta.* 1938, *21*, 1249-56.
VARIABLES:	**PREPARED BY:**
One temperature; 293 K	Hiroshi Miyamoto

EXPERIMENTAL VALUES:

The solubility of potassium chlorate in water at 20°C was given as:

$$0.58 \text{ mol kg}^{-1}$$

The concentration solubility product was also given simply as the square of the solubility:

$$3.36 \times 10^{-1} \text{ mol}^2 \text{ kg}^{-2}$$

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
No information was given.	No information was given.
	ESTIMATED ERROR: Nothing specified.
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Potassium chlorate; $KClO_3$; [3811-04-9] (2) Water-d_2; D_2O; [7789-20-0] (3) Water; H_2O; [7732-18-5]	Noonan, E.C. *J. Am. Chem. Soc.* 1948, *70*, 2915-8.
VARIABLES:	**PREPARED BY:**
T/K = 278.15	G. Jancso and H. Miyamoto

EXPERIMENTAL VALUES:

Water-d_2 mass %	Sodium Chlorate moles/100 moles of solvent
0	0.5845
91.43	0.5182
100	0.5120[a]

[a] Extrapolated by author.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Solubilities were determined by equilibrating solutions with excess salt, evaporating a filtered weighed portion of solution to dryness, and weighing the remaining salt to ± 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.

SOURCE AND PURITY OF MATERIALS:

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.

ESTIMATED ERROR:
Soly: precision better than 0.5 %.
Temp: precision ± 0.05 K (author).

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Potassium chlorate; $KClO_3$; [3811-04-9] (2) Water-d_2; D_2O; [7789-20-0] (3) Water; H_2O; [7732-18-5]	Chang, T.L.; Hsieh, Y.Y. *Sci. Repts. Natl. Tsing Hua Univ.* 1948, A5, 252-9.
VARIABLES: T/K = 298.15	**PREPARED BY:** G. Jancso and H. Miyamoto

EXPERIMENTAL VALUES:

t/°C	Water-d_2 mass %	Potassium Chlorate moles/55.51 moles of H_2O-D_2O 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[a]

[a] The solubility in 100 % D_2O was obtained from the solubilities in the H_2O-D_2O mixtures by linear extrapolation.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Saturated solutions of $KClO_3$ in the H_2O-D_2O 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°C; the time of agitation in the 25°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°C and weighed.

SOURCE AND PURITY OF MATERIALS:

Baker's analyzed c.p. grade potassium chlorate was dried over calcium chloride in a desiccator for several days before use. D_2O 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 (authors).

REFERENCES:

1. Swift, E. Jr. *J. Am. Chem. Soc.* 1939, *61*, 198.