COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Potassium iodate; KIO_3; [7758-05-6]	Flottmann, 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:

t/°C	Solubility of potassium iodate		Density	Refractive index
	mass %	mol kg^{-1} [a]	g cm^{-3}	n_D
15	6.6894			
	6.6802			
	6.6827			
	(Av)6.684 (σ=0.005)	0.335	1.0584	1.33831
20	7.4765			
	7.4825			
	7.4755			
	(Av)7.478 (σ=0.004)	0.378	1.0648	1.33873
25	8.3386			
	8.3445			
	8.3452			
	(Av)8.343 (σ=0.004)	0.425	1.0708	1.33911

[a]Molalities calculated by the compiler using 1977 IUPAC recommended atomic masses.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:
An excess potassium iodate was added to distilled water, and the mixture was shaken in a thermostat for about 10 hours. Equilibrium was established from both undersaturation and supersaturation.

The sample of the saturated solution was filtered off, and the solution was evaporated to dryness.

SOURCE AND PURITY OF MATERIALS:
The purest commercial potassium iodate (Kahlbaum) was dissolved in distilled water, the solution was decanted three times to remove the impurity. The recrystallized potassium iodate was used for the solubility determination.

ESTIMATED ERROR:
Soly: standard deviation is given in the table described above (compiler calculated)
Temp: ± 0.02°C (author)

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Potassium iodate; KIO_3; [7758-05-6] (2) Water; H_2O; [7732-18-5]	Benrath, A.; Gjedebo, F.; Schiffer, B.; Wunderlich, H. *Z. Anorg. Allgem. Chem.* 1937, *231*, 285-97.
VARIABLES: T/K = 390 to 573	**PREPARED BY:** Hiroshi Miyamoto and Mark Salomon

EXPERIMENTAL VALUES:

Solubility of KIO_3[a,b]

t/°C	mass %	mol kg^{-1}	mole %
117	26.1	1.65	2.89
126	27.4	1.76	3.08
147	31.4	2.14	3.71
160	34.1	2.42	4.17
177	37.4	2.79	4.79
201	41.6	3.33	5.66
206	42.6	3.47	5.88
220	44.1	3.69	6.23
231	46.8	4.11	6.89
243	48.6	4.42	7.37
253	50.5	4.77	7.91
265	51.6	4.98	8.24
269	53.1	5.29	8.70
291	56.5	6.07	9.86
300	58.0	6.45	10.41

[a] Molalities and mole % calculated by the compilers.

[b] Nature of the solid phases not specified.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Synthetic method used with visual observation of temperature of crystallization and solubilization (ref 1).
The weighed salt and water were placed in a small tube. The tubes were set in an oven equipped with a mica window. A thermometer was immersed in the oven.

SOURCE AND PURITY OF MATERIALS:

No information is given.

ESTIMATED ERROR:

Nothing specified.

REFERENCES:

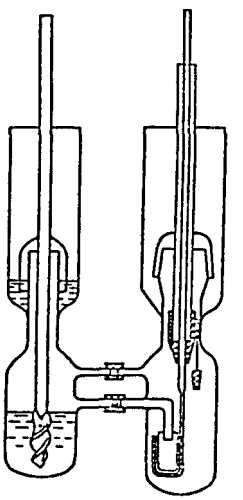
1. Jaenecke, E. *Z. Physik. Chem.* 1936, *A177*, 7.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Potassium iodate; KIO_3; [7758-05-6] (2) Water; H_2O; [7732-18-5]	Bresusov, O.N.; Kashina, N.I.; Revzina, T.V.; Sobolevskaya, N.G. *Zh. Neorg. Khim.* 1967, *12*, 2240-3; *Russ. J. Inorg. Chem.* (*Engl. Transl.*) 1967, *12*, 1179-81.
VARIABLES: Temperature: 273.2 to 373.2 K	**PREPARED BY:** Hiroshi Miyamoto

EXPERIMENTAL VALUES:

t/°C	Solubility of KIO_3[a] mass %	mol %	mol kg^{-1} (compiler)
0	4.57	0.402	0.224
10	6.04	0.538	0.300
20	7.68	0.695	0.389
25	8.57	0.783	0.438
30	9.35	0.861	0.482
40	11.13	1.043	0.585
50	13.07	1.250	0.703
60	15.30	1.498	0.844
70	17.41	1.744	0.985
80	19.55	2.005	1.136
90	21.85	2.300	1.306
100	23.99	2.588	1.475

[a] The nature of the solid phase was not specified.



High temp. apparatus

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Isothermal method. Equilibrium reached in 4-5 h. From 90-100°C, soly detd in apparatus shown in figure. At equilibrium, the apparatus was tilted to allow satd sln to filter through connecting tube into weighed test tubes. The test tube was closed with a stopper, withdrawn, and weighed. Condensation on the walls of the apparatus and loss of water by evaporation was thus prevented. At the lower temperatures, ordinary soly vessels were used, and pipets with glass filters were used for sampling (no other details given). Above 50°C, the pipets were preheated in the thermostat.
The iodate content was determined iodometrically.

SOURCE AND PURITY OF MATERIALS:

Results of analysis of KIO_3:

KIO_3 content; 99.5 %
Impurities, %, Rb 0.01; Cs 0.01; Na 0.005; SO_4 <0.01; Fe 0.005.

ESTIMATED ERROR:

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

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Potassium iodate; KIO_3; [7758-05-6] (2) Water; H_2O; [7732-18-5]	Kolthoff, I.M.; Chantooni, M.K. *J. Phys. Chem.* 1973, 77, 523-6.
VARIABLES: T/K = 298	**PREPARED BY:** Hiroshi Miyamoto

EXPERIMENTAL VALUES:

(1) Volumetric determination:

The solubility of KIO_3 in water at 25°C was found to be

$$0.44 \text{ mol dm}^{-3}.$$

(2) Potentiometric determination:

The solubility product of KIO_3 in water is given:

$$pK_{s0} = 1.6 \text{ (authors)}$$
$$K_{s0} = 2.5 \times 10^{-2} \text{ mol}^2 \text{ dm}^{-6} \text{ (compiler)}$$

The solubility product of KIO_3 was calculated from EMF data using the following equation:

$$E_{II} - E_I = 0.0591 \, [\, pK_{s0}(AgCl) - pK_{s0}(AgIO_3) + pK_{s0}(KIO_3) + 2 \log[c(KCl)\, y_{\pm}(KCl)]]$$

where E_I and E_{II} are Emfs of Cell I and II, respectively. With a particular cation glass electrode E_I = +0.051V and E_{II} = +0.213V, which combined with the accepted values in water $pK_{s0}(AGCl)$ = 9.7, $pK_{s0}(AgIO_3)$ = 7.5, and the mean activity coefficient $y_{\pm}(KCl)$ in 0.44 mol dm^{-3} KCl solution of 0.65 (ref 1) yield the value for $pK_{s0}(KIO_3)$.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

(1) The solubility product of KIO_3 in water was estimated from the difference in emf of Cell I and II without liquid junction

$Ag, AgIO_3/salt(c_1)\ /K(gl)$ I

$Ag, AgCl/salt(c_2)\ /K(gl)$ II

where c_1 is the concentration of IO_3 in saturated solution, and c_2 is the concentration of Cl^- saturated in 0.44 mol dm^{-3} KIO_3 solution.

(2) The details of the isothermal method are not given. The iodate content was determined iodometrically.

SOURCE AND PURITY OF MATERIALS:

KIO_3 was dried in *vacuo* at 70°C for 3 hours.
Electrodes were prepared electrolytically (ref 2).

ESTIMATED ERROR:

The uncertainty in pK_{s0} is ± 0.05.
Temp: not given.

REFERENCES:

1. Bates, R.G.; Staples, B.G.; Robinson, R.A. *Anal. Chem.* 1970, *42*, 867.
2. Ives, D.J.; Janz, G.J. *Reference Electrodes*. Academic Press. N.Y. 1961, p179; Kolthoff, I.M.; Chantooni, M.K. *J. Am. Chem. Soc.* 1965, *87*, 4428.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Potassium iodate; KIO_3; [7758-05-6] (2) Water-d_2; D_2O; [7789-20-0] (3) Water; H_2O; [7732-18-5]	Chang, T.L.; Hsieh, Y.Y. *J. Chinese Chem. Soc. Peking*, 1949, *16*, 10-2.
VARIABLES: T/K = 298	**PREPARED BY:** G. Jancso

EXPERIMENTAL VALUES:

Water-d_2 mol %	Potassium Iodate of solubilities mole/55.51 moles of solvent
0	0.431
99.3	0.3586 0.3597
	(Av)0.359
100[a]	0.358

[a] Solubility in 100 mole % D_2O calculated by the compiler using linear extrapolation.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Saturated solutions of potassium iodate were prepared by the method of supersaturation. The saturated solutions were made by agitating the excess salt with water for one hour at 70°C and then for several hours in a 25°C bath.
A sample of the clear solution was delivered in a weighing bottle, then the solvent evaporated and the residual pure salt was dried in vacuum at 100°C and weighed. Two duplicate determinations were made on the same sample of prepared solution.

SOURCE AND PURITY OF MATERIALS:

Baker's analyzed "chemically pure" reagent grade KIO_3 was used. Heavy water was obtained from Norsk Hydro-Electrisk Kvalatofaktieselskab in Oslo, and had a deuterium concentration of 99.7 mol %. The 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: precision better than 1 %.
Temp: nothing specified.

REFERENCES:

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