COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Lithium dihydrogen phosphate; LiH_2PO_4; [13453-80-8] (2) Lithium iodate; $LiIO_3$; [13765-03-2] (3) Phosphoric acid; H_3PO_4; [7664-38-2] (4) Water; H_2O; [7732-18-5]	Shklovskaya, R.M.; Arkhipov, S.M.; Kidyarov, B.I.; Vdovkina, T.E. *Zh. Neorg. Khim.* 1982, 27, 1597-8; *Russ. J. Inorg. Chem.* (*Engl. Transl.*) 1982, 27, 902.
VARIABLES: Composition at 298.2 K	**PREPARED BY:** Hiroshi Miyamoto

EXPERIMENTAL VALUES: Composition of saturated solutions at 25.0°C [a]

$LiIO_3$		LiH_2PO_4		Nature of the solid phase[b]
mass %	mol % (compiler)	mass %	mol % (compiler)	
43.82[c]	7.173	-	-	A
36.50	6.002	8.31	2.39	"
26.71	4.271	16.92	4.735	"
21.50	3.453	22.91	6.438	"
15.25	2.481	30.70	8.742	"
10.42	1.766	38.91	11.54	"
7.63	1.340	44.40	13.64	"
5.90	1.09	49.73	16.09	"
4.81	0.937	54.20	18.47	"
3.93	0.797	57.61	20.45	A+B
1.50	0.290	57.25	19.34	B
-	-	61.00	21.33	"

[a] Initial solvent was a 1 % phosphoric acid solution.

[b] A = $LiIO_3$; B = LiH_2PO_4

[c] For the binary system the compiler computes the following:

soly of $LiIO_3$ = 4.289 mol kg^{-1}

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:
Isothermal method used. Equilibrium was reached in 15-20 days.
The solubility determinations in the LiH_2PO_4-$LiIO_3$-H_2O system was carried out in 1 % phosphoric acid solution.
Samples of the liquid phases were analyzed for iodate iodometrically, and for the dihydrogen phosphate by direct titration with sodium hydroxide using thymolphthalein as an indicator.
The solid phases were identified by the method of residues and checked by X-ray diffraction.

SOURCE AND PURITY OF MATERIALS:
"Special purity" grade lithium iodate and "pure" grade lithium dihydrogen phosphate were used.

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

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Lithium iodate; $LiIO_3$; [13765-03-2] (2) Potassium iodate; KIO_3; [7758-05-6] (3) Iodic acid; HIO_3; [7782-68-5] (4) Water; H_2O; [7732-18-5]	Azarova, L.A.; Vinogradov, E.E.; Lepeshkov, I.M. *Zh. Neorg. Khim.* 1978, *23*, 1952-7; *Russ. J. Inorg. Chem.* (*Engl. Transl.*) 1978, *23*, 1072-5.
VARIABLES:	**PREPARED BY:**
Composition at 298 K	Hiroshi Miyamoto

EXPERIMENTAL VALUES: Composition of saturated solutions at 25°C

$LiIO_3$		KIO_3		HIO_3		Nature of the solid phase[a]
mass %	mol % (compiler)	mass %	mol % (compiler)	mass %	mol % (compiler)	
1.59	0.183	12.83	1.253	0.72	0.086	A+D
3.69	0.430	12.04	1.192	0.69	0.083	"
11.73	1.449	9.57	1.005	0.55	0.070	"
11.28	1.371	8.48	0.876	0.61	0.077	"
14.94	1.913	9.43	1.026	0.59	0.078	A+D+E
15.40	1.974	9.12	0.993	0.54	0.072	"
15.50	1.981	8.81	0.957	0.50	0.066	D+E
16.31	2.068	7.31	0.787	0.52	0.068	"
18.71	2.440	6.97	0.773	0.90	0.121	"
17.97	2.271	4.64	0.498	1.31	0.171	"
20.92	2.748	1.59	0.177	4.77	0.648	"
18.13	2.277	2.29	0.244	2.99	0.388	"
25.14	3.580	1.26	0.152	7.39	1.088	"
32.47	5.432	1.20	0.171	11.62	2.010	"
35.71	6.635	1.14	0.180	15.00	2.881	D+E+B
35.86	6.642	0.82	0.129	14.99	2.870	"
44.79	7.884	0.34	0.051	3.40	0.619	E+B
42.64	7.288	0.26	0.038	3.77	0.666	"
42.22	7.187	0.26	0.038	3.93	0.692	"
41.78	7.153	0.52	0.076	4.48	0.793	"
35.98	5.530	0.31	0.040	3.17	0.504	"
37.40	7.206	0.41	0.067	16.17	3.221	"

continued.....

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

The $LiIO_3$-KIO_3-HIO_3-H_2O system was studied by the isothermal method. Equilibrium in the system was established in 14 days except for viscous solutions when equilibrium was established after one month. In sampling, the solutions were centrifuged, then thermostated, and only after this procedure was liquid phase separated from the solid. The liquid and solid phases were analyzed for K^+ gravimetrically by precipitation with sodium tetraphenylborate in acetic acid, Li^+ by flame photometry, IO_3^- by iodometric titration, and H^+ by titration with standard alkali. The compositions of the solid phases were determined by Schreinemakers' method of residues.

SOURCE AND PURITY OF MATERIALS:

"Chemically pure" grade KIO_3 and HIO_3 were used. Lithium iodate was made from HIO_3 and LI_2CO_3.

ESTIMATED ERROR:

Nothing specified.

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Lithium iodate; $LiIO_3$; [13765-03-2]	Azarova, L.A.; Vinogradov, E.E.; Lepeshkov, I.M.
(2) Potassium iodate; KIO_3; [7758-05-6]	*Zh. Neorg. Khim.* 1978, 23, 1952-7; *Russ. J. Inorg. Chem. (Engl. Transl.)* 1978, 23, 1072-5.
(3) Iodic acid; HIO_3; [7782-68-5]	
(4) Water; H_2O; [7732-18-5]	

EXPERIMENTAL VALUES: (Continued)

Composition of saturated solutions at 25°C

$LiIO_3$		KIO_3		HIO_3		Nature of the solid phase[a]
mass %	mol % (compiler)	mass %	mol % (compiler)	mass %	mol % (compiler)	
40.91	11.856	1.09	0.268	31.15	9.332	F+B
38.41	9.504	0.99	0.208	27.24	6.968	B+D+F
41.97	11.981	0.93	0.226	29.67	8.755	"
1.61	0.182	2.02	0.194	10.31	1.207	D+F
2.98	0.342	1.83	0.178	10.38	1.231	"
4.24	0.490	1.65	0.162	9.88	1.179	"
5.00	0.584	1.54	0.153	10.34	1.249	"
7.59	0.910	1.48	0.151	10.19	1.262	"
10.50	1.330	1.50	0.161	12.21	1.599	"
10.48	1.285	1.39	0.145	9.48	1.202	"
18.83	2.693	1.33	0.162	13.98	2.067	"
6.43	2.355	0.41	0.128	74.40	28.17	C+F
9.22	3.085	0.01	0.003	69.16	23.92	"
11.17	4.133	0.07	0.022	70.30	26.89	"
15.34	6.195	0.06	0.021	68.62	28.65	"
18.19	8.317	0.59	0.229	68.41	32.33	"
21.78	8.444	trace	-	61.08	24.48	"
39.94	11.78	1.29	0.323	32.59	9.938	"
39.75	12.08	1.59	0.411	33.58	10.55	B+F+G
40.12	12.11	1.81	0.464	32.72	10.21	"
33.08	8.704	1.85	0.414	34.37	9.348	"
30.37	8.316	0.96	0.223	39.64	11.22	F+G
35.61	11.81	1.94	0.547	40.42	13.86	"
37.51	11.48	1.42	0.369	36.25	11.47	"
28.99	11.79	0.28	0.097	54.88	23.07	C+F+G
28.99	11.79	0.28	0.097	54.88	23.07	"

[a] A = KIO_3; B = $LiIO_3$; C = HIO_3; D = $KIO_3.HIO_3$; E = $KIO_3.2LiIO_3$; F = $KIO_3.2HIO_3$; G = $mLiIO_3.nHIO_3$

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Lithium iodate; $LiIO_3$; [13765-03-2] (2) Aluminum iodate; $Al(IO_3)_3$; [15123-75-8] (3) Iodic acid; HIO_3; [7782-68-5] (4) Water; H_2O; [7732-18-5]	Shklovskaya, R.M.; Arkhipov, S.M.; Kidyarov, B.I.; Tsibulevskaya, K.A. *Zh. Neorg. Khim.* 1979, *24*, 253-5; *Russ. J. Inorg. Chem.* (*Engl. Transl.*) 1979, *24*, 141-2.
VARIABLES: Composition at 298.2 K	PREPARED BY: Hiroshi Miyamoto

EXPERIMENTAL VALUES: Compositions of saturated solutions at 25.0°C

HIO_3		$LiIO_3$		$Al(IO_3)_3$		Nature of the solid phase[a]
mass %	mol % (compiler)	mass %	mol % (compiler)	mass %	mol % (compiler)	
0.0	0.0	40.96	6.678	2.41	0.121	A+B
1.93	0.328	39.78	6.543	2.27	0.123	"
3.24	0.569	40.28	6.838	2.53	0.142	"
7.53	1.378	38.47	6.809	2.70	0.158	"
10.62	1.987	36.27	6.564	3.15	0.188	"
14.36	2.904	36.06	7.054	4.11	0.265	"
18.83	4.025	34.17	7.065	4.55	0.310	"
30.30	8.467	36.19	9.783	3.67	0.327	A+B+S
28.13	7.515	40.42	10.45	-	-	A+S
35.40	10.04	32.21	8.834	3.19	0.288	B+S
40.35	11.57	28.54	7.916	2.43	0.222	B+C+S
43.26	12.48	26.23	7.320	2.11	0.194	C+S
52.44	18.39	24.38	8.273	1.83	0.205	"
56.39	18.65	18.69	5.981	1.64	0.173	"
64.73	26.31	18.54	7.290	-	-	D+S
64.03	25.44	17.06	6.557	1.43	0.181	C+D+S
63.39	21.35	11.63	3.789	2.29	0.246	C+D
71.02	26.71	7.05	2.565	2.76	0.331	"
72.72	26.45	3.69	1.299	3.36	0.390	"
71.06	22.48	-	-	3.98	0.402	"
10.52	1.263	-	-	5.40	0.207	B+C
17.71	2.457	6.58	0.883	4.50	0.199	"

AUXILIARY INFORMATION continued.....

METHOD/APPARATUS/PROCEDURE:
The quaternary system $LiIO_3$-$Al(IO_3)_3$-HIO_3-H_2O was studied by the isothermal method. Equilibrium was established in 30-45 days. Aliquots of the liquid phases were analyzed for iodate by iodometric titration, for lithium by flame photometry, and for aluminum by complexometric titration. The iodic acid was determined by difference, but for the eutectic solution iodic acid was determined by titration with standard NaOH solution.
The solid phases were identified by the method of residues, and by X-ray diffraction.

SOURCE AND PURITY OF MATERIALS:
"Special purity" grade α-$LiIO_3$ and HIO_3 were recrystallized twice from aqueous solution.
Aluminum iodate was prepared at 80-90°C by neutralization of a saturated solution of iodic acid with freshly precipitated aluminium hydroxide in equivalent amounts, cooling the solution to room temperature, and drying the salt. Found, mass %: Al 4.03; IO_3 78.7; H_2O 17.6. Calcd. for $Al(IO_3)_3.6H_2O$, mass %: Al 4.09; IO_3 79.53; H_2O 16.38.

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

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Lithium iodate; $LiIO_3$; [13765-03-2] (2) Aluminum iodate; $Al(IO_3)_3$; [15123-75-8] (3) Iodic acid; HIO_3; [7782-68-5] (4) Water; H_2O; [7732-18-5]	Shklovskaya, R.M.; Arkhipov, S.M.; Kidyarov, B.I.; Tsibulevskaya, K.A. *Zh. Neorg. Khim.* 1979, *24*, 253-5; *Russ. J. Inorg. Chem.* (*Engl. Transl.*) 1979, *24*, 141-2.

EXPERIMENTAL VALUES: (Continued)

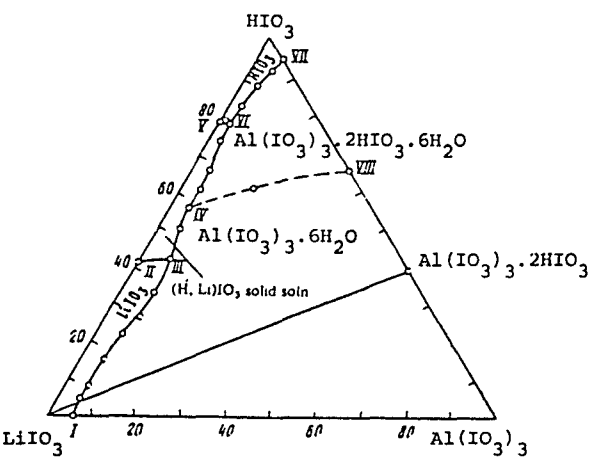
[a] Solid phases are:

A = α-$LiIO_3$; B = $Al(IO_3)_3.6H_2O$ C = $Al(IO_3)_3.2HIO_3.6H_2O$ D = HIO_3

S = solid solution $(H,Li)IO_3$

COMMENTS AND/OR ADDITIONAL DATA:

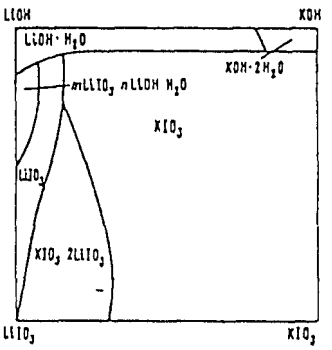
The phase diagram is given below (based on mass % units).



COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Lithium iodate; $LiIO_3$; [13765-03-2] (2) Lithium hydroxide; LiOH; [1310-65-2] (3) Potassium iodate; KIO_3; [7758-05-6] (4) Potassium hydroxide; KOH; [1310-58-3] (5) Water; H_2O; [7732-18-5]	Vinogradov, E.E.; Lepeshkov, I.N.; Tarasova, G.N. *Zh. Neorg. Khim.* 1978, *23*, 3360-5; *Russ. J. Inorg. Chem. (Engl. Transl.)* 1978, *23*, 1865-8.
VARIABLES:	**PREPARED BY:**
Composition at 298.2 K	Hiroshi Miyamoto

EXPERIMENTAL VALUES:

The phase diagram for the penternary system is shown below. Numerical solubility data are given on the following two pages.



AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

The $LiIO_3$-LiOH-KIO_3-KOH-H_2O system was studied by the isothermal method. The time required to reach equilibrium in the system with continuous stirring is different for different regions of the system (see below).

Region	Time
$LiOH.H_2O$ + KIO_3	5 days
KIO_3 + $KOH.2H_2O$	5 days
$LiIO_3$ + $KIO_3.2LiIO_3$	10-14 days
$LiIO_3$ + KIO_3	10-14 days
$LiIO_3$ + solid soln	> 3 months
$LiIO_3$ + $LiOH.H_2O$	> 3 months

Specimens of the liquid phases were withdrawn and analyzed for Li^+ by the periodate method, K^+ gravimetrically using soldium tetraphenylborate, IO_3^- iodometrically, and OH^- by titration with 0.1 N HCl using Methyl Orange as an indicator.

The composition of the solid was determined by Schreinemakers' method of residues.

SOURCE AND PURITY OF MATERIALS:

C.p. grade KIO_3 was used. $LiIO_3$ prepared from HIO_3 and Li_2CO_3. LiOH was freed of Li_2CO_3 impurity by recrystallization from saturated aqueous solution in silver vessels in a stream of purified nitrogen at 150°C. KOH was purified from alcoholic solution, the temperature being gradually raised to 250°C.

ESTIMATED ERROR:

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

REFERENCES:

COMPONENTS:
(1) Lithium iodate; $LiIO_3$; [13765-03-2]
(2) Lithium hydroxide; LiOH; [1310-65-2]
(3) Potassium iodate; KIO_3; [7758-05-6]
(4) Potassium hydroxide; KOH; [1310-58-3]
(5) Water; H_2O; [7732-18-5]

ORIGINAL MEASUREMENTS:
Vinogradov, E.E.; Lepeshkov, I.N. Tarasova, G.N.
Zh. Neorg. Khim. 1978 23, 3360-5;
Russ. J. Inorg. Chem. (Engl. Transl.) 1978, 23, 1865-8.

EXPERIMENTAL VALUES (Continued)

Composition of saturated solutions at 25°C

$LiIO_3$ mass %	$LiIO_3$ mol % (compiler)	LiOH mass %	LiOH mol % (compiler)	KIO_3 mass %	KIO_3 mol % (compiler)	KOH mass %	KOH mol % (compiler)	Nature of the solid phase
39.89	6.177	-	-	0.09	0.012	-	-	A+E
24.64	3.165	0.52	0.51	0.60	0.065	-	-	"
20.18	2.479	0.84	0.78	1.04	0.109	-	-	"
15.43	1.820	1.31	1.17	1.97	0.197	-	-	"
10.91	1.250	1.68	1.46	3.56	0.346	-	-	"
8.64	0.982	2.01	1.73	4.93	0.476	-	-	"
3.28	0.364	3.99	3.36	7.33	0.691	-	-	"
3.19	0.354	4.05	3.41	7.44	0.701	-	-	A+B+E
14.16	1.700	-	-	5.18	0.529	-	-	"
7.92	0.905	0.56	0.49	6.57	0.638	-	-	B+E
7.92	0.910	1.34	1.17	6.84	0.667	-	-	"
3.78	0.424	2.73	2.32	8.21	0.782	-	-	"
3.67	0.409	3.62	3.06	7.44	0.704	-	-	"
2.35	0.260	4.49	3.77	7.88	0.741	-	-	"
2.09	0.231	4.94	4.14	7.72	0.724	-	-	A+B
1.46	0.160	5.51	4.60	7.83	0.731	-	-	"
0.12	0.013	6.24	5.19	8.54	0.794	-	-	"
-	-	2.99	2.45	8.08	0.741	0.01	0.003	"
-	-	7.49	6.19	7.52	0.695	0.27	0.095	"
-	-	8.21	6.77	7.28	0.672	0.20	0.070	"
-	-	8.49	7.00	6.96	0.642	0.47	0.17	"
-	-	9.48	7.78	6.08	0.559	0.69	0.24	"
-	-	9.66	7.95	6.22	0.573	0.76	0.27	A+B+D
-	-	9.97	8.24	6.53	0.604	0.73	0.26	"
-	-	9.87	8.13	6.22	0.574	0.85	0.30	"
26.98	3.612	6.86	6.97	-	-	-	-	"
25.26	3.315	6.94	6.92	0.04	0.004	0	0	A+F
23.54	3.102	7.48	7.48	1.92	0.215	-	-	"
20.15	2.491	6.67	6.26	0.05	0.005	-	-	"
18.60	2.273	8.15	7.56	0.16	0.017	-	-	"
9.48	1.11	9.28	8.25	4.93	0.490	-	-	A+F
10.15	1.137	9.46	8.04	0.05	0.005	-	-	A+D+F
13.63	1.585	9.77	8.63	0.11	0.011	-	-	"

(continued)

COMPONENTS:

(1) Lithium iodate; $LiIO_3$; [13765-03-2]

(2) Lithium hydroxide; LiOH; [1310-65-2]

(3) Potassium iodate; KIO_3; [7758-05-6]

(4) Potassium hydroxide; KOH; [1310-58-3]

(5) Water; H_2O; [7732-18-5]

ORIGINAL MEASUREMENTS:

Vinogradov, E.E.; Lepeshkov, I.N.; Tarasova, G.N.

Zh. Neorg. Khim. 1978, 23, 3360-5; *Russ. J. Inorg. Chem.* (*Engl. Transl.*) 1978, 23, 1865-8.

EXPERIMENTAL VALUES: (Continued)

Composition of saturated solutions at 25°C

$LiIO_3$ mass %	$LiIO_3$ mol % (compiler)	LiOH mass %	LiOH mol % (compiler)	KIO_3 mass %	KIO_3 mol % (compiler)	KOH mass %	KOH mol % (compiler)	Nature of the solid phase
11.95	1.361	9.13	7.90	-	-	-	-	D+F
7.28	0.803	8.21	6.87	1.71	0.160	-	-	"
1.39	0.151	10.01	8.242	5.36	0.494	-	-	"
2.08	0.226	8.66	7.15	5.25	0.485	-	-	"
1.05	0.114	9.77	8.09	6.29	0.583	-	-	"
-	-	10.87	9.007	6.86	0.636	0.36	0.13	"
-	-	9.56	7.71	2.78	0.251	2.64	0.909	B+D
-	-	8.14	6.62	4.01	0.365	2.71	0.941	"
-	-	8.21	6.68	2.50	0.230	4.79	1.66	"
-	-	7.56	6.24	1.70	0.157	8.02	2.83	"
-	-	6.35	5.36	1.11	0.105	12.22	4.403	"
-	-	5.93	5.02	1.05	0.0995	12.81	4.628	"
-	-	3.07	2.67	0.98	0.095	17.40	6.457	"
-	-	1.83	1.66	0.04	0.004	24.36	9.427	"
-	-	2.59	2.99	0.27	0.035	50.04	24.67	"
-	-	1.83	1.91	0.02	0.002	40.66	18.15	"
-	-	1.62	1.69	0.02	0.002	40.75	18.19	"
-	-	1.35	1.58	0.27	0.035	51.81	25.89	"
-	-	1.28	1.49	0.40	0.052	51.01	25.32	"
-	-	1.24	1.46	0.28	0.037	52.27	26.24	"
-	-	-	-	0.26	0.033	49.02	23.68	"
-	-	0.97	1.03	0.01	0.001	42.53	19.27	"
-	-	0.96	1.04	0.31	0.038	44.06	20.34	"
-	-	0.55	0.70	-	-	60.18	32.75	C+D
-	-	11.10	8.586	-	-	-	-	D
-	-	-	-	-	-	54.23	27.56	C
-	-	-	-	-	-	-	-	A
43.82	7.173	-	-	8.39	0.765	-	-	B

[a] A = $LiIO_3$; B = KIO_3; C = $KOH.2H_2O$; D = $LiOH.H_2O$; E = $KIO_3.2LiIO_3$; F = $mLiIO_3.nLiOH.H_2O$.