COMPONENTS:	EVALUATOR.
1. Sodium selenite; Na_2SeO_3; [10102-18-8]	Mary R. Masson, Dept. of Chemistry, University of Aberdeen, Meston Walk, Old Aberdeen, AB9 2UE, Scotland, UK.
2. Water; H_2O; [7732-18-5]	June 1984.

CRITICAL EVALUATION:

The binary system sodium selenite - water was studied by Janickis (1,2), and data are also available from studies of ternary systems (3 - 7). The data are all in reasonable agreement, apart from one or two points, which were rejected before final regression equations were derived. There are four equations, corresponding to the equilibria with the four possible solid phases, ice, $Na_2SeO_3.8H_2O$ [41292-05-1], $Na_2SeO_3.5H_2O$ [26970-82-1], and Na_2SeO_3.

The equations are (1) for 253 - 273 K, solid phase ice:

$$(T - 273.15) = 0.0659 - 0.343y + 0.0115y^2 - 0.000419y^3 \qquad s = 0.116 \text{ (8 pts)}$$

or

$$y = -0.199 - 4.33(T - 273.2) - 0.165(T - 273.2)^2 - 0.00227(T - 273.2)^3 \qquad s = 0.140 \text{ (9 pts)}$$

(2) for 253 - 264 K, solid phase $Na_2SeO_3.8H_2O$:

$$y = 48.2 + 0.821(T - 273.2) + 0.0176(T - 173.2)^2 \qquad s = 0.188 \text{ (5 pts)}$$

(3) for 253 - 310 K, solid phase $Na_2SeO_3.5H_2O$:

$$y = 43.2 + 0.108(T - 273.2) + 0.00205(T - 273.2)^2 \qquad s = 0.148 \text{ (20 pts)}$$

and (4) for 310 - 373 K, solid phase Na_2SeO_3:

$$y = 54.0 - 0.133(T - 273.2) + 0.000483(T - 273.2)^2 \qquad s = 0.207 \text{ (14 pts)}$$

where $y = 100w$ is the solubility expressed in mass % of Na_2SeO_3, T is the temperature in K, and s is the standard deviation of the dependent variable about the regression line.

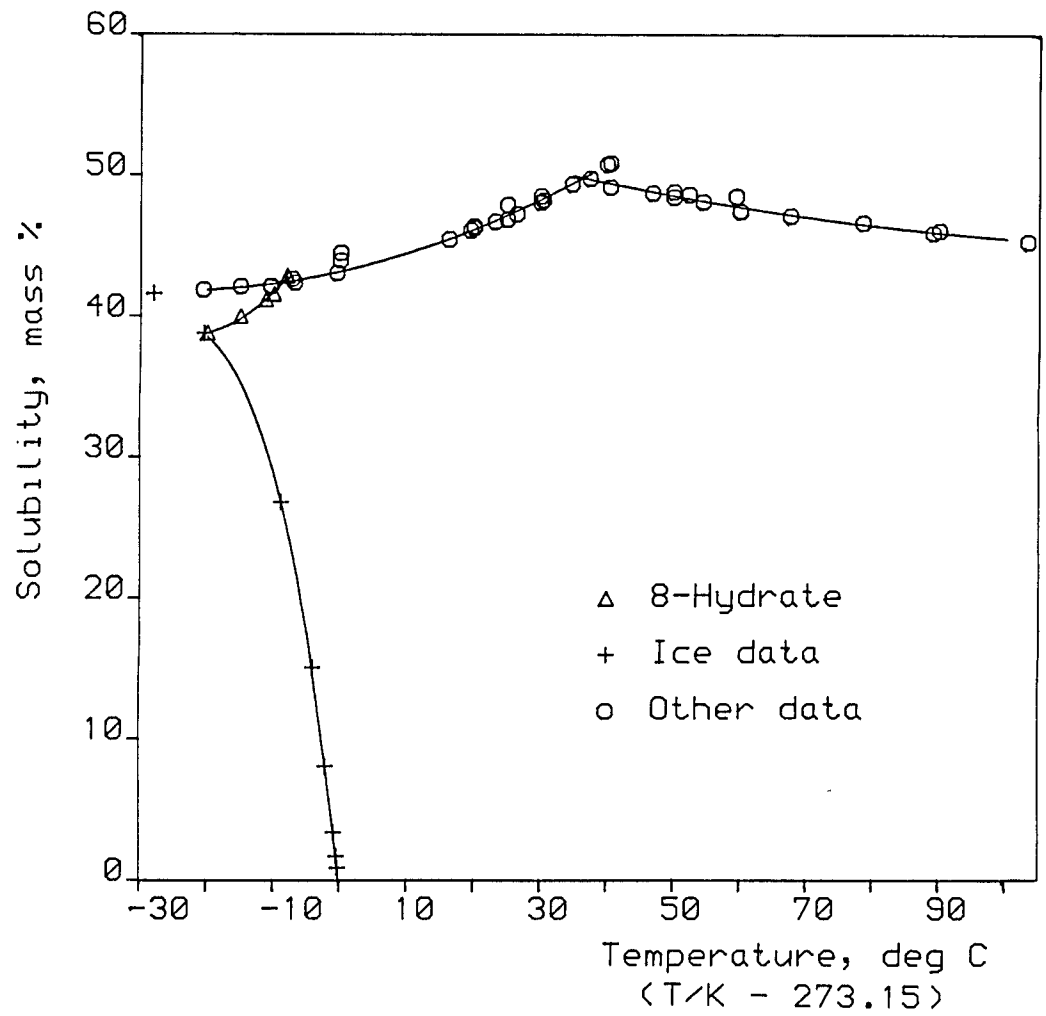
TENTATIVE SOLUBILITIES

The following tentative solubility values for Na_2SeO_3 in water were calculated from equations (3) and (4).

COMPONENTS:	EVALUATOR:
1. Sodium selenite; Na_2SeO_3; [10102-18-8]	Mary R. Masson, Dept. of Chemistry, University of Aberdeen, Meston Walk, Old Aberdeen, AB9 2UE, Scotland, UK.
2. Water; H_2O; [7732-18-5]	June 1984.

CRITICAL EVALUATION: (continued)

T/K	Solubility	
	mass %	molality, mol/kg
253.2	41.8	4.15
263.2	42.3	4.24
273.2	43.2	4.40
283.2	44.5	4.64
293.2	46.1	4.95
298.2	47.1	5.15
303.2	48.3	5.40
308.2	49.5	5.67
313.2	49.5	5.67
323.2	48.6	5.47
333.2	47.8	5.29
343.2	47.1	5.15
353.2	46.5	5.03
363.2	45.9	4.91
373.2	45.5	4.83



COMPONENTS:	EVALUATOR:
1. Sodium selenite; Na_2SeO_3; [10102-18-8]	Mary R. Masson, Dept. of Chemistry, University of Aberdeen, Meston Walk, Old Aberdeen, AB9 2UE, Scotland, UK.
2. Water; H_2O; [7732-18-5]	June 1984.

CRITICAL EVALUATION: (continued)

TERNARY SYSTEMS

The ternary systems involving solium sulfite (3), ethanol (4), sodium selenate (5), sodium carbonate (6) and sodium tellurite (7) are all straightforward systems, and the data appear to be reasonably reliable. In the system involving selenious acid (8) three double salts were observed:

$Na_2SeO_3.7H_2SeO_3$	[15855-80-8]	$(NaH_7(SeO_3)_4)$
$Na_2SeO_3.3H_2SeO_3$	[14013-56-0]	$(NaH_3(SeO_3)_2)$
$Na_2SeO_3.H_2SeO_3$	[7782-82-3]	$(NaHSeO_3)$

The data for the system SeO_2-NaOH-H_2O (9) do not appear to be very reliable, as can be seen from the random nature of the tie-lines in the computer diagram. Also, the data do not appear to support the conclusions reached by the authors.

REFERENCES

1. Janitzki, J. *Z. Anorg. Allgem. Chem.* 1932, *205*, 49.
2. Janickis, J.; Gutmanaite, H. *Z. Anorg. Allgem. Chem.* 1936, *225*, 1.
3. Klebanov, G.S.; Ostapkevich, N.A. *Zh. Priklad. Khim.* 1966, *39*, 2467; **J. Appl. Chem. USSR (Eng. Transl.)* 1966, *39*, 2315.
4. Klebanov, G.S.; Ostapkevich, N.A. *Zh. Priklad. Khim.* 1966, *39*, 1435; **J. Appl. Chem. USSR (Eng. Transl.)* 1966, *39*, 1342.
5. Yanitskii, I.V.; Patkausas, R.M. *Zh. Priklad. Khim.* 1970, *43*, 522; **J. Appl. Chem. USSR (Eng. Transl.)* 1970, *43*, 530.
6. Chimboulev, M.T.; Vassilev, H. *Dokl. Bolg. Akad. Nauk* 1973, *26*, 1509.
7. Chimbulev, M.; Vasilev, Kh. *God. Vissh. Khim.-Tekhnol. Inst. Sofia*, 1977, *22*, 247.
8. Sabbah, R.; Périnet, G. *J. Chim. Phys.* 1965, *62*, 929.
9. Rustamov, P.G.; Mardakhaev, B.N. *Azerb. Khim. Zh.* 1963, 131.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium selenite; Na_2SeO_3; [10102-18-8]	Janitzki, J.
2. Water; H_2O; [7732-18-5]	*Z. Anorg. Allgem. Chem.* 1932, *205*, 49-75.
VARIABLES:	PREPARED BY:
Temperature: 253 - 376 K	Mary R. Masson

EXPERIMENTAL VALUES: Composition of saturated solutions

t/°C	Na_2SeO_3 mass %	Na_2SeO_3[a] mol/kg	Solid[b] phase
-20.0	38.81	3.667	C
-15.0	40.00	3.855	C
-11.2	41.20	4.052	C
-10.0	41.58	4.116	C
- 8.0	42.90	4.344	C
-20.6	41.88	4.167	B
-15.0	42.11	4.206	B
-10.4	42.15	4.213	B
-10.5	42.13	4.210	B
- 7.2	42.65	4.300	B
- 6.8	42.40	4.256	B
- 0.5	43.09	4.378	B
+16.3	45.48	4.824	B
+19.5	46.12	4.950	B
+23.2	46.73	5.072	B
+26.4	47.28	5.186	B
+30.4	48.27	5.396	B
+34.7	49.40	5.645	B
+40.5	50.90	5.994	B
+37.4	49.79	5.734	A
+40.4	49.18	5.596	A
+46.8	48.76	5.502	A
+50.0	48.85*	5.522	A
+52.3	48.66*	5.481	A
+54.4	48.14	5.368	A
+59.4	48.54*	5.454	A

(continued on next page)

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

For each temperature, a saturated solution was prepared by stirring the salt in water inside a stoppered 4-cm diameter test-tube. Small samples of solution were removed at intervals for analysis, in order to test for attainment of equilibrium. The time required varied between 2½ and 19 hr. The solutions were analysed for SeO_2 by the method of Norris and Fay (1).

The solid phases were identified by analysis.

SOURCE AND PURITY OF MATERIALS:

ESTIMATED ERROR:

Temperature: -20 - 0°C ±0.2°C
0 - 60°C ±0.1°C
60 - 110°C ±0.3°C

REFERENCES:

1. Norris, J.F.; Fay, H. *Amer. Chem. J.* 1896, *18*, 703; 1900, *23*, 119.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium selenite; Na_2SeO_3; [10102-18-8]	Janitzki, J.
2. Water; H_2O; [7732-18-5]	*Z. Anorg. Allgem. Chem.* 1932, *205*, 49-75.

EXPERIMENTAL VALUES (continued):

t/°C	Na_2SeO_3 mass %	Na_2SeO_3[a] mol/kg	Solid[b] phase
+67.6	47.15	5.159	A
+78.5	46.67	5.060	A
+89.1	45.93	4.912	A
+103.3	45.30	4.789	A

[a] Molalities calculated by the compiler.

[b] Solids: A - Na_2SeO_3, B - $Na_2SeO_3.5H_2O$, C - $Na_2SeO_3.8H_2O$

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium selenite; Na_2SeO_3; [10102-18-8]	Janickis, J.; Gutmanaite, H.
2. Water; H_2O; [7732-18-5]	*Z. Anorg. Allgem. Chem.* 1936, 227, 1 - 16.
VARIABLES:	PREPARED BY:
Temperature: 245 - 273 K	Mary R. Masson

EXPERIMENTAL VALUES:

Composition of equilibrium solutions

t/°C	Na_2SeO_3 mol/dm^3	Na_2SeO_3 mass %	Na_2SeO_3[a] mol/kg	Solid phase
-0.250	0.05	0.860	0.0501	ice
-0.468	0.1	1.706	0.1003	"
-0.890	0.2	3.361	0.2011	"
-2.075	0.5	8.05	0.506	"
-4.095	1	15.06	1.025	"
-8.885	2	26.79	2.115	"
-20.5	satd.	38.8	3.665	ice + $Na_2SeO_3.8H_2O$
-28.1	satd.	41.6	4.12	ice + $Na_2SeO_3.5H_2O$

[a] Molalities calculated by the compiler.

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

Freezing points of prepared solutions were measured by use of a Beckman-type apparatus (1). Determinations were repeated until the desired reproducibility was attained. Each reported value is the mean of at least three determinations.

SOURCE AND PURITY OF MATERIALS.

Sodium selenite was prepared by neutralization of selenious acid with sodium hydroxide.

ESTIMATED ERROR:

Temperature reproducibility 0.5%

REFERENCES:

1. Ostwald, W.; Luther, R. *Hand- und Hilfsbuch zur Ausfuhrung physikochemischer Messungen* 5th Ed., Akademische Verlag., Leipzig, 1931.

COMPONENTS:

1. Sodium selenite; Na_2SeO_3; [10102-18-8]
2. Sodium sulfite; Na_2SO_3; [7757-83-7]
3. Water; H_2O; [7732-18-5]

ORIGINAL MEASUREMENTS:

Klebanov, G.S.; Ostapkevich, N.A.

Zh. Priklad. Khim. 1966, *39*, 2467-2470; **J. Appl. Chem. USSR (Eng. Transl.)* 1966, *39*, 2315-8.

VARIABLES:

Composition
Temperature: 273 and 323 K

PREPARED BY:

Mary R. Masson

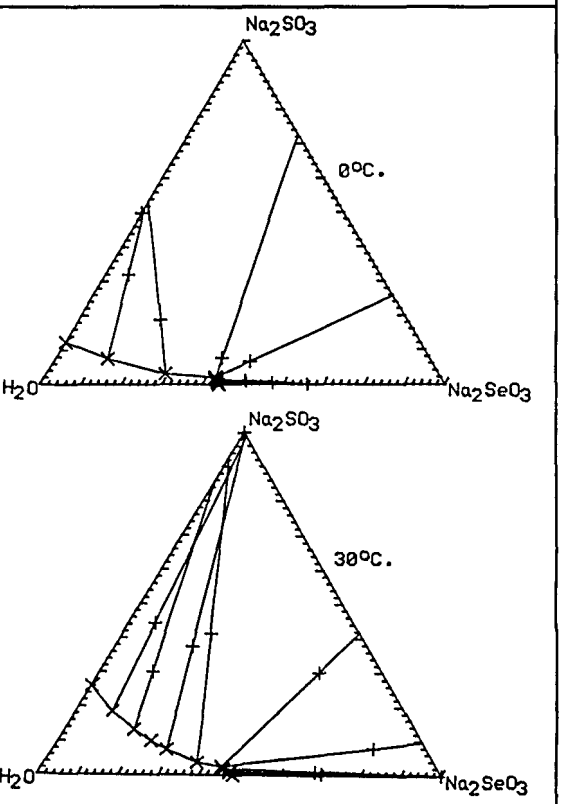
EXPERIMENTAL VALUES:

Composition of equilibrium solutions

Na_2SeO_3 mass %	Na_2SO_3 mass %	Na_2SeO_3[a] mol/kg	Na_2SO_3[a] mol/kg	Solid[b] phase
Temperature = 0°C				
43.95	-	4.534	0.	B
43.15	0.78	4.450	0.110	B
42.40	1.40	4.362	0.198	B
42.20	1.94	4.368	0.276	B + D
29.26	3.13	2.502	0.367	D
12.85	7.48	0.933	0.745	D
-	12.30	0.	1.113	D
Temperature = 50°C				
48.48	-	5.441	0.	A
47.20	0.73	5.242	0.111	A
45.13	1.65	4.903	0.246	A
44.41	2.28	4.817	0.339	A + C
37.73	3.58	3.717	0.484	C
28.10	7.45	2.521	0.917	C
22.90	10.01	1.974	1.184	C
17.00	13.21	1.409	1.502	C
9.02	18.50	0.720	2.025	C
-	25.91	0.	2.775	C

[a] Molalities calculated by the compiler.

[b] Solid phases: A - Na_2SeO_3, B - $Na_2SeO_3.5H_2O$, C - Na_2SO_3, D - $Na_2SO_3.7H_2O$



METHOD APPARATUS/PROCEDURE:

Mixtures of Na_2SeO_3 and Na_2SO_3 were dissolved isothermally in water contained in glass vessels with stirrers fitted with hydraulic seals. Trace amounts of p-phenylenediamine were added to the solutions to prevent aerial oxidation of sulfite. 0°C was maintained by melting ice, and 50°C with the aid of a contact thermometer and electromagnetic relay. Equilibrium was reached after 2 days at 0°C and 30 - 35 hr at 50°C.

The solutions were analysed for selenite and sulfite as follows. For sulfite, sodium bicarbonate and excess of 0.1*N* iodine solution were added, then the solution was acidified with acetic acid, and the excess of iodine was titrated with thiosulfate. For selenite, sulfite was bound with formaldehyde, the solution was acidified with HCl, and KI was added. The iodine liberated was titrated with thiosulfate.

The solid residues were also analysed. The compositions of the solid phases were determined by Schreinemakers' remainder method.

SOURCE AND PURITY OF MATERIALS:

Sodium sulfite was of analytical grade, and sodium selenite was of reagent grade.

ESTIMATED ERROR:

Temperature: ±0.1 K
Solubility: no estimate possible.

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium selenite; Na_2SeO_3; [10102-18-8] 2. Ethanol; C_2H_5OH; [64-17-5] 3. Water; H_2O; [7732-18-5]	Klebanov, G.S.; Ostapkevich, N.A. *Zh. Prikład. Khim.* 1966, *39*, 1435-7; *J. Appl. Chem. USSR (Eng. Transl.)* 1966, *39*, 1342-4.
VARIABLES: Ethanol concentration Temperatures: 293 and 323 K	PREPARED BY: Mary R. Masson

EXPERIMENTAL VALUES:

Initial		Upper layer			Lower layer				Solid[b]
C_2H_5OH	Na_2SeO_3	C_2H_5OH	Na_2SeO_3[a]	C_2H_5OH[a]	Na_2SeO_3	C_2H_5OH	Na_2SeO_3	C_2H_5OH[a]	phase
mass %	mass %	mass %	mol/kg	mol/kg	mass %	mass %	mol/kg	mol/kg	
Temperature = 20°C									
0.0	-	-	-	-	46.30	-	4.986	-	B
1.5		not enough sample			44.28	1.36	4.710	0.543	B
7.0	0.30	76.33	0.074	70.895	43.80	1.51	4.631	0.599	B
10.0	0.32	76.28	0.079	70.758	43.71	1.52	4.615	0.602	B
30.0	0.30	76.23	0.074	70.501	43.53	1.50	4.579	0.592	B
50.0	0.31	76.32	0.077	70.886	43.62	1.51	4.597	0.597	B
70.0	0.32	76.25	0.079	70.640	43.51	1.53	4.578	0.604	B
80.0	0.18	78.52	0.049	80.017	-	-	-	-	A
90.0	0.055	85.63	0.022	129.842	-	-	-	-	A
Temperature = 50°C									
0.0	-	-	-	-	48.48	-	5.441	-	A
3.0		not enough sample			48.10	0.44	5.405	0.186	A
10.0	0.24	78.37	0.065	79.528	46.36	1.23	5.115	0.509	A
30.0	0.23	78.39	0.062	79.586	46.37	1.24	5.118	0.514	A
50.0	0.23	78.36	0.062	79.444	46.35	1.22	5.112	0.505	A
70.0	0.23	78.40	0.062	79.633	46.37	1.21	5.115	0.501	A
80.0	0.16	79.15	0.045	83.037	-	-	-	-	A
90.0	0.04	86.42	0.017	138.541	-	-	-	-	A

[a] Molalities calculated by the compiler.

[b] Solid phases: A - Na_2SeO_3, B - $Na_2SeO_3.5H_2O$

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

Aqueous ethanolic solutions were saturated with sodium selenite at 20 and 50°C in glass vessels (100 - 150-ml), fitted with hydraulic seals at 20°C and with reflux condensers at 50°C. Equilibrium was reached after 16 - 28 hr.

Selenite in the solutions and moist solids was determined iodometrically after distillation from the samples.

SOURCE AND PURITY OF MATERIALS:

Reagent-grade sodium selenite was used. Ethanol and water were distilled twice.

ESTIMATED ERROR:

Temperature: ±0.1 K
Analyses: no estimate possible.

REFERENCES:

COMPONENTS:

1. Sodium selenite; Na_2SeO_3; [10102-18-8]
2. Sodium selenate; Na_2SeO_4; [13410-01-0]
3. Water; H_2O; [7732-18-5]

ORIGINAL MEASUREMENTS:

Yanitskii, I.V.; Patkauskas, R.M.

Zh. Priklad. Khim. 1970, *43*, 522-27; **J. Appl. Chem. USSR (Eng. Transl.)* 1970, *43*, 530-5.

VARIABLES:

Concentrations of components
Six temperatures: 273 - 333 K

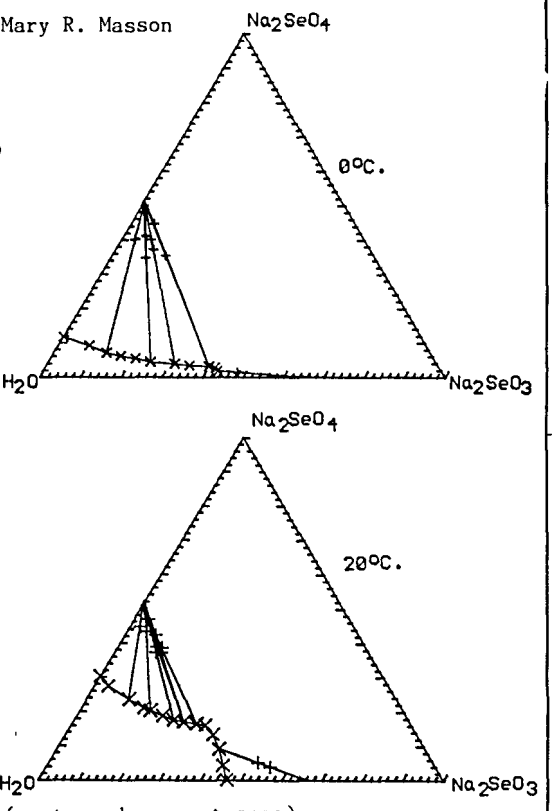
PREPARED BY:

Mary R. Masson

EXPERIMENTAL VALUES:

Composition of equilibrium solutions

Na_2SeO_3 mass %	Na_2SeO_4 mass %	Na_2SeO_3[a] mol/kg	Na_2SeO_4[a] mol/kg	Solid[b] phase
Temperature = 0°C				
-	11.7	0.	0.701	B
7.63	9.21	0.531	0.586	B
12.9	7.06	0.932	0.467	B
16.9	6.21	1.271	0.427	B
20.9	5.43	1.640	0.390	B
25.1	4.34	2.057	0.326	B
31.3	3.89	2.793	0.318	B
35.2	3.40	3.315	0.293	B
40.1	3.20	4.089	0.299	B
41.8	2.80	4.363	0.268	B + D
42.9	1.78	4.484	0.170	D
44.5	-			D
Temperature = 20°C				
-	30.3	0.	2.301	B
3.39	27.4	0.283	2.095	B
10.39	23.5	0.909	1.881	B
15.2	21.0	1.378	1.742	B
17.3	20.3	1.603	1.722	B
21.0	18.8	2.017	1.653	B
24.3	17.6	2.418	1.603	B
27.1	17.1	2.808	1.622	B
30.5	16.5	3.328	1.648	B
32.9	16.2	3.738	1.685	B + D



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AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

Saturated solutions were prepared in three-necked glass flasks fitted with thermometers and stirrers, which were kept immersed in a water thermostat. Equilibrium was reached after about 36 hr at 0°C, 6-10 hr at 20-40°C, and 10-15 hr at 60°C.

Samples for analysis were removed through the third neck by suction through a cotton plug into tubes. Selenite was determined iodometrically in the solution (1). Total selenium was determined after reduction of the solution as follows: the test solution was boiled gently under reflux for 20 min with 10 ml of satd. KBr and 10ml of 23% HCl solution. A few drops of satd. alcoholic acetanilide were added to remove residual free bromine. All the selenium was then present as selenite, and was determined as above. Selenate was then obtained by difference.

The solid phases were identified by Schreinemakers' method of residuals.

SOURCE AND PURITY OF MATERIALS:

Sodium selenite was prepared by neutralization of analytical grade selenious acid with carbonate-free analytical grade sodium hydroxide. Sodium selenate was prepared by electrolytic oxidation of concentrated selenite solution at a lead anode, at 25 mA/cm^2 current density.

ESTIMATED ERROR:

Temperature: ±0.1 K

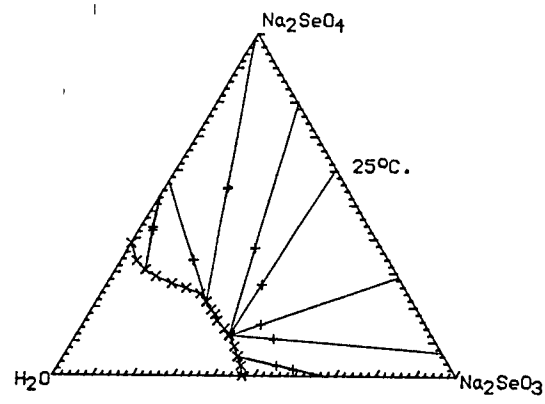
REFERENCES:

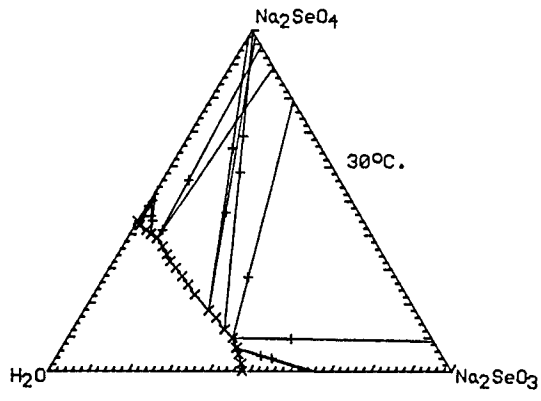
1. Yanitskii, I.V.; Zelionkaite, V.I.; Patsauskas, E.I. *Zh. Neorg. Khim.* 1957, 2, 1341.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium selenite; Na_2SeO_3; [10102-18-8]	Yanitskii, I.V.; Patkauskas, R.M.
2. Sodium selenate; Na_2SeO_4; [13410-01-0]	*Zh. Priklad. Khim.* 1970, *43*, 522-27; **J. Appl. Chem. USSR (Eng. Transl.)* 1970, *43*, 530-5.
3. Water; H_2O; [7732-18-5]	

EXPERIMENTAL VALUES (continued):

Na_2SeO_3 mass %	Na_2SeO_4 mass %	Na_2SeO_3[a] mol/kg	Na_2SeO_4[a] mol/kg	Solid[b] phase
Temperature = 20°C (continued)				
36.3	13.4	4.173	1.410	D
39.9	9.14	4.527	0.949	D
43.4	4.32	4.800	0.437	D
46.4	-	5.006	0.	D
Temperature = 25°C				
-	38.5	0.	3.313	B
3.88	33.4	0.358	2.818	B
7.28	30.8	0.680	2.633	B
10.9	28.9	1.047	2.541	B
15.9	26.9	1.607	2.489	B
20.1	25.6	2.140	2.495	B
24.5	23.9	2.745	2.451	A + B
27.2	21.5	3.066	2.218	A
29.5	19.2	3.325	1.981	A
31.2	17.9	3.544	1.861	A
32.6	16.1	3.675	1.661	A
35.4	13.8	4.068	1.443	A
37.8	11.8	4.337	1.239	A + D
40.7	8.58	4.640	0.895	D
42.9	5.73	4.829	0.590	D
45.1	3.02	5.027	0.308	D
46.9	-	5.107	0.	D
Temperature = 30°C				
-	44.0	0.	4.159	B
1.12	42.6	0.115	4.006	B
3.52	41.2	0.368	3.945	B
5.15	40.2	0.545	3.893	B
7.34	39.0	0.791	3.847	A + B
9.96	36.5	1.076	3.608	A
12.2	34.2	1.316	3.377	A
14.0	32.2	1.505	3.168	A
16.4	30.3	1.779	3.009	A
19.2	27.8	2.095	2.776	A
22.0	25.3	2.414	2.541	A
25.1	22.4	2.765	2.258	A
30.9	17.8	3.483	1.836	A
33.8	15.7	3.870	1.645	A
37.6	12.2	4.331	1.286	A
40.9	9.74	4.791	1.044	A + D
43.3	6.82	5.020	0.724	D
44.8	4.95	5.155	0.521	D
46.8	2.21	5.307	0.229	D
48.1	-	5.359	0.	D





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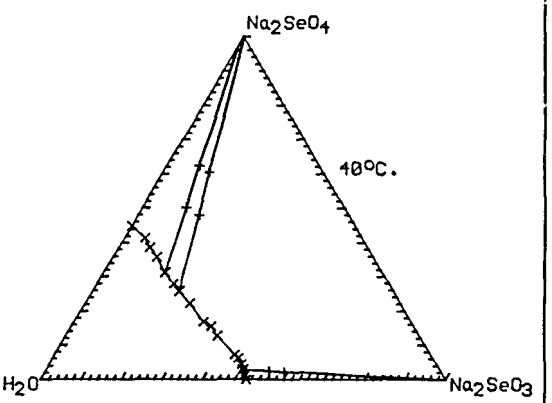
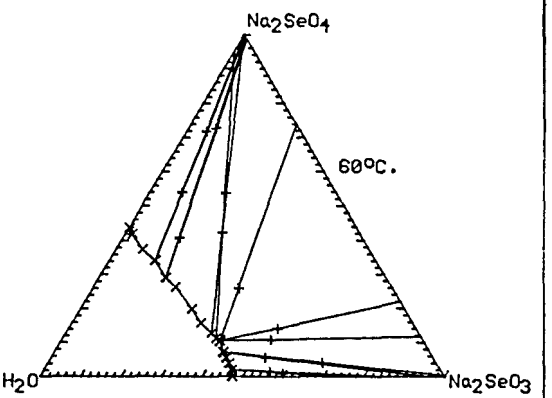
COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium selenite; Na_2SeO_3; [10102-18-8]	Yanitskii, I.V.; Patkauskas, R.M.
2. Sodium selenate; Na_2SeO_4; [13410-01-0]	*Zh. Priklad. Khim.* 1970, *43*, 522-27; **J. Appl. Chem. USSR (Eng. Transl.)* 1970, *43*, 530-5.
3. Water; H_2O; [7732-18-5]	

EXPERIMENTAL VALUES (continued):

Na_2SeO_3 mass %	Na_2SeO_4 mass %	Na_2SeO_3[a] mol/kg	Na_2SeO_4[a] mol/kg	Solid[b] phase
Temperature = 40°C				
-	44.9	0.	4.313	A
5.0	41.3	0.538	4.071	A
7.59	38.5	0.814	3.780	A
10.8	35.7	1.167	3.532	A
15.1	31.2	1.626	3.07[illegible]	A
18.9	27.9	2.054	2.776	A
21.3	25.7	2.324	2.566	A
25.7	22.3	2.858	2.270	A
31.9	16.9	3.603	1.747	A
34.5	15.6	3.998	1.655	A
37.4	12.7	4.334	1.347	A
44.5	7.17	5.324	0.785	A
45.9	6.15	5.535	0.679	A + C
47.5	4.36	5.705	0.479	C
48.5	2.77	5.755	0.301	C
49.7	1.23	5.857	0.133	C
50.8	-	5.970	0.	C
Temperature = 60°C				
-	43.8	0.	4.125	A
1.7	41.9	0.174	3.932	A
6.51	37.4	0.671	3.529	A
11.2	34.1	1.184	3.299	A
16.5	29.0	1.751	2.816	A
20.2	26.3	2.183	2.602	A
27.4	19.9	3.006	1.999	A
31.7	15.8	3.491	1.593	A
35.8	12.9	4.035	1.331	A
37.8	11.3	4.294	1.175	A
39.1	10.5	4.486	1.103	A + C
41.6	7.2	4.698	0.744	C
43.2	5.6	4.879	0.579	C
44.7	3.94	5.033	0.406	C
46.3	1.95	5.173	0.199	C
47.5	-	5.232	0.	





[a] Molalities calculated by the compiler.

[b] Solid phases: A - Na_2SeO_4, B - $Na_2SeO_4.10H_2O$, C - Na_2SeO_3, D - $Na_2SeO_3.5H_2O$

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium selenite; Na_2SeO_3; [10102-18-8] 2. Sodium carbonate; Na_2CO_3; [497-19-8] 3. Water; H_2O; [7732-18-5]	Chimboulev, M.T.; Vassilev, H. *Dokl. Bolg. Akad. Nauk* 1973, *26*, 1509-12.
VARIABLES: Composition Temperature: 303 - 363 K	PREPARED BY: Mary R. Masson

EXPERIMENTAL VALUES:

Composition of equilibrium solutions				
Na_2SeO_3 mass %	Na_2CO_3 mass %	Na_2SeO_3[a] mol/kg	Na_2CO_3[a] mol/kg	Solid[b] phase
Temperature = 30°C				
48.52	-	5.450	0.	B
45.68	3.27	5.174	0.604	B
43.10	6.03	4.899	1.118	B + C
40.83	7.14	4.538	1.295	C
37.17	8.62	3.965	1.500	C
31.94	11.87	3.287	1.993	C
28.63	14.71	2.922	2.449	C
26.55	16.10	2.677	2.649	C + D
24.26	16.33	2.361	2.593	D
18.74	19.15	1.745	2.909	D
14.06	21.90	1.270	3.226	D
10.21	24.46	0.904	3.532	D
8.5[c]	25.5	0.745	3.645	D + E
6.82	26.23	0.589	3.696	E
3.58	26.97	0.298	3.664	E
-	28.14	0.	3.695	E

[a] Molalities calculated by the compiler.

[b] Solid phases: A - Na_2SeO_3, B - $Na_2SeO_3.5H_2O$, C - $Na_2CO_3.H_2O$, D - $Na_2CO_3.7H_2O$, E - $Na_2CO_3.10H_2O$

[c] The values for this point were obtained by extrapolation.

(continued on next page)

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

Mixtures of twice recrystallized $Na_2SeO_3.5H_2O$ and $Na_2CO_3.10H_2O$ were dissolved isothermally in distilled water by continuous stirring in a glass vessel fitted with a hydraulic lock until equilibrium was reached (24 - 36 hr). Two weighed samples of the liquid phase were analysed for selenite gravimetrically (as zinc uranyl acetate).

The "bottom phase" (solid plus contaminating liquid) was also analysed for each point: the results are tabulated in the source. The compositions of the phases were determined by Schreinemakers' remainder method. The identities were confirmed by X-ray powder diffraction.

SOURCE AND PURITY OF MATERIALS:

Not stated.

ESTIMATED ERROR:

ESTIMATED ERROR:

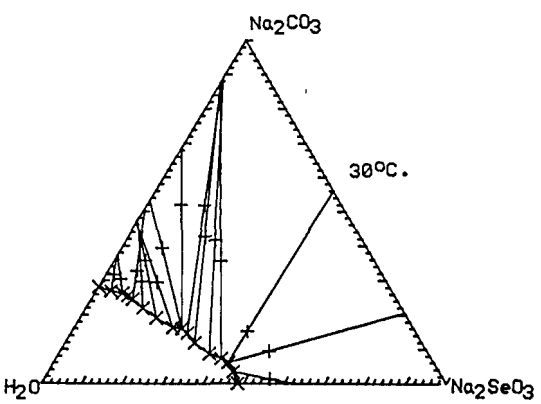
Not stated, and no estimate possible from data available.

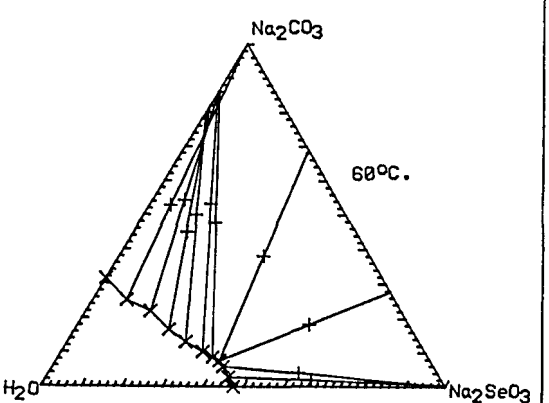
REFERENCES:

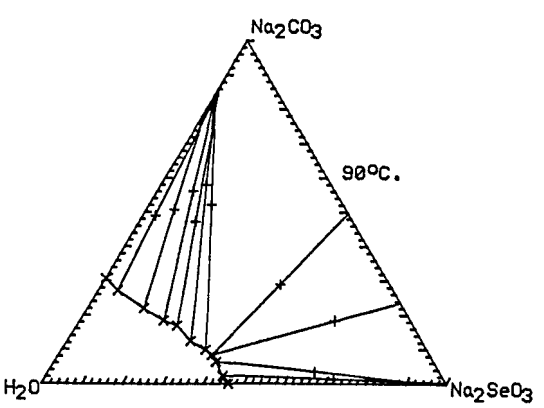
COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium selenite; Na_2SeO_3; [10102-18-8]	Chimboulev, M.T.; Vassilev, H.
2. Sodium carbonate; Na_2CO_3; [497-19-8]	*Dokl. Bolg. Akad. Nauk* 1973, *26*, 1509-12.
3. Water; H_2O; [7732-18-5]	

EXPERIMENTAL VALUES (continued):

Composition of equilibrium solutions				
Na_2SeO_3 mass %	Na_2CO_3 mass %	Na_2SeO_3[a] mol/kg	Na_2CO_3[a] mol/kg	Solid[b] phase
Temperature = 60°C				
47.45	-	5.221	0.	A
44.80	2.74	4.938	0.493	A
41.93	5.80	4.638	1.047	A
40.19	7.43	4.437	1.338	A + C
38.02	8.51	4.112	1.502	C
34.79	10.12	3.652	1.733	C
29.10	13.07	2.910	2.132	C
23.17	16.69	2.228	2.618	C
15.85	21.94	1.473	3.327	C
8.32	25.18	0.723	3.572	C
-	31.42	0.	4.323	C
Temperature = 90°C				
46.10	-	4.946	0.	A
43.58	2.21	4.648	0.385	A
39.86	6.37	4.286	1.118	A
37.82	8.35	4.063	1.464	A + C
35.42	9.92	3.747	1.712	C
30.38	12.46	3.073	2.057	C
24.67	16.93	2.443	2.735	C
20.55	18.41	1.947	2.846	C
13.83	21.90	1.244	3.215	C
4.69	27.12	0.398	3.752	C
-	30.65	0.	4.170	C







COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium selenite; Na_2SeO_3; [10102-18-8] 2. Sodium tellurite; Na_2TeO_3; [10102-20-2] 3. Water; H_2O; [7732-18-5]	Chimbulev, M.; Vasilev, Kh. *God. Vissh. Khim.-Tekhnol. Inst., Sofia* 1977, 22, 247-254.
VARIABLES: Concentrations of Na_2SeO_3 and Na_2TeO_3 Temperature: 303, 333 and 363 K	PREPARED BY: Mary R. Masson

EXPERIMENTAL VALUES:

Composition of equilibrium solutions

Na_2SeO_3 mass %	Na_2TeO_3 mass %	Na_2SeO_3[a] mol/kg	Na_2TeO_3[a] mol/kg	Solid[b] phase
Temperature = 30°C				
48.52	-	5.450	0.	B
44.71	4.05	5.045	0.357	B
39.15	11.10	4.550	1.007	B
33.78	18.12	4.061	1.700	B
31.16	20.83	3.753	1.958	B + D
29.43	22.59	3.547	2.125	D
22.55	28.30	2.653	2.599	D
14.10	33.97	1.570	2.952	D
5.95	41.35	0.653	3.541	D
-	46.23	0.	3.880	D

[a] Molalities calculated by the compiler.

[b] Solid phases: A - Na_2SeO_3, B - $Na_2SeO_3.5H_2O$
C - Na_2TeO_3, D - $Na_2TeO_3.5H_2O$.

(continued on next page)

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

Mixtures of $Na_2SeO_3.5H_2O$ and $Na_2TeO_3.5H_2O$ were dissolved isothermally in distilled water by continuous stirring, until equilibrium was reached after 24 - 36 hr. Samples of the liquid phase were analysed for selenium and tellurium as described in (1).

The "bottom phase" (solid plus contaminating liquid) was also analysed for each point: the results are given in the source. The compositions of the solid phases were determined by Schreinemakers' remainder method. The identities were confirmed by X-ray powder diffraction.

SOURCE AND PURITY OF MATERIALS:

Not stated.

ESTIMATED ERROR:

Not stated, and no estimate possible from data available.

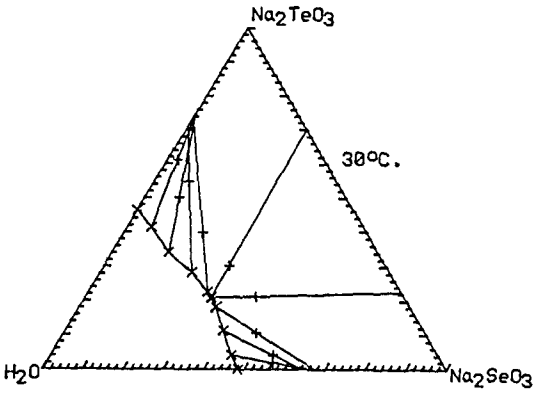
REFERENCES:

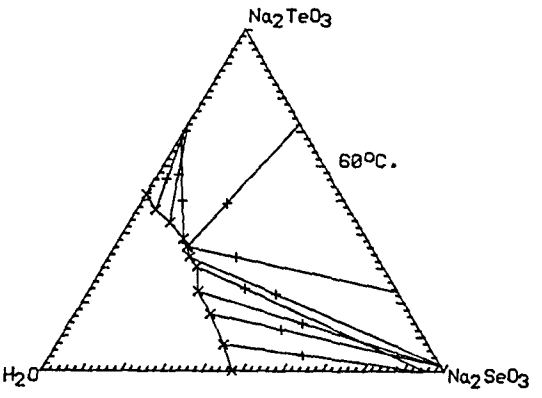
1. Knyazeva, R.N.; Florinskaya, A.A.; Lastukhinaya, Zh.Ya. *Metody opredeleniya i analiza redikh elementov*, Izd.-vo Akademii Nauk SSSR, Moskva, 1961, p.605.

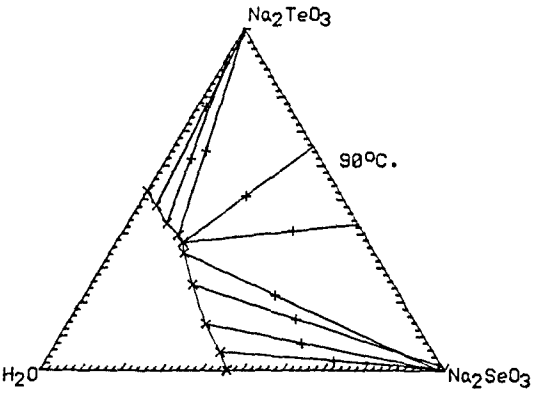
COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium selenite; Na_2SeO_3; [10102-18-8]	Chimbulev, M.; Vasilev, Kh.
2. Sodium tellurite; Na_2TeO_3; [10102-20-2]	*God. Vissh. Khim.-Tekhnol. Inst., Sofia* 1977, 22, 247-254.
3. Water; H_2O; [7732-18-5]	

EXPERIMENTAL VALUES (continued):

Na_2SeO_3 mass %	Na_2TeO_3 mass %	Na_2SeO_3[a] mol/kg	Na_2TeO_3[a] mol/kg	Solid[b] phase
Temperature = 60°C				
47.45	-	5.221	0.	A
41.38	7.73	4.702	0.686	A
33.61	16.68	3.910	1.514	A
27.15	23.30	3.168	2.122	A
23.26	30.52	2.910	2.980	A
20.05	33.28	2.484	3.218	A
17.95	36.20	2.264	3.563	A + D
15.80	38.54	2.001	3.809	D
9.97	43.31	1.234	4.184	D
4.64	47.10	0.556	4.405	D
-	51.68	0.	4.827	D
Temperature = 90°C				
46.10	-	4.946	0.	A
41.76	5.52	4.580	0.473	A
34.22	13.61	3.793	1.177	A
25.08	25.04	2.907	2.266	A
18.41	34.35	2.253	3.282	A
16.53	37.48	2.078	3.678	A + C
14.19	39.62	1.776	3.871	C
9.57	43.15	1.170	4.119	C
4.34	48.31	0.530	4.605	C
-	52.48	0.	4.984	C







COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium selenite; Na_2SeO_3; [10102-18-8] 2. Selenious acid; H_2SeO_3; [7783-00-8] 3. Water; H_2O; [7732-18-5]	Sabbah, R.; Périnet, G. *J. Chim. Phys.* 1965, *62*, 929-36.
VARIABLES: Concentrations of the components Temperature: 298 K	**PREPARED BY:** Mary R. Masson

EXPERIMENTAL VALUES:

Composition of equilibrium solutions, mol/1000 g of solution, at 25°C

Na/Se	H_2SeO_3 total	H_2SeO_3 free	Na_2SeO_3	Solid[a] phase
0.0	6.23	6.23	0.0	A
0.047	6.37	6.22	0.15	A
0.072	6.39	6.16	0.23	A
0.080	6.43	6.17	0.26	A + B
0.089	6.38	6.10	0.28	B
0.111	6.29	5.94	0.35	B
0.131	6.17	5.76	0.41	B
0.152	6.00	5.54	0.46	B + C
0.156	5.89	5.42	0.47	C
0.256	5.08	4.42	0.66	C
0.398	4.29	3.43	0.86	C
0.502	3.98	2.98	1.00	C
0.642	3.76	2.55	1.21	C
0.848	4.10	2.36	1.74	C
0.906	4.50	2.46	2.04	C + D
0.930	4.54	2.43	2.11	D
1.08	4.30	2.13	2.17	D
1.22	4.18	1.62	2.56	D
1.28	4.16	1.50	2.66	D
1.35	4.24	1.40	2.84	D + E
1.41	4.01	1.19	2.82	E
1.44	3.91	1.10	2.81	E
1.65	3.35	0.59	2.76	F
1.94	2.86	0.09	2.77	F

[a]Solid phases:

A - H_2SeO_3

B - $Na_2SeO_3.7H_2SeO_3$

C - $Na_2SeO_3.3H_2SeO_3$

D - $Na_2SeO_3.H_2SeO_3$

E - Na_2SeO_3

F - $Na_2SeO_3.5H_2O$

(continued on next page)

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

A series of solutions of differing extents of neutralization of selenious acid were kept until crystals formed. The mixture of crystals and saturated solution was placed in a conical flask, which was sealed and then agitated in a thermostat at 25°C for three days. The solutions were analysed by potentiometric titration with hydrochloric acid or sodium hydroxide solution.

The solids were identified and characterized by thermogravimetry, differential thermal analysis, and X-ray diffraction.

SOURCE AND PURITY OF MATERIALS:

Water was distilled and demineralized. Its final conductivity at 25°C was about 2×10^{-5} $ohm^{-1}m^{-1}$.

Selenious acid (Fluka) was found by analysis to be 99.6% pure.

Hydrochloric acid and sodium hydroxide were 99.9% pure.

ESTIMATED ERROR:

Temperature: ±0.05 K

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium selenite; Na_2SeO_3; [10102-18-8]	Sabbah, R.; Périnet, G.
2. Selenious acid; H_2SeO_3; [7783-00-8]	*J. Chim. Phys.* 1965, *62*, 929-36.
3. Water; H_2O; [7732-18-5]	

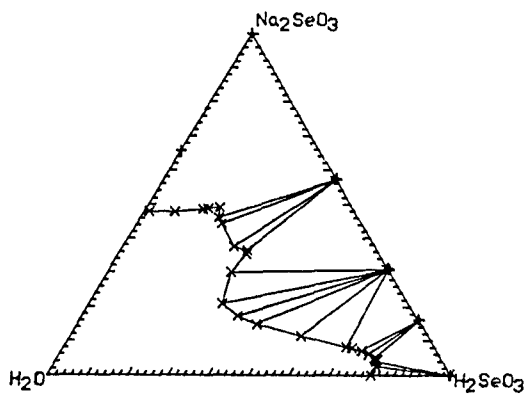
EXPERIMENTAL VALUES (continued):

Compositions of solutions expressed in units of mass % and mol/kg

H_2SeO_3[b] mass %	Na_2SeO_3[b] mass %	H_2SeO_3[c] mol/kg	Na_2SeO_3[c] mol/kg
80.355	0.	31.712	0.
80.226	2.594	36.204	0.873
79.452	3.978	37.174	1.388
79.581	4.496	38.749	1.633
78.678	4.842	37.015	1.699
76.614	6.053	34.270	2.019
74.292	7.091	30.939	2.202
71.455	7.955	26.906	2.234
69.907	8.128	24.676	2.140
57.009	11.414	13.998	2.090
44.240	14.873	8.389	2.103
38.436	17.294	6.731	2.259
32.890	20.926	5.521	2.620
30.439	30.092	5.979	4.409
31.729	35.280	7.457	6.183
31.342	36.490	7.554	6.559
27.473	37.528	6.086	6.200
20.895	44.273	4.651	7.349
19.347	46.002	4.329	7.677
18.057	49.115	4.265	8.651
15.349	48.769	3.316	7.859
14.188	48.596	2.956	7.551
7.610	47.731	1.321	6.180
1.161	47.904	0.177	5.438

[b] Mass % values calculated by the compiler.

[c] Molalities calculated by the compiler.



COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Selenium dioxide; SeO_2; [7446-08-4] 2. Sodium hydroxide; NaOH; [1310-73-2] 3. Water; H_2O; [7732-18-5]	Rustamov, P.G.; Mardakhaev, B.N. *Azerb. Khim. Zh.* 1963, 131-40.
VARIABLES: Concentrations of the components Temperature: 298 K	**PREPARED BY:** Mary R. Masson

EXPERIMENTAL VALUES:

Composition of equilibrium solutions at 25°C

Na_2O mass %	SeO_2 mass %	H_2O mass %	Na_2O[a] mol/kg	SeO_2[a] mol/kg	Solid[b] phase
-	74.04	25.96	0.	25.704	A
1.61	70.04	28.35	0.916	22.265	A
1.61	70.02	28.37	0.916	22.243	A
1.86	68.70	29.44	1.019	21.031	A
3.11	65.70	31.19	1.609	18.984	A
3.72	63.80	32.48	1.848	17.703	A
4.19	64.10	31.71	2.132	18.218	A
3.95	62.10	33.95	1.877	16.485	A + B
3.44	62.74	33.82	1.641	16.719	A + B
5.56	46.50	47.94	1.871	8.742	B
6.51	42.30	51.19	2.052	7.447	B
7.86	36.10	56.04	2.263	5.806	B
10.15	41.16	48.69	3.363	7.618	B
12.87	44.10	43.03	4.826	9.236	B
4.35	52.70	42.95[c]	1.634	11.058	B + C
12.03	40.12	47.85	4.056	7.556	C
15.97	47.90	36.13	7.132	11.948	C
17.64	28.10	54.26[c]	5.245	4.667	C

(continued on next page)

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
An isothermal dissolution technique. Equilibrium took 6 - 12 hr to be reached. Solid phases were identified by Schreinemakers' method and by microscopy. Compiler's note: some of the data were illegible even in the original journal, and there were some obvious errors, which could be corrected (points marked "c"). Some other sets of data do not add up to 100%, but there is no way to tell which figure is in error (points marked "d").	ESTIMATED ERROR: Temperature: ±0.02 K Analyses: no estimates possible. REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Selenium dioxide; SeO_2; [7446-08-4]	Rustamov, P.G.; Mardakhaev, B.N.
2. Sodium hydroxide; NaOH; [1310-73-2]	*Azerb. Khim. Zh.* 1963, 131-40.
3. Water; H_2O; [7732-18-5]	

EXPERIMENTAL VALUES (continued):

Na_2O mass %	SeO_2 mass %	H_2O mass %	Na_2O[a] mol/kg	SeO_2[a] mol/kg	Solid[b] phase
19.49	26.28	54.23	5.799	4.367	C
19.48	22.38	58.14	5.406	3.469	C
21.05	13.15	65.15[d]	5.161	1.801	C
19.44	9.21	71.35	4.396	1.163	?
20.17	8.60	71.23	4.569	1.088	?
21.79	8.95	69.26	5.076	1.165	?
23.17	8.72	68.11[c]	5.489	1.154	?
23.73	6.99	69.28	5.526	0.909	?
23.18	6.04	70.78	5.284	0.769	D
25.20	3.30	72.50[d]	5.686	0.416	D
27.52	2.03	70.45	6.303	0.260	D
29.84	0.82	69.34	6.943	0.107	D
30.54	0.47	68.99	7.142	0.061	D
34.39	0.47	65.14	8.518	0.065	D
38.03	0.34	61.63	9.956	0.050	D
40.59	0.59	58.82	11.134	0.090	D + E
40.35	0.60	59.05[c]	11.025	0.092	D + E
41.05	-	59.95	11.235	0.	E

Compiler's note: the computer plot for this system shows little resemblance to the diagram given in the paper, even when drawn in units of mol %, as in the paper. The diagram included here is drawn in the more usual mass % units, which show the system more clearly. The conclusions made by the authors as to the solid phases present seem rather dubious.

[a] Molalities calculated by the compiler.

[b] Solid phases: A - H_2SeO_3; B - $Na_2Se_4O_9.5H_2O$; C - $Na_2Se_2O_5.5H_2O$; D - $Na_2SeO_3.5H_2O$; E - $NaOH.H_2O$