COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7] 2. Sodium sulfate; Na_2SO_4; [7757-82-6] 3. Water; H_2O; [7732-18-5]	Durymanova, M.A.; Telepneva, A.E. *Zh. Prikład. Khim.* 1972, 45, 1610-12; *J. Appl. Chem. USSR (Eng. Transl.)* 1972, 45, 1680-2.
VARIABLES: Concentrations of the components One temperature: 373 K	PREPARED BY: Mary R. Masson

EXPERIMENTAL VALUES: Composition of equilibrium solutions at 100°C

Na_2SO_3 mass %	Na_2SO_4 mass %	Na_2SO_3[a] mol/kg	Na_2SO_4[a] mol/kg	Solid[b] phase
20.8	-	2.084	0.	A
19.4	3.4	1.994	0.310	B
19.4	3.7	2.002	0.339	B
19.2	4.2	1.989	0.386	B
18.4	6.4	1.941	0.599	B
18.0	6.5	1.892	0.606	B
17.5	8.6	1.879	0.819	B
16.9	8.4	1.795	0.792	B
15.9	11.0	1.726	1.059	B
15.5	12.5	1.708	1.222	B
15.5	11.3	1.680	1.087	B
15.3	12.0	1.670	1.162	B
15.2	12.9	1.677	1.263	B
14.8	13.5	1.638	1.326	B
14.7	13.5	1.624	1.324	B
14.5	14.7	1.625	1.462	B + C
14.3	14.8	1.600	1.470	B + C
13.1	16.6	1.478	1.662	C
12.4	17.1	1.395	1.708	C
11.0	19.3	1.252	1.949	C
10.4	19.3	1.174	1.933	C
10.3	19.5	1.164	1.956	C
9.5	20.5	1.077	2.062	C
8.5	22.6	0.979	2.309	C

(continued on next page)

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

The systems were studied under isothermal conditions in a thermostat filled with glycerol. Equilibrium was reached after 5 days. Sodium sulfite was determined iodometrically, and sodium sulfate by precipitation of the sulfate as barium sulfate and weighing.

The identities of the solids were determined by the method of wet residues.

SOURCE AND PURITY OF MATERIALS:

Sodium sulfate was of c.p. grade. Sodium sulfite was prepared by saturating aqueous c.p. sodium carbonate with the stoichiometric amount of sulfur dioxide.

ESTIMATED ERROR:

Temperature: ±0.5 K
Analyses: no estimate possible.

REFERENCES:

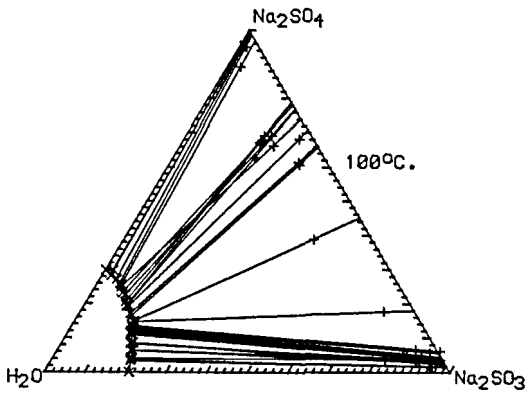
COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7]	Durymanova, M.A.; Telepneva, A.E.
2. Sodium sulfate; Na_2SO_4; [7757-82-6]	*Zh. Priklad. Khim.* 1972, 45, 1610-12; *J. Appl. Chem. USSR (Eng. Transl.)* 1972, 45, 1680-2.
3. Water; H_2O; [7732-18-5]	

EXPERIMENTAL VALUES (continued):

Na_2SO_3 mass %	Na_2SO_4 mass %	Na_2SO_3[a] mol/kg	Na_2SO_4[a] mol/kg	Solid[b] phase
7.4	23.2	0.846	2.354	C
6.3	24.8	0.725	2.534	C
6.1	25.4	0.707	2.611	D
5.4	25.9	0.624	2.654	D
4.0	27.1	0.461	2.769	D
2.0	28.2	0.227	2.844	D
1.8	29.8	0.209	3.067	D
0.0	29.9	0.000	3.003	E

[a] Molalities calculated by the compiler.

[b] Solid phase: A - Na_2SO_3, B - mixture of Na_2SO_3 with a small amount of Na_2SO_4, C - mixture of 25% Na_2SO_3 and 75% of Na_2SO_4, D - mixture of Na_2SO_4 with a small amount of Na_2SO_3, E - Na_2SO_4.



COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7] 2. Sodium sulfate; Na_2SO_4; [7757-82-6] 3. Water; H_2O; [7732-18-5]	Kuznetsova, A.G.; Yaroshenko, L.B. *Zh. Priklad. Khim.* 1981, 54, 2197-2201; *J. Appl. Chem. USSR (Eng. Transl.)* 1981, 54, 1929-32.
VARIABLES: Concentrations of the components One temperature: 298 K	PREPARED BY: Mary R. Masson

EXPERIMENTAL VALUES:

Compositions of equilibrium solutions at 25°C

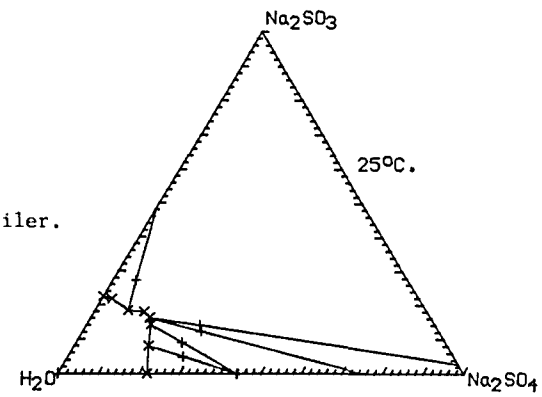
Na_2SO_4 mass %	Na_2SO_3 mass %	Na_2SO_3[a] mol/kg	Na_2SO_4[a] mol/kg	Solid[b] phase
0.0	22.4	0.0	2.29	A
2.5	21.7	0.232	2.271	A
8.1	18.3	0.775	1.973	A
12.3	17.9	1.241	2.035	A
14.52	16.07	1.473	1.837	A + B
15.8	14.1	1.587	1.596	B
18.3	8.0	1.748	0.861	B
22.03	0.0	1.989	0.0	B

[a] Molalities calculated by the compiler.

[b] Solid phase: A - $Na_2SO_3.7H_2O$,

B - $Na_2SO_4.10H_2O$

Note: data were read from graph by the compiler.



METHOD APPARATUS/PROCEDURE:

An isothermal procedure was used. The desired amounts of salts and water were placed in a vessel and stirred for 6 hr in a thermostat. Sodium sulfite in the solution was determined iodometrically, and the sum of sulfite and sulfate was determined by titration with barium chloride soln. (nitchromazo indicator) after oxidation with hydrogen peroxide.

The solid phases were dried in air after washing with ethyl acetone. The solid phase composition was determined by Schreinemakers' method and checked by chemical analysis.

SOURCE AND PURITY OF MATERIALS:

Sodium sulfate was "chemically pure" and sodium sulfite was special purity grade.

ESTIMATED ERROR:

Temperature: a thermostat was used, but the error was not stated.

Analyses: no estimate possible. There was an error of up to 0.5% in reading the graph.

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7] 2. Sodium sulfate; Na_2SO_4; [7757-82-6] 3. Water; H_2O; [7732-18-5]	Lewis, N.B.; Rivett, A.C.D. *J. Chem. Soc.* 1924, *125*, 1156-67.
VARIABLES: Concentrations of the components Temperature: 273 - 341 K	PREPARED BY: Mary R. Masson

EXPERIMENTAL VALUES:

Systems in equilibrium with hydrated solids

t/°C	Na_2SO_3 mass %	Na_2SO_4 mass %	S_E[a] mass % (mol/kg)[b]
0.10	11.59	1.11	
	11.34	1.76	
	11.37	1.77	
	11.37	1.79	12.3 (1.113)
17.5	18.04	3.79	
	17.09	5.97	
	16.45	7.59	
	16.46	7.66	
	16.48	7.64	20.0 (1.983)
21.0	20.64	1.84	
	19.38	4.67	
	18.09	7.62	21.7 (2.199)
25.0	21.61	4.14	
	19.44	8.97	
	18.27	11.05	
	16.81	14.54	
	16.77	14.50	23.7 (2.464)
27.5	23.33	3.45	
	21.87	6.52	
	20.21	9.99	25.0 (2.645)
31.5	25.64	2.93	
	24.09	6.08	
	22.53	9.23	
	21.00	12.22	27.15 (2.957)
25.0	27.69	2.83	
	27.71	2.74	
	26.41	5.16	
	24.94	7.96	
	23.39	11.30	
	21.83	14.11	29.2 (3.272)

(continued on next page)

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

A mixture was prepared of water, excess of $Na_2SO_3.7H_2O$, and varying amounts of sodium sulfate, added either as anhydrous or hydrated form. This was placed in a sealed or well stoppered tube, then sometimes preheated, sometimes not, and placed in a thermostat at the desired temperature, where it was rotated for 5-100 hr. Two samples of the solution were withdrawn for analysis through a cotton wool filter. One was run into excess of iodine, which was back-titrated with thiosulfate to obtain the sulfite concentration. The other was treated with hydrogen peroxide to oxidize sulfite to sulfate, then heated to dryness and weighed to find the total sulfate. Both measured samples were weighed to find the solution density.

SOURCE AND PURITY OF MATERIALS:

Various anhydrous and hydrated salts were used. Consistent results were obtained when the sulfite was BDH commercial anhydrous sodium sulfite, which contains some sodium sulfate as impurity.

ESTIMATED ERROR:

Temperature: ±0.02°, except at 0.1°C, where it was ±0.1°C.
Analyses: about ±0.5%.

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMETS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7]	Lewis, N.B.; Rivett, A.C.D.
2. Sodium sulfate; Na_2SO_4; [7757-82-6]	*J. Chem. Soc.* 1924, *125*, 1156-67.
3. Water; H_2O; [7732-18-5]	

EXPERIMENTAL VALUES (continued):

Systems in equilibrium with hydrated solids

t/°C	Na_2SO_3 mass %	Na_2SO_4 mass %	S_E[a] mass % (mol/kg)[b]
33.0	25.29	2.30	
	25.33	2.44	
	22.75	6.63	
	21.36	8.87	
	20.10	10.95	26.8 (2.905)
37.5	24.73	2.51	
	24.81	2.54	
	23.54	4.63	
	22.38	6.52	
	21.14	8.59	
	19.94	10.70	26.3 (2.831)
42.5	24.32	2.17	
	24.42	2.16	
	22.88	4.72	
	21.78	6.78	
	20.42	9.06	
	20.42	9.03	
	19.11	11.15	
	19.23	11.07	25.7 (2.744)
47.5	23.89	2.46	
	24.03	2.40	
	22.56	4.77	
	21.22	7.14	25.25 (2.680)
52.5	23.31	2.18	
	23.31	2.24	
	22.54	3.72	
	21.29	5.80	
	20.13	7.73	
	19.26	9.20	24.7 (2.603)
57.5	22.93	2.03	
	22.58	2.69	
	21.50	4.56	
	18.93	9.04	24.1 (2.519)
62.5	22.02	2.95	
	20.82	4.91	
	20.72	5.20	
	19.52	7.52	
	19.47	7.44	
	18.28	9.48	
	17.94	10.16	23.6 (2.451)
67.5	22.23	1.87	
	21.01	4.16	
	19.93	6.27	
	18.85	8.35	23.2 (2.397)

[a] Values obtained for mass % of Na_2SO_3 were plotted against the values of mass % of Na_2SO_4. A series of straight-line plots was obtained. For each temperature, the line was extrapolated to 0.0 mass % of Na_2SO_4. The corresponding solubility of Na_2SO_3, expressed as mass %, is given here as S_E.

The values were found to be in good agreement with solubilities measured in the normal manner.

[b] Molalities calculated by the compiler.

Note: no data on solid phases is given.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7] 2. Sodium sulfate; Na_2SO_4; [7757-82-6] 3. Water; H_2O; [7732-18-5]	Lewis, N.B.; Rivett, A.C.D. *J. Chem. Soc.* 1924, *125*, 1162-7.
VARIABLES: Three temperatures: 313, 318, 333 K Concentrations of the components	PREPARED BY: Mary R. Masson

EXPERIMENTAL VALUES:

Composition of equilibrium solutions

Na_2SO_3 mass %	Na_2SO_4 mass %	Na_2SO_3[a] mol/kg	Na_2SO_4[a] mol/kg	Solid[b] phase
Temperature = 60°C				
1.01	30.26	0.117	3.100	A
3.90	27.84	0.453	2.871	A
4.24	27.48	0.493	2.833	A
9.76	22.69	1.146	2.365	A
10.92	22.02	1.292	2.312	A + B
13.60	18.59	1.591	1.930	B
15.56	16.59	1.819	1.721	B
17.78	13.66	2.058	1.403	B
19.37	12.52	2.256	1.294	B
20.27	10.62	2.327	1.082	C
20.79	10.35	2.395	1.058	C
20.87	10.13	2.400	1.034	C
21.86	9.56	2.529	0.981	C
24.17	8.05	2.829	0.836	D
25.09	5.70	2.876	0.580	D
25.03	4.94	2.836	0.497	D
20.99	9.25	2.387	0.934	E
21.37	7.20	2.374	0.710	E
21.60	5.26	2.343	0.506	E
22.47	3.96	2.423	0.379	E
22.82	2.83	2.435	0.268	E

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AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

For satisfactory results in this system it was necessary to form the solids from homogeneous solutions. In practice, this meant that water had to be evaporated from unsaturated solutions by gentle boiling under reduced pressure. The solutions were contained in stoppered tubes with side-arms for the attachment of pressure tubing. The tubes were rocked in a thermostat. Only a small amount of solid was allowed to form, because its composition would be expected to change continuously.

Sulfite was determined by reaction with excess of iodine and titration of the excess with thiosulfate. Total sulfate was determined after oxidation with hydrogen peroxide by weighing as sodium sulfate.

SOURCE AND PURITY OF MATERIALS:

ESTIMATED ERROR:

Temperature: ±0.2°C
Analyses: about ±0.5%

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7]	Lewis, N.B.; Rivett, A.C.D.
2. Sodium sulfate; Na_2SO_4; [7757-82-6]	*J. Chem. Soc.* 1924, *125*, 1162-7.
3. Water; H_2O; [7732-18-5]	

EXPERIMENTAL VALUES (continued):

Na_2SO_3 mass %	Na_2SO_4 mass %	Na_2SO_3[a] mol/kg	Na_2SO_4[a] mol/kg	Solid[b] phase
Temperature = 45°C				
2.01	30.16	0.235	3.130	A
7.56	25.58	0.897	2.694	A
7.51	25.57	0.890	2.690	A
9.62	24.05	1.151	2.553	A
12.93	20.66	1.545	2.190	B
15.05	18.68	1.802	1.984	B
17.47	15.81	2.077	1.668	B
19.85	13.87	2.376	1.473	B
22.36	10.60	2.646	1.113	U
20.52	12.01	2.413	1.253	C
22.33	9.92	2.615	1.031	C
23.81	8.87	2.806	0.928	C
24.72	7.84	2.908	0.818	C
25.52	7.61	3.028	0.801	C
24.10	8.59	2.841	0.898	C + D
24.75	7.28	2.889	0.754	D
26.35	3.86	2.996	0.389	D
28.06	2.90	3.225	0.296	D
28.19	2.29	3.217	0.232	D
26.36	2.56	2.942	0.254	U
21.33	10.43	2.480	1.076	E
22.71	7.78	2.592	0.788	E
23.48	7.11	2.684	0.721	E
23.91	5.88	2.702	0.590	E
23.82	5.96	2.691	0.598	E
24.61	3.79	2.727	0.373	E
24.64	3.85	2.734	0.379	E
25.16	3.11	2.783	0.305	E
25.89	2.29	2.860	0.224	E
26.53	1.79	2.937	0.176	E
Temperature = 40°C				
1.03	31.6	0.121	3.302	A
3.73	29.3	0.442	3.080	A
6.43	26.8	0.764	2.826	A
8.99	24.5	1.072	2.593	A
12.83	21.5	1.550	2.305	A
13.01	21.2	1.569	2.269	A + B
12.61	21.6	1.521	2.311	B metastable
14.54	20.03	1.763	2.155	B
16.76	17.30	2.017	1.847	B
17.85	16.09	2.144	1.715	B
19.53	14.23	2.339	1.512	B
20.74	12.71	2.473	1.345	B
24.49	9.92	2.962	1.065	B
25.38	8.41	3.041	0.894	B
18.07	16.78	2.201	1.813	C
20.01	14.30	2.417	1.533	C
22.33	11.49	2.677	1.222	C
22.63	11.34	2.719	1.209	C
22.76	10.80	2.718	1.144	C
25.06	8.25	2.981	0.871	C
27.46	7.09	3.329	0.763	?
27.60	7.02	3.349	0.756	?
28.63	6.75	3.515	0.735	?
25.58	7.73	3.043	0.816	D
26.08	5.88	3.041	0.608	D

(continued on next page)

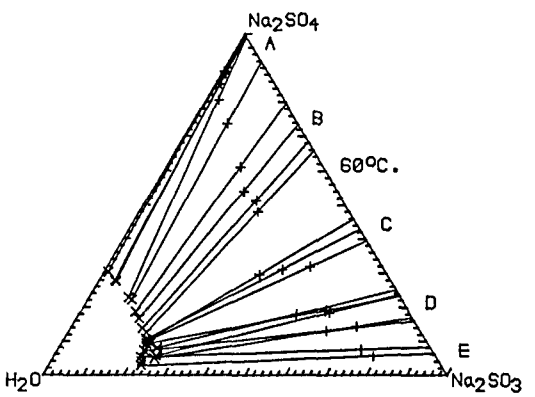
COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7]	Lewis, N.B.; Rivett, A.C.D.
2. Sodium sulfate; Na_2SO_4; [7757-82-6]	*J. Chem. Soc.* 1924, *125*, 1162-7.
3. Water; H_2O; [7732-18-5]	

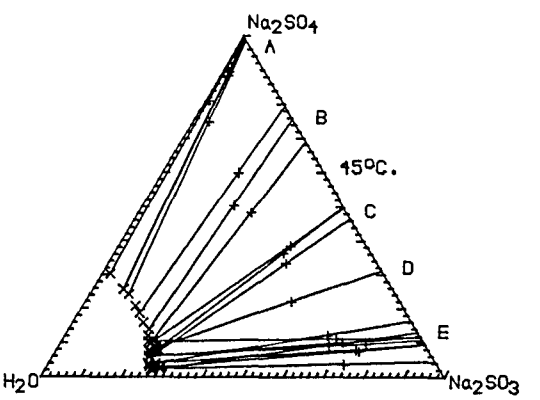
EXPERIMENTAL VALUES (continued):

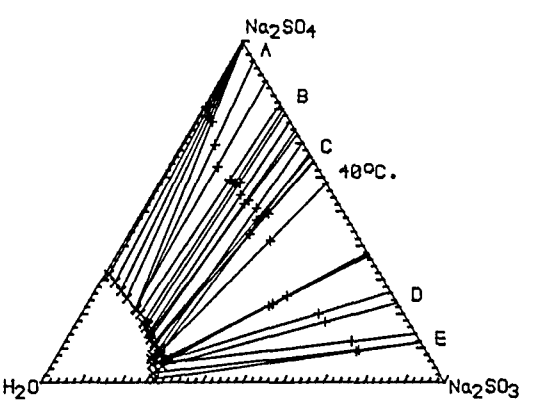
Na_2SO_3 mass %	Na_2SO_4 mass %	Na_2SO_3[a] mol/kg	Na_2SO_4[a] mol/kg	Solid[b] phase
Temperature = 40°C				
27.52	4.79	3.226	0.498	D
23.62	8.07	2.743	0.832	E
23.80	6.90	2.725	0.701	E
24.89	5.24	2.826	0.528	E
26.47	2.67	2.964	0.265	E
27.61	0.87	3.063	0.086	E

[a] Molalities calculated by the compiler.

[b] Solids A, B, C, D and E are series of mixed crystals corresponding to the five solution curves noted by these authors. U signifies an unstable solid. Several metastable systems were observed.







COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7] 2. Sodium sulfate; Na_2SO_4; [7757-82-6] 3. Water; H_2O; [7732-18-5]	Rivett, A.C.D.; Lewis, N.B. *Rec. Trav. Chem. Pays-Bas* 1923, 42, 954-63.
VARIABLES: Concentrations of the components Four temperatures: 273 311 K	PREPARED BY: Mary R. Masson

EXPERIMENTAL VALUES:

Stable system at 25°C

Na_2SO_3 mass %	Na_2SO_4 mass %	Na_2SO_3[a] mol/kg	Na_2SO_4[a] mol/kg
21.61	4.14	2.309	0.393
19.44	8.97	2.154	0.882
18.27	11.05	2.051	1.101
16.81	14.49	1.941	1.485
16.77	14.50	1.936	1.485
16.81	14.54	1.943	1.491
16.81	14.54	1.943	1.491
16.80	14.55	1.942	1.492
16.85	14.52	1.948	1.490
14.61	15.25	1.653	1.531
11.39	16.43	1.252	1.603
9.22	17.31	0.996	1.659
6.59	18.11	0.694	1.693
4.11	19.66	0.428	1.816
2.53	20.4	0.260	1.864

Metastable system at 25°C

Na_2SO_3 mass %	Na_2SO_4 mass %	Na_2SO_3[a] mol/kg	Na_2SO_4[a] mol/kg
27.29	1.69	3.049	0.168
26.57	3.99	3.036	0.405
25.45	6.75	3.010	0.703
26.32	7.47	3.154	0.794
23.40	10.93	2.827	1.172
21.88	12.34	2.639	1.321
20.35	13.82	2.453	1.478
18.52	16.18	2.250	1.744
18.34	16.32	2.227	1.758
16.94	17.82	2.060	1.923
15.43	19.12	1.870	2.057
14.39	20.51	1.754	2.218

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AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

Mixtures of solids were equilibrated with water in closed tubes maintained at constant temp. Two samples of the solution phase were drawn off through cotton wool, and analysed for sulfite, by reaction with excess of standard iodine and back-titration of the excess with standard thiosulfate, and for sulfite + sulfate, by oxidizing sulfite to sulfate with hydrogen peroxide, then evaporating all to dryness and weighing to obtain total sulfate. The density of the solution was also measured. The moist solids were similarly analysed.

SOURCE AND PURITY OF MATERIALS:

Commercial "pure" samples of $Na_2SO_3.7H_2O$ and $Na_2SO_4.10H_2O$ were used. The mixtures prepared were heated to about 80°C; the undissolved hydrated crystals broke down to a fine white anhydrous powder.

ESTIMATED ERROR:

Temperature: ±0.02°C, except at 0.1°C, where it was ±0.1°C

Analyses: about ±0.5%

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7]	Rivett, A.C.D.; Lewis, N.B.
2. Sodium sulfate; Na_2SO_4; [7757-82-6]	*Rec. Trav. Chem. Pays-Bas* 1923, *42*, 954-63.
3. Water; H_2O; [7732-18-5]	

EXPERIMENTAL VALUES: (continued):

Stable system at 37.5°C

Na_2SO_3 mass %	Na_2SO_4 mass %	Na_2SO_3[a] mol/kg	Na_2SO_4[a] mol/kg
27.51	1.80	3.088	0.179
26.15	3.35	2.943	0.335
25.29	4.13	2.843	0.412
24.81	5.28	2.816	0.532
26.32	7.26	3.144	0.770
25.78	7.14	3.049	0.749
25.06	7.66	2.955	0.802
25.40	7.76	3.015	0.817
23.23	10.25	2.771	1.085
23.06	9.23	2.702	0.960
21.52	11.61	2.553	1.222
21.05	12.05	2.496	1.268
18.13	15.24	2.159	1.610
17.72	15.43	2.103	1.625
16.47	17.26	1.972	1.834
12.87	20.60	1.535	2.180
8.90	25.16	1.071	2.686
14.47	20.10	1.755	2.163
11.30	22.63	1.357	2.411
9.04	24.66	1.082	2.619
6.13	27.34	0.731	2.893
4.78	28.36	0.567	2.986
2.57	30.07	0.303	3.143

Metastable system at 17.5°C

Na_2SO_3 mass %	Na_2SO_4 mass %	Na_2SO_3[a] mol/kg	Na_2SO_4[a] mol/kg
18.87	1.82	1.888	0.162
18.04	3.79	1.831	0.341
17.09	5.97	1.762	0.546
16.45	7.59	1.718	0.703
16.46	7.66	1.721	0.711
16.48	7.64	1.723	0.709
14.78	7.93	1.517	0.722
11.56	8.54	1.148	0.752
8.48	9.89	0.824	0.853
5.99	10.61	0.570	0.896
2.61	12.15	0.243	1.004

System at 0.1°C

Na_2SO_3 mass %	Na_2SO_4 mass %	Na_2SO_3[a] mol/kg	Na_2SO_4[a] mol/kg
11.59	1.11	1.053	0.090
11.34	1.76	1.035	0.143
11.37	1.77	1.039	0.143
11.37	1.79	1.039	0.145
8.56	1.95	0.759	0.153
5.93	2.42	0.513	0.186
3.07	3.11	0.260	0.233

[a] Molalities calculated by the compiler.

The extrapolated values for the solubility of sodium sulfite in water are:
0.1°C - 12.0 mass % 17.5°C - 19.8 mass % 25°C - 23.75 mass %

The authors conclude as follows:
At 0.1, 17.5 and 25°C the stable systems show two series of mixed crystals (with corresponding solutions curves), one being between the heptahydrates and the other being between the decahydrates of sodium sulfite and sodium sulfate.

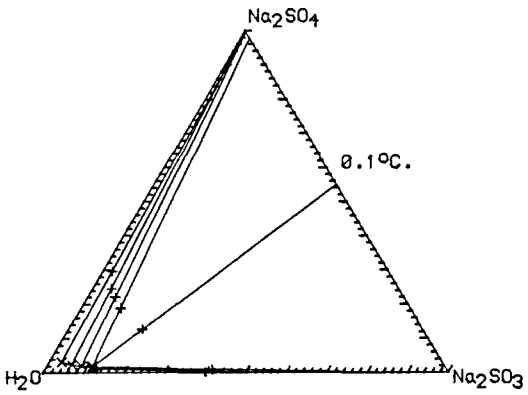
At 25°C there is also a metastable system in which there is extensive mixed crystal formation between the anhydrous salts.

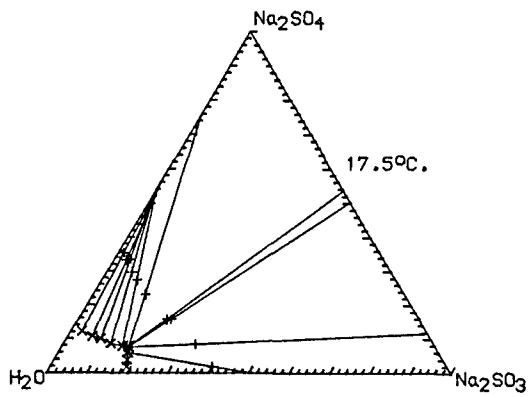
At 37.5°C there are three series of mixed crystals formed between the anhydrous salts.

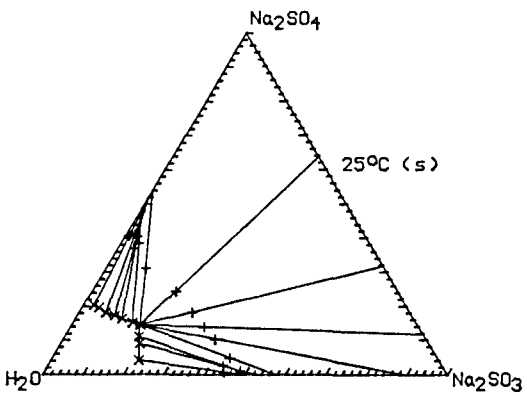
(continued on next page)

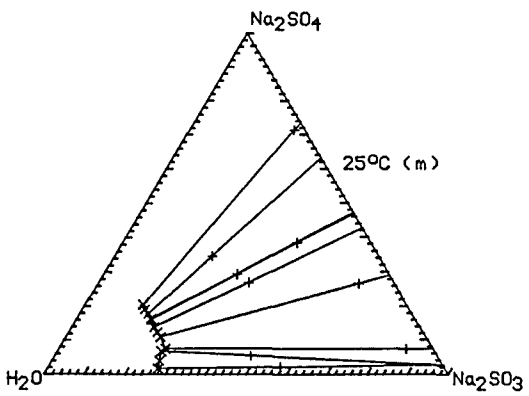
COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7] 2. Sodium sulfate; Na_2SO_4; [7757-82-6] 3. Water; H_2O; [7732-18-5]	Rivett, A.C.D.; Lewis, N.B. *Rec. Trav. Chem. Pays-Bas* 1923, 42, 954-63.

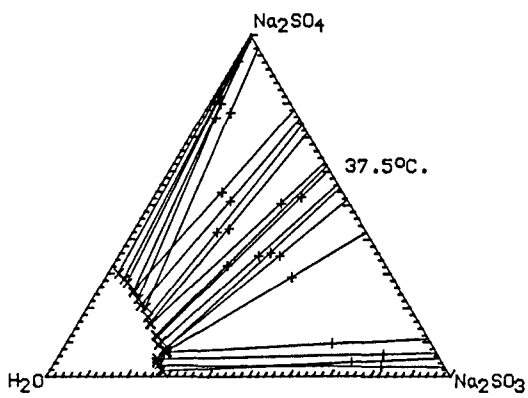
EXPERIMENTAL VALUES (continued):











COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-5] 2. Sodium sulfate; Na_2SO_4; [7757-82-6] 3. Water; H_2O; [7732-18-5]	Palkina, N.A. *Tr. Vornezh. Gos. Univ.* 1950, *17*, 61-88.
VARIABLES: Six temperatures: 273 - 288 K Concentrations of the components	PREPARED BY: Mary R. Masson

EXPERIMENTAL VALUES:

Composition of equilibrium solutions

Na_2SO_4 mass %	Na_2SO_3 mass %	Na_2SO_4[a] mol/kg	Na_2SO_3[a] mol/kg	Solid[b] phase
Temperature = 0°C				
4.22	0.0	0.310	0.	
2.6	4.87	0.198	0.418	A
2.35	6.0	0.181	0.519	A
1.8	9.83	0.143	0.883	A
1.7	11.3	0.138	1.031	*
0.0	11.9	0.	1.072	
Temperature = 5°C				
5.9	0.0	0.441	0.	
4.89	2.1	0.370	0.179	A
4.0	4.75	0.309	0.413	A
2.9	9.71	0.234	0.882	A
2.7	12.4	0.224	1.159	*
2.19	12.5	0.181	1.163	B
0.0	13.8	0.	1.270	
Temperature = 10°C				
8.25	0.0	0.633	0.	
7.35	2.0	0.571	0.175	A
6.2	4.69	0.490	0.418	A
5.0	9.5	0.412	0.882	A
4.4	13.0	0.375	1.249	A
4.3	14.15	0.371	1.377	*
3.5	14.47	0.300	1.400	B
2.12	15.0	0.180	1.436	B
0.0	15.8	0.	1.489	

(continued on next page)

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:
A polythermal procedure was used, based on the following systems:

I (5% Na_2SO_3 + 95% water) + Na_2SO_4

II (10% Na_2SO_3 + 90% water) + Na_2SO_4

III (15% Na_2SO_3 + 85% water) + Na_2SO_4

IV (2.5% Na_2SO_4 + 97.5% water) + Na_2SO_3

V (5%Na_2SO_4 + 95% water) + Na_2SO_3

VI (7.5% Na_2SO_4 + 92.5% water)+ Na_2SO_3

SOURCE AND PURITY OF MATERIALS:

ESTIMATED ERROR:

No estimates possible.

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-5]	Palkina, N.A.
2. Sodium sulfate; Na_2SO_4; [7757-82-6]	*Tr. Vornezh. Gos. Univ.* 1950, *17*, 61-88.
3. Water; H_2O; [7732-18-5]	

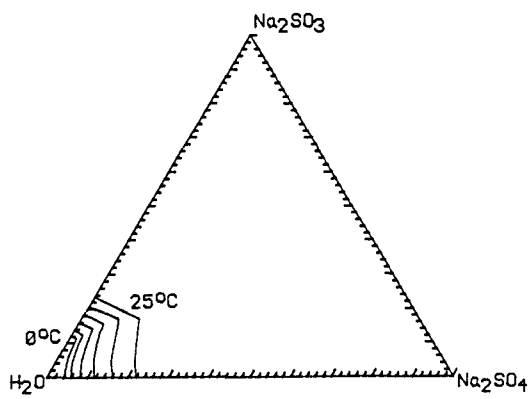
EXPERIMENTAL VALUES (continued):

Composition of equilibrium solutions

Na_2SO_4 mass %	Na_2SO_3 mass %	Na_2SO_4[a] mol/kg	Na_2SO_3[a] mol/kg	Solid[b] phase
Temperature = 15°C				
11.6	0.0	0.924	0.	
9.2	4.54	0.751	0.418	A
7.6	9.24	0.643	0.882	A
6.52	13.1	0.571	1.293	A
6.5	14.12	0.576	1.411	A
6.2	15.5	0.557	1.571	*
4.17	16.5	0.370	1.650	B
2.06	17.5	0.180	1.726	B
0.0	18.2	0.	1.765	
Temperature = 20°C				
16.2	0.0	1.361	0.	
13.6	4.32	1.167	0.418	A
12.0	8.8	1.067	0.882	A
10.5	13.42	0.972	1.400	A
9.4	16.8	0.897	1.806	*
6.13	18.3	0.571	1.921	B
4.03	19.1	0.369	1.971	B
2.0	19.9	0.180	2.022	B
0.0	20.8	0.	2.084	
Temperature = 25°C				
21.9	0.0	1.974	0.	
19.6	4.02	1.807	0.418	A
17.8	8.22	1.694	0.882	A
16.0	12.6	1.578	1.400	A
14.3	17.0	1.465	1.963	*
5.87	20.8	0.564	2.250	A
3.96	21.7	0.375	2.316	A
1.94	22.5	0.181	2.363	A
0.0	23.5	0.	2.437	

[a] Molalties calculated by the compiler.

[b] Solid phases: A - "Solid solution of $Na_2SO_4.10H_2O$ and $Na_2SO_3.10H_2O$",
B - "Solid solution of $Na_2SO_4.7H_2O$ and $Na_2SO_3.7H_2O$".
* - A + B, liquid composition determined graphically.



COMPONENTS:

1. Sodium sulfite; Na_2SO_3; [7757-83-7]
2. Sodium sulfate; Na_2SO_4; [7757-82-6]
3. Water; H_2O; [7732-18-5]

VARIABLES:

One temperature: 273 K
Concentrations of the components.

ORIGINAL MEASUREMENTS:

Sotova, N.N.; Kuznetsova, A.G.; Torocheshnikov, N.S.
Zh. Prikład. Khim. 1978, *51*, 779-84; **Russ. J. Appl. Chem. (Eng. Transl.)* 1978, *51*, 760-4; also Sotova, N.N.; Kuznetsova, A.G.; Torocheshnikov, N.S.; Kononova, I.V.; **Mezhvuz. Sb. Altaisk. Politekhn. In-t.* 1976, 2(57), 150-5; also **Fiz.-Khim. Osn. Tekhnol. Pererab. Khim. Syr'ya* 1976, 2, 150-5.

PREPARED BY:

Mary R. Masson

EXPERIMENTAL VALUES:

Composition of equilibrium solutions at 0°C

Na_2SO_4 mass %	Na_2SO_3 mass %	Na_2SO_4[a] mol/kg	Na_2SO_3[a] mol/kg	Solid[b] phase
4.50	0.0	0.332	0.	A
3.00	3.62	0.226	0.308	A
2.98	5.56	0.229	0.482	A
3.20	6.70	0.250	0.590	A
2.19	7.56	0.171	0.665	A
1.85	11.06	0.150	1.008	A
1.60	12.03	0.130	1.105	A + B
1.60	11.85	0.130	1.086	A + B
0.64	12.34	0.052	1.125	B
0.11	12.29	0.009	1.113	B
0.0	12.30	0.	1.113	B

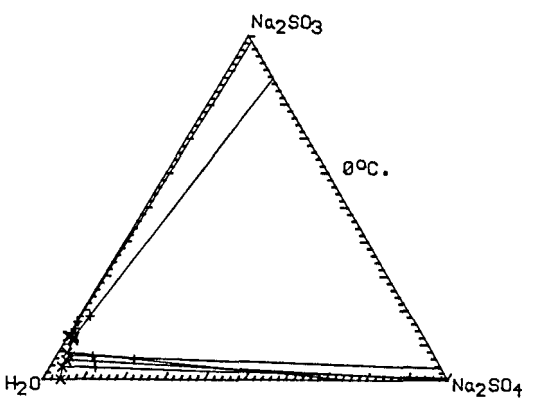
[a] Molality calculated by the compiler.

[b] Solid phases: A - $Na_2SO_4.10H_2O$, B - $Na_2SO_3.7H_2O$

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

The isothermal method was used. p-Phenylenediamine was used as anti-oxidant. Sulfite was determined iodometrically, and sodium sulfate was weighed to obtain total sulfate after a peroxide oxidation.



SOURCE AND PURITY OF MATERIALS:

Sodium sulfate was of analytical grade, and sodium sulfite was of high-purity grade.

ESTIMATED ERROR:

Temperature: ±0.2 K
Analyses: no estimate given.

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7] 2. Sodium sulfate; Na_2SO_4; [7757-82-6] 3. Water; H_2O; [7732-18-5]	Sotova, N.N.; Torocheshnikov, N.S.; Kuznetsova, A.G.; Sokolova, E.I. *Khimiya i Tekhnol. Mineral'n. Solei i Galurgichesk. Pr.-v, Varnaul* 1978, 59-65.
VARIABLES: One temperature: 373 K Concentrations of the components.	PREPARED BY: Mary R. Masson

EXPERIMENTAL VALUES:

Composition of equilibrium solutions at 100°C

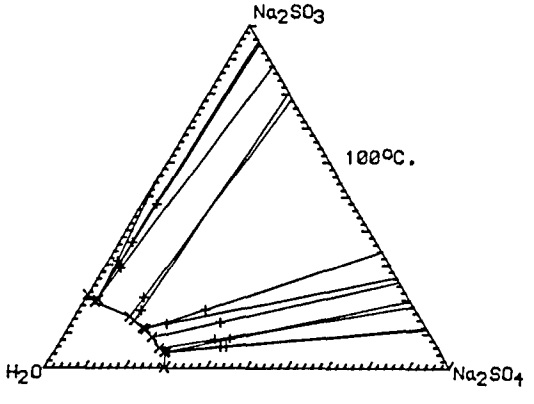
Na_2SO_4 mass %	Na_2SO_3 mass %	Na_2SO_4[a] mol/kg	Na_2SO_3[a] mol/kg	Solid[b] phase
-	21.2	0.	2.135	A
3.2	19.9	0.293	2.053	A
2.79	19.16	0.252	1.948	A + D
13.5	14.8	1.326	1.638	D
15.2	13.7	1.505	1.529	D
18.4	11.5	1.848	1.302	D
19.2	11.2	1.942	1.277	D
22.0	8.8	2.238	1.009	D
25.4	5.6	2.592	0.644	D
27.45	4.55	2.842	0.531	D
27.5	4.9	2.864	0.575	C
29.6	-	2.960	0.	C

[a] Molalities calculated by the compiler.

[b] Solid phases: A - Na_2SO_3, C - Na_2SO_4, D - $\underline{n}Na_2SO_3.\underline{m}Na_2SO_4$

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:
An isothermal method was used.



SOURCE AND PURITY OF MATERIALS:

ESTIMATED ERROR:
No estimates possible.

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7] 2. Sodium sulfate; Na_2SO_4; [7757-82-6] 3. Water; H_2O; [7732-18-5]	Sotova, N.N.; Toroheshnikov, N.S.; Kuznetsova, A.G.; Poroshkova, M.A. *Khimiya i Tekhnol. Mineral'n. Solei i Galurgichesk. Pr.-v, Varnaul* 1978, 59-65.
VARIABLES:	PREPARED BY:
One temperature: 333 K Concentrations of the components.	Mary R. Masson

EXPERIMENTAL VALUES:

Composition of equilibrium solutions at 60°C

Na_2SO_4 mass %	Na_2SO_3 mass %	Na_2SO_4[a] mol/kg	Na_2SO_3[a] mol/kg	Solid[b] phase
31.5	0.0	3.237	0.	C
30.0	2.2	3.115	0.257	C
27.7	3.9	2.851	0.452	C
26.0	7.2	2.740	0.855	C
25.6	8.7	2.743	1.051	D
24.2	9.2	2.558	1.096	D
24.0	10.0	2.568	1.230	D
18.0	13.6	1.853	1.578	D
9.4	18.5	0.918	2.036	D
7.5	21.2	0.741	2.359	D
3.9	22.3	0.372	2.397	A
3.4	22.4	0.323	2.395	A
0.0	23.3	0.	2.410	A

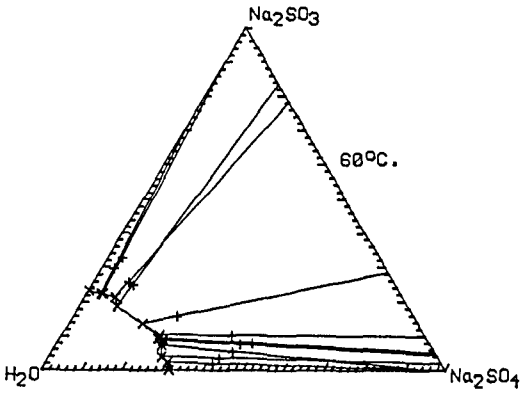
[a] Molalities calculated by the compiler.

[b] Solid phases: A - Na_2SO_3, C - Na_2SO_4, D - solid solution of sodium sulfite and sodium sulfate

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

The isothermal method was used.



SOURCE AND PURITY OF MATERIALS:

ESTIMATED ERROR:

Temperature: ±0.1 K
Analyses: no estimates possible.

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7] 2. Sodium sulfate; Na_2SO_4; [7757-82-6] 3. Water; H_2O; [7732-18-5]	Wöhler, L.; Dierksen, J. *Z. Angew. Chem.* 1926, *39*, 33-36.
VARIABLES: Temperature: 296 - 353 K Concentrations of the components.	PREPARED BY: Mary R. Masson

EXPERIMENTAL VALUES:

Composition of saturated solutions

t/°C	Na_2SO_4 mass %	Na_2SO_3 mass %	Na_2SO_4[a] mol/kg	Na_2SO_3[a] mol/kg
23	9.55	15.25	0.894	1.609
40	18.48	16.26	1.994	1.977
60	14.21	16.59	1.446	1.902
80	14.95	15.15	1.506	1.720

[a] Molalities calculated by the compiler.

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Sulfite was determined iodometrically. Sulfate was determined by difference after oxidation to sodium sulfate with hydrogen peroxide.	
	ESTIMATED ERROR: No estimates possible.
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7] 2. Sodium sulfate; Na_2SO_4; [7757-82-6] 3. Water; H_2O; [7732-18-5]	Kuznetsova, A.G.; Sedova, V.A. *VINITI Deposited Document* 1981, 5710-81.
VARIABLES: Temperature: 288 K Composition	PREPARED BY: Mary R. Masson

EXPERIMENTAL VALUES:

Composition of saturated solutions

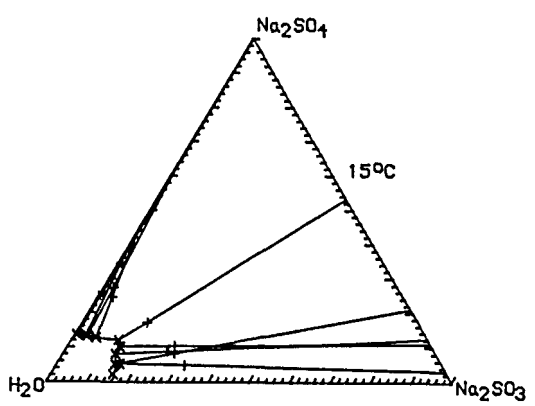
Na_2SO_3 mass %	Na_2SO_4 mass %	Na_2SO_3[a] mol/kg	Na_2SO_4[a] mol/kg	Solid[b] phase
0.50	13.50	0.046	1.105	A
2.68	13.42	0.253	1.126	A
3.32	13.11	0.315	1.104	A
5.65	12.67	0.549	1.092	A
11.62	12.07	1.208	1.114	A + B
12.79	10.13	1.316	0.925	B
12.83	8.00	1.286	0.711	B
14.33	5.07	1.411	0.443	B
15.27	5.18	1.523	0.458	B
15.23	2.18	1.463	0.186	B

[a] Molalities calculated by the compiler.

[b] Solid phases: A - $Na_2SO_4.10H_2O$, B - solid solution

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:
Isothermal method.



SOURCE AND PURITY OF MATERIALS:

ESTIMATED ERROR:
No estimates possible.

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7] 2. Sodium chloride; NaCl; [7647-14-5] 3. Water; H_2O; [7732-18-5]	Kobe, K.A.; Hellwig, K.C. *Ind. Eng. Chem.* 1955, *47*, 1116-21.
VARIABLES: Concentrations of the components Temperature: 273 - 373 K	PREPARED BY: Mary R. Masson

EXPERIMENTAL VALUES:

t/°C	NaCl mass %	NaCl g/100g water	NaCl mol/kg	Na_2SO_3 mass %	Na_2SO_3 g/100g water	Na_2SO_3 mol/kg	Solid[c] phase
			Composition of saturated solutions				
0.0	0.	0.0	0.	11.70	13.3	1.051	A
	6.21	7.23	1.236	7.85	9.13	0.725	A
	18.10	23.2	3.969	3.87	4.96	0.393	A
	24.44	33.6	5.750	2.83	3.89	0.309	A + C
	26.20	35.5	6.075	0.	0.0	0.	C
25.0	0.	0.0	0.	23.49	30.7	2.436	A
	2.79	3.65	0.624	20.67	27.0	2.143	A
	6.65	8.79	1.504	17.70	23.4	1.856	A
	11.31	14.2	2.629	15.08	20.2	1.625	A
	12.48	16.9	2.891	13.66	18.5	1.467	A
	15.65	21.6	3.695	11.88	16.4	1.301	A
	18.90	26.8	4.586	10.58	15.0	1.190	A
	19.34	28.1	4.809	11.84	17.2	1.365	A + C
	20.17	29.2	4.998	10.77	15.6	1.237	A + C
	20.43	29.4	5.031	10.08	14.5	1.151	A + C
	20.88	29.9	5.117	9.29	13.3	1.056	C
	22.26	31.5	5.390	7.07	10.0	0.794	C
	22.96	32.3	5.527	5.96	8.39	0.665	C
	23.90	33.3	5.699	4.34	6.05	0.480	C
	24.46	33.9	5.800	3.38	4.68	0.372	C
	25.10	34.6	5.921	2.36	3.25	0.258	C
	25.70	35.2	6.018	1.23	1.74	0.134	C
	26.47	36.0	6.160	0.	0.0	0.	C

(continued on next page)

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

Solids were equilibrated with water in sealed borosilicate-glass tubes for up to 20 days.

Solution was removed from the tube for analysis, under nitrogen. Separate aliquots were measured and weighed, then analysed for sulfite and chloride. Sulfite was determined by reaction with excess of iodine and back-titration with sodium thiosulfate, and chloride was determined mercurimetrically, after oxidation of sulfite to sulfate with hydrogen peroxide to prevent it from interfering (1).

SOURCE AND PURITY OF MATERIALS:

Sodium sulfite was obtained from J.T.Baker Chemical Co., and was found to assay at 100.1%. Sodium chloride from the same source assayed at 99.8%. Dissolved oxygen was removed from distilled water by boiling under reduced pressure at 60-65°C for 1 hr. This water was stored under nitrogen and used within 5 hr.

ESTIMATED ERROR:

No estimates possible.

REFERENCES:

1. Domask, W.G.; Kobe, K.A. *Anal. Chem.* 1952, 24, 989.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7]	Kobe, K.A.; Hellwig, K.C.
2. Sodium chloride; NaCl; [7647-14-5]	*Ind. Eng. Chem.* 1955, *47*, 1116-21.
3. Water; H_2O; [7732-18-5]	

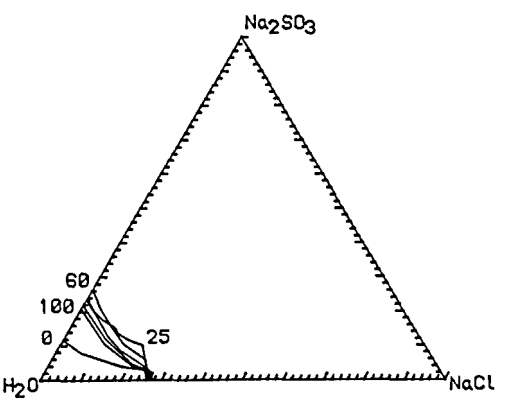
EXPERIMENTAL VALUES (continued):

t/°C	NaCl[a] mass %	NaCl[b] g/100g water	NaCl[a] mol/kg	Na_2SO_3[a] mass %	Na_2SO_3[b] g/100g water	Na_2SO_3[a] mol/kg	Solid[c] phase
40.0	0.	0.0	0.	26.25	35.6	2.824	B
	5.00	6.71	1.149	20.55	27.6	2.190	B
	9.82	13.2	2.258	15.77	21.2	1.681	B
	15.49	20.9	3.576	10.38	14.0	1.111	B
	23.14	32.6	5.577	5.86	8.26	0.655	B + C
	24.02	33.6	5.751	4.51	6.31	0.501	B + C
	25.20	34.8	5.955	2.39	3.30	0.262	C
	26.74	36.5	6.246	0.	0.0	0.	C
60.0	0.	0.0	0.	23.78	31.2	2.475	B
	10.29	13.4	2.292	12.90	16.8	1.332	B
	15.76	20.8	3.560	8.48	11.2	0.888	B
	25.16	35.1	6.005	3.14	4.38	0.347	B + C
	25.61	35.6	6.091	2.44	3.39	0.269	C
	26.09	36.1	6.178	1.65	2.28	0.181	C
	27.11	37.2	6.364	0.	0.0	0.	C
80.0	0.	0.0	0.	21.87	28.0	2.222	B
	10.26	13.2	2.258	11.98	15.4	1.222	B
	20.47	27.3	4.672	4.56	6.08	0.483	B
	26.08	36.5	6.244	2.45	3.43	0.272	B + C
	26.77	37.2	6.364	1.25	1.74	0.138	C
	27.59	38.1	6.520	0.	0.0	0.	C
100.0	0.	0.0	20.82	0.	26.3	2.086	B
	10.64	13.5	10.56	2.310	13.4	1.063	B
	20.76	27.6	4.04	4.724	5.37	0.426	B
	26.96	38.0	2.08	6.501	2.93	0.233	B + C
	26.88	38.9	0.44	6.329	0.61	0.048	C
	28.21	39.3	0.	6.724	0.0	0.	C

[a] Molalities and mass % values calculated by the compiler.

[b] Original data.

[c] Solid phases: A - $Na_2SO_3.7H_2O$, B - Na_2SO_3, C - NaCl



COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7] 2. Sodium chloride; NaCl; [7647-14-5] 3. Water; H_2O; [7732-18-5]	Labash, J.A.; Lusby, G.R. *Can. J. Chem.* 1955, *33*, 774-86
VARIABLES: Two temperatures: 293 and 333 K Concentrations of the components	PREPARED BY: Mary R. Masson

EXPERIMENTAL VALUES:

NaCl	Na_2SO_3	Na_2SO_4	Composition of equilibrium solutions NaCl[b]	Na_2SO_3[b]	Na_2SO_4[b]	Solid[b]
mass %	mass %	mass %	mol/kg	mol/kg	mol/kg	phase
Temperature = 60°C						
26.36	0.0	-	6.125	0.	0.	A
24.22	3.26	0.22	5.732	0.358	0.021	A
23.68	4.35	0.21	5.647	0.481	0.021	u.d.
21.10	7.41	1.24	5.140	0.837	0.124	u.d.
21.19	7.61	1.23	5.182	0.863	0.124	.d.
16.73	9.13	1.14	3.922	0.992	0.110	B
16.89	9.20	0.71	3.948	0.997	0.068	B
10.27	12.46	1.04	2.305	1.297	0.096	B
6.76	14.87	0.86	1.492	1.522	0.078	B
0.0	20.58	0.77	0.	2.076	0.069	B
Temperature = 60°C						
27.03	0.0	-	6.339	0.	0.	A
25.77	1.89	0.30	6.121	0.208	0.029	A + C?
25.14	3.04	0.16	6.003	0.337	0.016	A + C?
18.85	5.98	0.93	4.345	0.639	0.088	C
14.03	9.57	0.70	3.171	1.003	0.065	C
12.75	10.64	1.05	2.887	1.117	0.098	C
11.69	11.46	2.40	2.687	1.221	0.227	C
10.88	11.27	1.06	2.424	1.164	0.097	C
7.55	15.80	2.04	1.732	1.680	0.192	C
4.45	18.90	1.32	1.011	1.991	0.123	C
2.98	21.90	1.02	0.688	2.345	0.097	C
1.29	22.50	0.65	0.292	2.363	0.061	C
0.0	22.86	0.67	0.	2.372	0.062	

(continued on next page)

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

Solutions were stirred under nitrogen in a three-necked flask. A saturated solution was prepared of one of the single salts, and portions of the second was added with stirring in the presence of excess of the first salt. Addition of the second salt was continued until the solution composition became constant. Samples were withdrawn, after settling, through a pipette plugged with cotton wool. The weighed sample was diluted to volume in a standard flask.

Sulfite was determined by adding an aliquot of the freshly diluted solution to excess of iodine solution, and back-titrating the excess with thiosulfate. Total sulfate was determined gravimetrically as barium sulfate after oxidation with bromine water, sodium gravimetrically after conversion of all sodium salts to the sulfate, and chloride by addition of excess of silver nitrate, and back-titration with ammonium thiocyanate.

SOURCE AND PURITY OF MATERIALS:

Sodium sulfite heptahydrate was prepared freshly from a saturated solution of anhydrous sodium sulfite by cooling. Anhydrous sodium sulfite and sodium chloride were of analytical grade.

ESTIMATED ERROR:

Temperature: ±1 K
Analyses: 0.2% for sulfite and chloride, and 0.4% for sodium and total sulfate.

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7]	Labash, J.A.; Lusby, G.R.
2. Sodium chloride; NaCl; [7647-14-5]	*Can. J. Chem.* 1955, *33*, 774-86
3. Water; H_2O; [7732-18-5]	

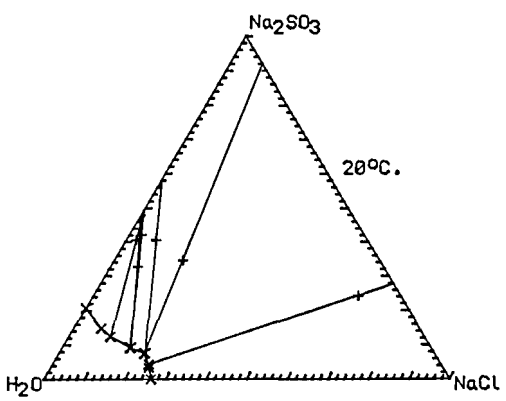
EXPERIMENTAL VALUES (continued):

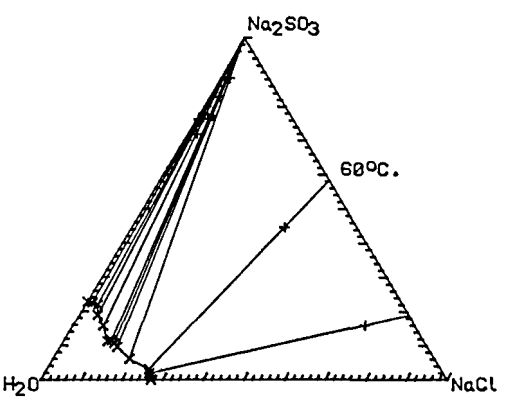
Composition of equilibrium solutions at 60°C, after equilibration for seven weeks in rotating bottles.

NaCl	Na_2SO_3	Na_2SO_4	NaCl[a]	Na_2SO_3[a]	Na_2SO_4[a]	Solid[b]
mass %	mass %	mass %	mol/kg	mol/kg	mol/kg	phase
25.77	1.89	0.30	6.121	0.208	0.029	A + C?
25.20	1.97	0.62	5.972	0.216	0.060	A + C?
25.25	2.08	0.70	6.003	0.229	0.068	A + C?
25.55	2.54	0.04??	6.083	0.280	0.004	A + C?
25.14	3.04	0.16	6.003	0.337	0.016	A + C?
25.03	2.93	0.30	5.970	0.324	0.029	A + C?
23.36	2.68	0.56	5.446	0.290	0.054	A + C?
24.72	3.00	0.56	5.898	0.332	0.055	A + C?

[a] Molalities calculated by the compiler.

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





COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-77] 2. Sodium chloride; NaCl; [647-14-5] 3. Water; H_2O; [7732-18-5]	Durymanova, M.A.; Telepneva, A.E.; Zagrebina, L.A. *Zh. Neorg. Khim.* 1971, *16*, 500-3; *Russ. J. Inorg. Chem. (Eng. Transl.)* 1971, *16*, 264-6
VARIABLES: One temperature: 298 K Concentrations of the components	PREPARED BY: Mary R. Masson

EXPERIMENTAL VALUES: Composition of equilibrium solutions at 25°C

NaCl mass %	Na_2SO_3 mass %	NaCl[a] mol/kg	Na_2SO_3[a] mol/kg	Solid[b] phase
-	23.5	0.	2.437	A
1.2	21.9	0.267	2.259	A
5.1	18.9	1.148	1.973	A
5.6	18.6	1.264	1.947	A
7.2	17.2	1.630	1.805	A
9.5	15.5	2.167	1.640	A
11.1	14.6	2.556	1.559	A + B
11.5	14.7	2.666	1.580	A + B
12.4	13.7	2.871	1.471	B
15.8	10.9	3.688	1.180	B
17.4	9.5	4.073	1.031	B
17.4	9.1	4.051	0.982	B
18.6	9.2	4.408	1.011	B
19.9	7.5	4.690	0.820	B
21.9	6.4	5.227	0.708	B
22.8	5.7	5.457	0.632	B + C
22.9	5.6	5.480	0.621	B + C
23.0	5.5	5.504	0.610	B + C
23.1	5.5	5.536	0.611	B + C
23.5	4.5	5.585	0.496	C
25.2	1.8	5.907	0.196	C
26.5	-	6.169	0.	C

[a] Molalities calculated by the compiler.

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

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

The experiments were done under isothermal conditions in an ordinary water thermostat; 7 days were required for equilibrium to be reached.

Sodium sulfite was determined iodometrically, and sodium chloride by titration with mercury nitrate.

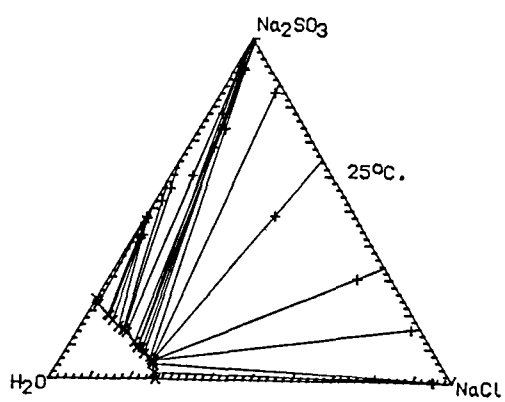
The composition of the solids were determined by Schreinemakers' method, and by chemical and crystal-optical analyses.

ESTIMATED ERROR:

Temperature: ±0.05 K
Analyses: no estimate possible.

SOURCE AND PURITY OF MATERIALS:

Chemically pure grade sodium chloride was used, and sodium sulfite was prepared by saturating cp sodium carbonate with 100% of sulfur dioxide.



COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7] 2. Sodium pyrosulfite; $Na_2S_2O_5$; [7681-57-4] 3. Water; H_2O; [7732-18-5]	Sotova, N.N.; Kuznetsova, A.G.; Torocheshnikov, N.S. *Zh. Priklad. Khim.* 1978, *51*, 779-84; *J. Appl. Chem. USSR (Eng. Transl.)* 1978, *51*, 760-4.
VARIABLES: One temperature: 273 K Concentrations of the components	PREPARED BY: Mary R. Masson

EXPERIMENTAL VALUES:

Composition of equilibrium solutions at 0°C

Na_2SO_3 mass %	'NaHSO$_3$' mass %	$Na_2S_2O_5$ mass %	Na_2SO_3[a] mol/kg	$NaHSO_3$[a] mol/kg	Na_2SO_3[a] mol/kg	$Na_2S_2O_5$[a] mol/kg	Solid[b] phase
0.0	35.21	32.15	0.	5.222	0.	2.493	A
0.76	35.06	32.03	0.094	5.250	0.090	2.507	A
2.33	33.73	30.81	0.289	5.069	0.276	2.424	A
2.95	33.73	30.81	0.370	5.119	0.353	2.447	A
3.77	32.64	29.82	0.470	4.933	0.450	2.362	A
4.34	32.90	30.05	0.549	5.038	0.525	2.409	A + B
4.71	32.37	29.57	0.594	4.944	0.569	2.367	A + B
4.58	32.66	29.81	0.579	5.001	0.554	2.390	B
4.75	32.88	30.03	0.604	5.066	0.578	2.422	B
6.23	23.30	21.28	0.701	3.177	0.682	1.544	B
8.27	13.66	12.48	0.840	1.681	0.828	0.828	B
8.38	12.21	11.15	0.837	1.478	0.826	0.729	B
12.30	0.0	0.	1.113	0.	1.113	0.	B

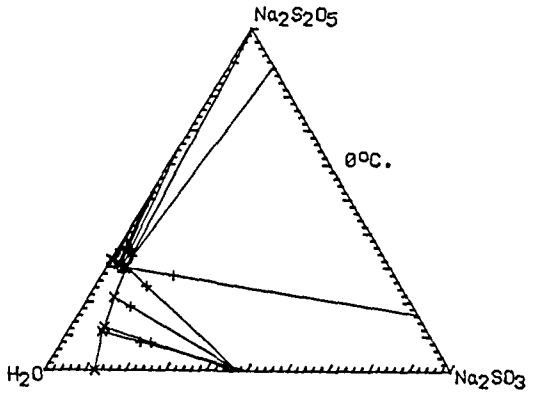
[a] Molalities calculated by the compiler.

[b] Solid phases: A - $Na_2S_2O_5.6H_2O$, B - $Na_2SO_3.7H_2O$

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

The isothermal method was used. p-Phenylenediamine was used as anti-oxidant. Total sulfite was determined iodometrically. Bisulfite was titrated with alkali as bisulfate after oxidation with peroxide. Sodium sulfate was weighed to obtain total sulfur.



SOURCE AND PURITY OF MATERIALS:

Sodium pyrosulfite was of analytical grade, and sodium sulfite was of high-purity grade.

ESTIMATED ERROR:

Temperature: ±0.2 K
Analyses: no estimate possible.

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7] 2. Sodium pyrosulfite; $Na_2S_2O_5$; [7681-57-4] 3. Water; H_2O; [7732-18-5]	Sotova, N.N.; Torocheshnikov, N.S.; Kuznetsova, A.G.; Sokolova, E.I. *Khimiya i Tekhnol. Mineral'n. Solei i Galurgichesk. Pr.-v, Varnaul* 1978, 53-59.
VARIABLES: One temperature: 373 K Concentrations of the components	PREPARED BY: Mary R. Masson

EXPERIMENTAL VALUES:

Composition of equilibrium solutions at 100°C

'NaHSO$_3$' mass %	$Na_2S_2O_5$ mass %	Na_2SO_3 mass %	$Na_2S_2O_5$[a] mol/kg	Na_2SO_3[a] mol/kg	Solid[b] phase
-	-	21.2	0.0	2.135	A
2.01	1.84	19.4	0.123	1.954	A
2.9	2.65	18.85	0.178	1.905	A
7.5	6.85	17.0	0.473	1.771	A
30.4	27.77	5.8	2.199	0.693	A
46.61	42.58	1.71	4.021	0.244	A
50.83	46.43	2.6	4.792	0.405	A + B
50.83	46.43	2.6	4.792	0.405	A + B
49.95	45.63	2.07	4.590	0.314	B
53.8	49.14	-	5.082	0.	B

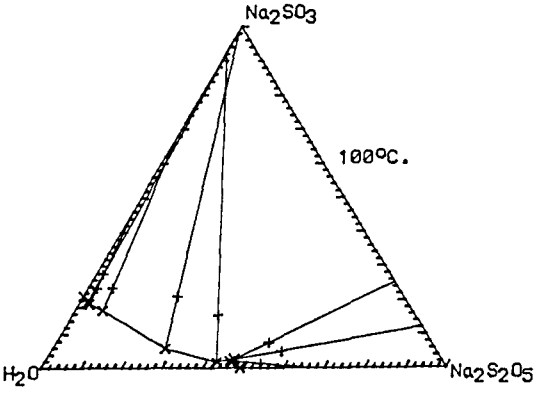
[a] Molalities calculated by the compiler.

[b] Solid phases: A - Na_2SO_3, B - $Na_2S_2O_5$

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

An isothermal method was used.



SOURCE AND PURITY OF MATERIALS:

ESTIMATED ERROR:

No estimates possible.

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7] 2. Sodium pyrosulfite; $Na_2S_2O_5$; [7681-57-4] 3. Water; H_2O; [7732-18-5]	Sotova, N.N.; Torocheshnikov, N.S.; Kuznetsova, A.G.; Poroshkova, M.A. *Khimiya i Tekhnol. Mineral'n. Solei i Galurgichesk. Pr.-v, Varnaul* 1978, 59-65.
VARIABLES:	PREPARED BY:
One temperature: 333 K Concentrations of the components	Mary R. Masson

EXPERIMENTAL VALUES:

Composition of equilibrium solutions at 60°C

Na_2SO_3 mass %	$Na_2S_2O_5$ mass %	Na_2SO_3[a] mol/kg	$Na_2S_2O_5$[a] mol/kg	Solid[b] phase
23.3	-	2.410	0.	A
21.4	2.6	2.234	0.180	A
13.9	9.7	1.443	0.668	A
12.4	13.5	1.328	0.958	A
8.3	25.0	0.987	1.972	A
22.3	41.9	0.327	3.950	A + B
2.9	42.7	0.423	4.129	B
0.0	44.5	0.	4.218	B

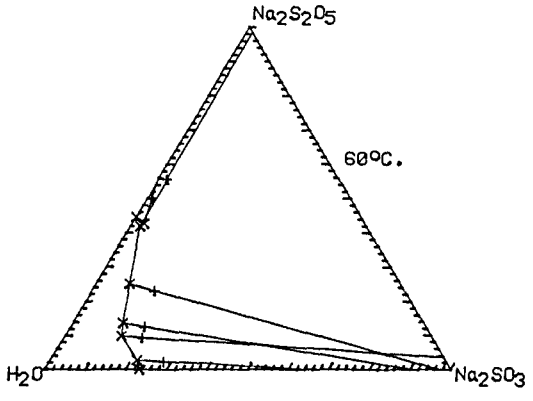
[a] Molalities calculated by the compiler.

[b] Solid phases: A - Na_2SO_3, B - $Na_2S_2O_5$

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

The isothermal method was used.



SOURCE AND PURITY OF MATERIALS.

ESTIMATED ERROR:

Temperature: ±0.1 K
Analyses: no estimate possible.

REFERENCES.

COMPONENTS:

1. Sodium sulfite; Na_2SO_3; [7757-83-7]
2. Sodium pyrosulfite; $Na_2S_2O_5$; [7681-57-4]
3. Water; H_2O; [7732-18-5]

ORIGINAL MEASUREMENTS:

Jäger, L.; Rejlek, M.; Klimeček, R.; Machala, J.

Chem. Prům. 1959, *9*, 361-3.

VARIABLES:

Four temperatures: 288 - 318 K
Concentrations of the components

PREPARED BY:

Mary R. Masson

EXPERIMENTAL VALUES:

Composition of equilibrium solutions

Na_2SO_3 mass %	$Na_2S_2O_5$ mass %	Na_2SO_3[a] mol/kg	$Na_2S_2O_5$[a] mol/kg	Solid[b] phase
Temperature = 15°C				
18.4	-	1.789	0.	A
16.1	4.3	1.605	0.284	A
14.1	9.2	1.459	0.631	A
12.0	14.5	1.295	1.038	A
10.7	20.2	1.229	1.538	A
9.1	26.9	1.128	2.211	A
8.6	29.0	1.093	2.445	A + B
6.5	31.4	0.830	2.660	B
-	37.9	0.	3.210	
Temperature = 25°C				
23.2	-	2.397	0.	A
20.9	4.5	2.223	0.317	A
19.5	7.5	2.119	0.540	A
17.9	10.45	1.982	0.767	A
16.0	16.0	1.867	1.238	A
14.0	23.0	1.763	1.920	A
12.2	27.0	1.592	2.336	A + B
11.2	28.6	1.476	2.499	B
5.5	33.8	0.719	2.929	B
3.6	36.4	0.476	3.191	B
2.6	37.1	0.342	3.236	B
-	39.9	0.	3.492	B

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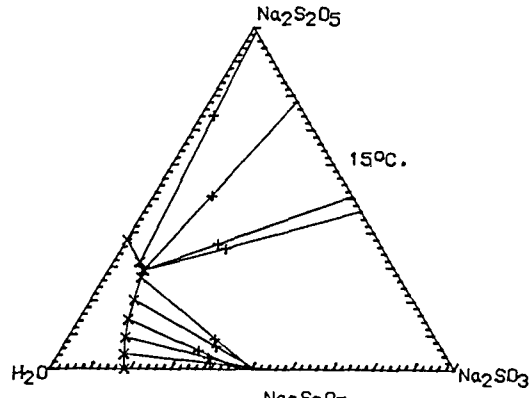
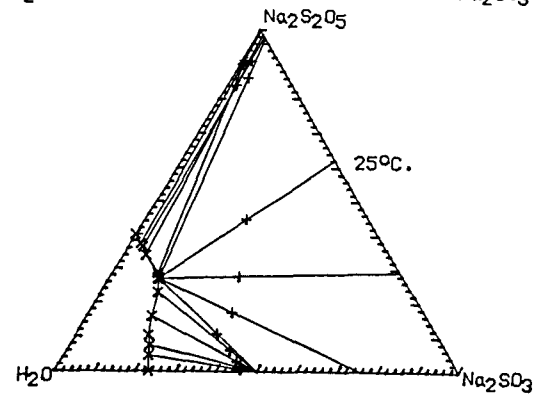




METHOD APPARATUS/PROCEDURE:

An isothermal method. The analysis involved an iodometic titration, and the oxidation of HSO_3^- to SO_4^{2-} with hydrogen peroxide. Solid phases were identified by microscopy and X-ray diffraction.

SOURCE AND PURITY OF MATERIALS:

Commercial sodium pyrosulfite was found to contain 2.2% of sodium sulfite. Sodium sulfite 7-hydrate was recrystallized from water.

ESTIMATED ERROR:

Temperature: ±0.1 K

Analyses: ±2% (authors)

REFERENCES:

COMPONENTS:

1. Sodium sulfite; Na_2SO_3; [7757-83-7]
2. Sodium pyrosulfite; $Na_2S_2O_5$; [7681-57-4]
3. Water; H_2O; [7732-18-5]

ORIGINAL MEASUREMENTS:

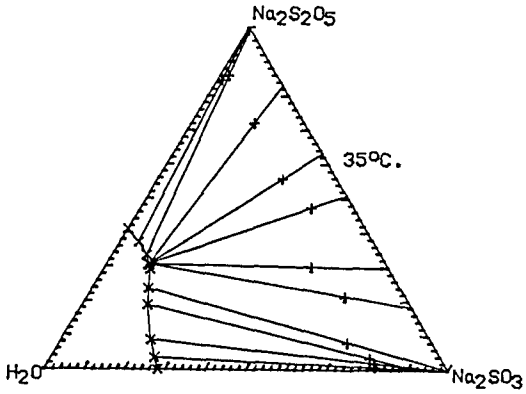
Jäger, L.; Rejlek, M.; Klimeček, R.; Machala, J.

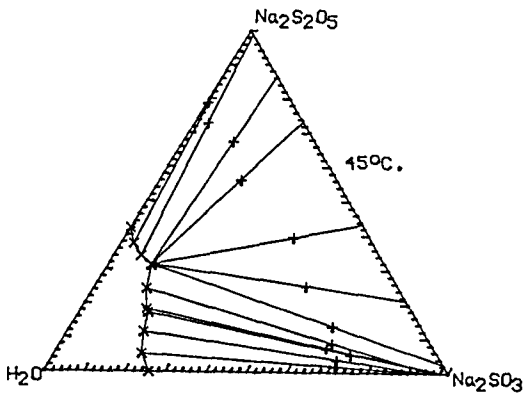
Chem. Prům. 1959, *9*, 361-3.

EXPERIMENTAL VALUES (continued):

Composition of equilibrium solutions

Na_2SO_3 mass %	$Na_2S_2O_5$ mass %	Na_2SO_3[a] mol/kg	$Na_2S_2O_5$[a] mol/kg	Solid[b] phase
Temperature =35°C				
28.1	-	3.101	0.	C
25.5	3.5	2.850	0.259	C
22.0	8.7	2.519	0.660	C
16.0	18.9	1.950	1.527	C
13.8	23.7	1.752	1.995	C
11.4	29.3	1.525	2.599	C
10.4	30.7	1.401	2.742	B + C
8.4	33.4	1.145	3.019	B
4.5	37.2	0.612	3.357	B
-	41.0	0.	3.656	B
Temperature = 45°C				
25.8	-	2.759	0.	C
21.5	5.3	2.330	0.381	C
18.7	11.7	2.132	0.884	C
16.9	17.3	2.038	1.383	C
16.0	18.4	1.935	1.475	C
13.0	24.3	1.645	2.039	C
10.6	31.4	1.450	2.848	B + C
6.7	34.1	0.898	3.030	B
3.0	37.5	0.400	3.315	B
-	42.0	0.	3.809	B





[a] Molalities calculated by the compiler.

[b] Solid phases: A - $Na_2SO_3.7H_2O$, B - $Na_2S_2O_5$, C - Na_2SO_3

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7] 2. Sodium pyrosulfite; $Na_2S_2O_5$; [7681-57-4] 3. Water; H_2O; [7732-18-5]	Arii, K. *Sci. Rep. Tohoku Imp. Univ.* 1932, *21*, 783-9; (Original: *Bull. Inst. Phys. and Chem. Research* 1926, *6*, 1065-73.)
VARIABLES:	PREPARED BY:
Concentrations of the components Two temperatures: 298 and 308 K	Mary R. Masson

EXPERIMENTAL VALUES:

Composition of equilibrium solutions at 25°C

Na_2SO_3 mass %	$Na_2S_2O_5$ mass %	Na_2SO_3[a] mol/kg^t	$Na_2S_2O_5$[a] mol/kg^t	Solid[b] phase
23.05	-	2.377	0.	B
20.98	3.66	2.209	0.255	B
17.70	10.39	1.953	0.760	B
17.01	12.49	1.914	0.932	B
15.67	16.70	1.838	1.299	B
15.06	18.65	1.802	1.480	B
13.89	21.91	1.717	1.795	B
11.83	26.73	1.528	2.289	B
11.28	29.10	1.501	2.568	B + C
10.87	29.45	1.445	2.596	C
10.46	29.79	1.389	2.623	C
9.63	30.70	1.280	2.706	C
8.33	31.77	1.103	2.790	C
7.22	32.70	0.953	2.863	C
4.46	35.34	0.588	3.088	C
1.78	37.93	0.234	3.309	C
-	39.75	0.	3.471	C

(continued on next page)

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

For systems where Na_2SO_3 was the solid phase, sulfur dioxide gas of the necessary amount was added to 20 ml of 25% sodium hydroxide, under a hydrogen atmosphere, and with cooling.

For systems where the solid was $Na_2S_2O_5$, a suitable amount of sodium hydroxide was added to sodium pyrosulfite solid.

The mixtures were stirred for 50-184 hr until equilibrium was reached. Weighed samples of the solution were analysed for sulfite by reaction with excess of iodine and determination of the excess with thiosulfate. The amount of pyrosulfite was determined by titrating the protons released in the oxidation reaction with alkali to a methyl orange end-point.

The solids were analysed similarly, after filtration under carbon dioxide.

SOURCE AND PURITY OF MATERIALS:

Sodium pyrosulfite was prepared by Foerster's method (2).

ESTIMATED ERROR:

Temperatures: ±0.01 K
Analyses: no estimate possible.

REFERENCES

1. Arii, K. *Sci. Rep. Tohoku Imp. Univ.* 1932, *21*, 772-8.
2. Foerster, F.; Brosche, A.; Norberg-Schutz, Chr. *Z. Phys. Chem.* 1924, *10*, 435-96.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7]	Arii, K.
2. Sodium pyrosulfite; $Na_2S_2O_5$; [7681-57-4]	*Sci. Rep. Tohoku Imp. Univ.* 1932, *21*, 783-9.
3. Water; H_2O; [7732-18-5]	

EXPERIMENTAL VALUES (continued):

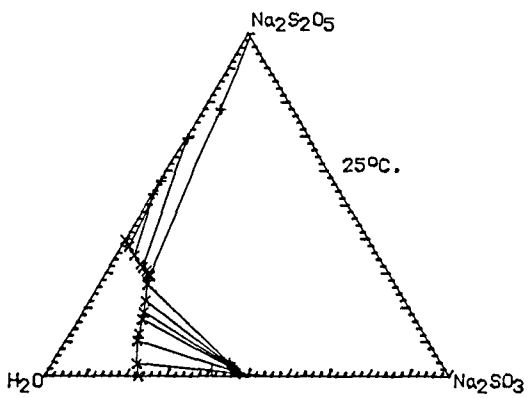
Composition of equilibrium solutions at 35°C

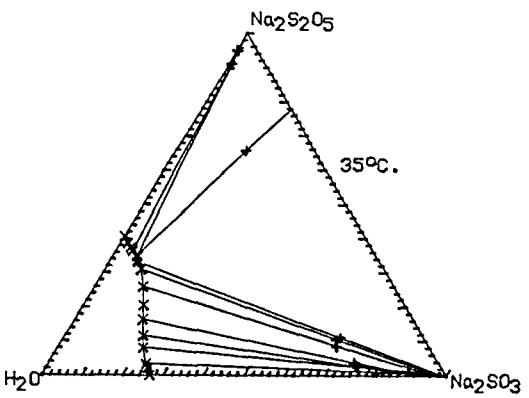
Na_2SO_3 mass %	$Na_2S_2O_5$ mass %	Na_2SO_3[a] mol/kg	$Na_2S_2O_5$[a] mol/kg	Solid[b] phase
26.57	-	2.871	0.	A
25.00	2.13	2.722	0.154	A
24.17	3.27	2.643	0.237	A
21.04	8.00	2.352	0.593	A
19.22	11.54	2.202	0.877	A
16.60	16.33	1.964	1.281	A
14.80	20.40	1.812	1.656	A
11.86	25.84	1.510	2.182	A
8.86	30.84	1.166	2.690	A
6.77	33.03	0.892	2.886	A
5.99	34.91	0.804	3.107	A + C
5.98	34.73	0.800	3.081	C
4.12	36.48	0.550	3.231	C
3.11	37.42	0.415	3.310	C
1.74	38.69	0.232	3.417	C
0.00	40.55	0.	3.588	C

[a] Molalities calculated by the compiler.

[b] Solid phases: A - Na_2SO_3, B - $Na_2SO_3.7H_2O$, C - $Na_2S_2O_5$

Notes: The author chose to work at 25°C and 35°C because he had found previously (1) that the transition point between $Na_2SO_3.7H_2O$ and Na_2SO_3 was 33.5°C. He concluded from his results that, when sulfur dioxide passes into sodium hydroxide solution, any solid that separates will be Na_2SO_3, $Na_2SO_3.7H_2O$, or $Na_2S_2O_5$, and not any double salt or solid solution between these salts, at temperatures of 25 and 35°C.





COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7] 2. Ammonium sulfite; $(NH_4)_2SO_3$; [10196-04-0] 3. Water; H_2O; [7732-18-5]	Labash, J.A.; Lusby, G.R. *Can. J. Chem.* 1955, *33*, 774-86.
VARIABLES:	PREPARED BY:
Two temperatures: 293 and 333 K Concentrations of the components	Mary R. Masson

EXPERIMENTAL VALUES:

Composition of equilibrium solutions at 20°C

Na_2SO_3 mass %	$(NH_4)_2SO_3$ mass %	$(NH_4)_2SO_4$ mass %	Na_2SO_3[a] mol/kg	$(NH_4)_2SO_3$[a] mol/kg	$(NH_4)_2SO_4$[a] mol/kg	Solid[b] phase
0.0	37.34	0.49	0.	5.171	0.060	A
4.74	33.52	1.10	0.620	4.760	0.137	A
9.91	30.91	0.62	1.343	0.545	0.080	A
14.79	27.55	1.00	2.071	4.187	0.134	A
14.98	27.43	0.96	2.099	4.171	0.128	A + B
17.26	25.75	1.30	2.459	3.981	0.177	n.d.
17.21	25.70	0.80	2.426	3.931	0.108	C
17.97	20.87	0.88	2.365	2.981	0.110	C
18.65	15.95	0.84	2.292	2.127	0.098	C
19.34	10.44	0.87	2.213	1.296	0.095	C
20.58	-	0.77 (Na)	2.076	0.	0.074	C

(continued on next page)

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

Solutions were stirred under nitrogen in a three-necked flask. Solutions were analysed often for bisulfite, formed by loss of ammonia, and ammonia gas was then added to replace that lost. A saturated solution was prepared of one of the single salts, and portions of the second salt were then added, with stirring, in presence of excess of the first salt. Addition of the second salt was continued until the soln composition became constant. Samples were withdrawn, after settling, through a pipette plugged with cotton wool. The weighed sample was diluted to volume in a standard flask.

Bisulfite was determined by acid-base titration as bisulfate after oxidation with neutral hydrogen peroxide. Sulfite was determined by adding an aliquot of the freshly diluted soln to excess of iodine solution. The excess was back-titrated with thiosulfate. Total sulfate was determined as barium sulfate, ammonium by (2) and sodium gravimetrically after conversion of all sodium salts to the sulfate.

SOURCE AND PURITY OF MATERIALS:

$(NH_4)_2SO_3.H_2O$ was freshly prepared from ammonia and sulfur dioxide gases. Sodium sulfite heptahydrate was prepared freshly by cooling a saturated solution of anhydrous sodium sulfite. Anhydrous sodium sulfite was of analytical grade.

ESTIMATED ERROR:

Temperature: ±0.1 K
Analyses: 0.2% for sulfite, ammonium, 0.4% for sodium and total sulfate.

REFERENCES:

1. Zil'berman, Y.I.; Ivanov, P.T. *Zh. Priklad. Khim.* 1941, *14*, 939.
2. Sutton, F. *Volumetric Analysis*, 12th Ed., Blakiston, Philadelphia, 1935. Page 75.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7]	Labash, J.A.; Lusby, G.R.
2. Ammonium sulfite; $(NH_4)_2SO_3$; [10196-04-0]	*Can. J. Chem.* 1955, *33*, 774-86.
3. Water; H_2O; [7732-18-5]	

EXPERIMENTAL VALUES (continued):

Composition of the equilibrium solutions at 60°C expressed as mass %

Na_2SO_3	$(NH_4)_2SO_3$	Na_2SO_4	NH_4HSO_3	NH_3	Solid[b] phase
8.35[c]	45.08	-	-	-	A + D
7.76	44.7	0.74	-	0.08	n.d.
7.69	45.0	0.71	0.08	-	n.d.

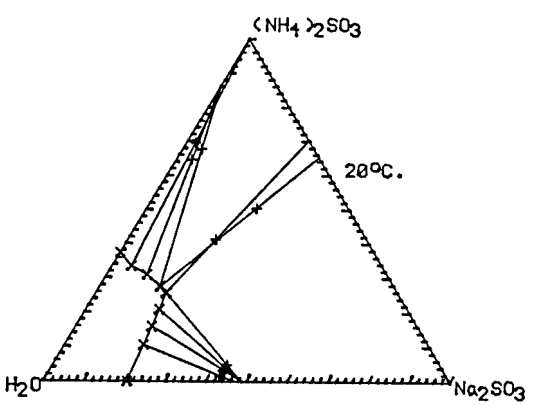
Compositions of these solutions expressed as molalities[a], mol/kg (compiler)

1.42[c]	8.33	-	-	-
1.32	8.24	0.11	-	0.10
1.31	8.33	0.11	0.017	

[a] Molalities calculated by the compiler.

[b] Solid phases: A - $(NH_4)_2SO_3.H_2O$, B - unknown solid,
C - $Na_2SO_3.7H_2O$, D - Na_2SO_3 n.d. - not determined

[c] From ref. (1)



COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7] 2. Ammonium sulfite; $(NH_4)_2SO_3$; [10196-04-0] 3. Water; H_2O; [7732-18-5]	Zil'berman, Ya.I.; Ivanov, P.T. *Zh. Prikład. Khim.* 1941, *14*, 939-46.
VARIABLES:	PREPARED BY:
Two temperatures: 333 and 358 K Concentrations of the components	Mary R. Masson

EXPERIMENTAL VALUES:

Composition of equilibrium solutions

SO_3^{2-} mass %	NH_4^+ mass %	Na_2SO_3 mass %	$(NH_4)_2SO_3$ mass %	Na_2SO_3[a]	$(NH_4)_2SO_3$	Solid[b] phase	
Temperature = 85°C							
-	-	22.1	-	2.250	0.	A	
36.00	14.60	5.52	47.16	0.925	8.581	A	
37.43	15.25	5.25	49.40	0.918	9.379	A	
41.22	16.95	5.51	54.67	1.098	11.821	A + B	
-	-	-	59.53	0.	12.665	B	
Temperature = 60°C							
33.92	11.82	12.20	38.11	1.948	6.604	A	
35.98	13.00	11.06	45.08	2.000	8.850	A	
36.40	13.97	8.35	45.08	1.422	8.335	A + B'	
-	-	(22.0)	-	2.237	0.0	(A)	(1)
-	-	-	(50.94)	0.0	8.940	(B)	(2)

[a] Molalities calculated by the compiler.

[b] Solid phases: A - Na_2SO_3, B - $(NH_4)_2SO_3$, B' - $(NH_4)_2SO_3.H_2O$

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AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

Solutions were equilibrated in glass test tubes fitted with spiral stirrers supplied with mercury seals. Freshly made salts were always used for each filling of a test tube. The anti-oxidant p-phenylenediamine was added to all solutions, and the work was done in an atmosphere of nitrogen, but experiments still had to be repeated often because of the formation of unacceptably high concentrations of sulfate.

Sulfite was determined by reaction with iodine solution, ammonium was volatilized by reaction with alkali, and collected in acid, the excess of which was titrated, sodium was weighed as sodium sulfate, and total sulfur as barium sulfate.

SOURCE AND PURITY OF MATERIALS:

Ammonium sulfite was made by saturating aqueous ammonia with sulfur dioxide, with cooling and in the presence of p-phenylenediamine as anti-oxidant. The crystals were filtered off and washed with alcohol. The product usually contained 0.5 - 1% of sulfate.

The sodium sulfite heptahydrate (reagent grade) contained about 1% of sulfate.

ESTIMATED ERROR:

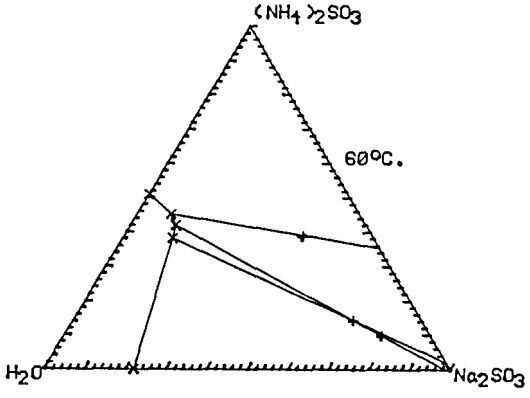
Analyses: 0.2% relative
Temperature: no estimate given (toluene and mercury thermoregulators)

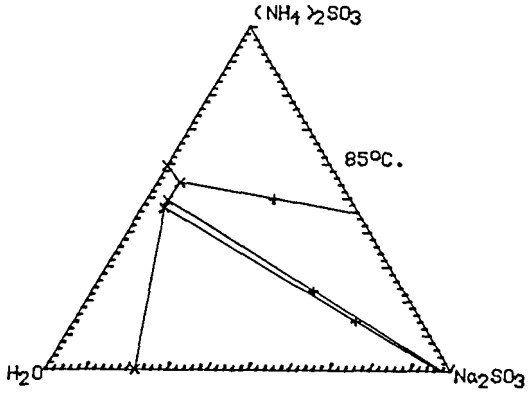
REFERENCES:

1. *Landolt* III (suppl.), Chap. I.
2. Mellor, J.W. *A Comprehensive Treatise on Inorganic and Theoretical Chemistry: Vol. X* Longmans, Green & Co., London, 1930.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7]	Zil'berman, Ya.I.; Ivanov, P.T.
2. Ammonium sulfite; $(NH_4)_2SO_3$; [10196-04-0]	*Zh. Priklad. Khim.* 1941, *14*, 939-46.
3. Water; H_2O; [7732-18-5]	

EXPERIMENTAL VALUES (continued):





COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-5] 2. Sodium thiosulfate; $Na_2S_2O_3$; [7772-04-7] 3. Water; H_2O; [7732-18-5]	Palkina, N.A. *Tr. Vornezh. Gos. Univ.* 1950, *17*, 61-88.
VARIABLES:	PREPARED BY:
Six temperatures: 273 - 298 K Concentrations of the components	Mary R. Masson

EXPERIMENTAL VALUES:

Composition of equilibrium solutions

Na_2SO_3 mass %	$Na_2S_2O_3$ mass %	Na_2SO_3[a] mol/kg	$Na_2S_2O_3$[a] mol/kg	Solid[b] phase
Temperature = 0°C				
11.9	0.0	1.072	0.	A
8.6	9.1	0.829	0.699	A
6.1	18.78	0.644	1.581	A
4.9	23.77	0.545	2.108	A
4.2	26.82	0.483	2.459	A
3.25	30.97	0.392	2.978	*
0.81	32.73	0.097	3.115	B
0.0	33.4	0.	3.172	
Temperature = 5°C				
13.8	0.0	1.270	0.	
9.9	9.0	0.969	0.702	A
7.4	18.52	0.793	1.581	A
6.1	23.47	0.687	2.108	A
5.4	26.48	0.629	2.459	A
4.1	31.54	0.505	3.100	A
4.0	32.1	0.497	3.177	*
0.0	35.2	0.	3.436	

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AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

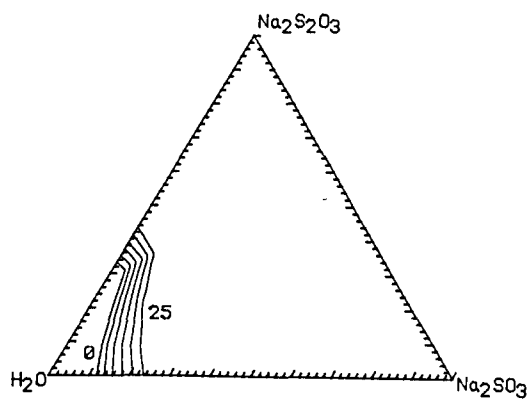
A polythermal procedure was used, based on the following systems:

I (10% $Na_2S_2O_3$ + 90% water) + Na_2SO_3
II (20% $Na_2S_2O_3$ + 80% water) + Na_2SO_3
III (25% $Na_2S_2O_3$ + 75% water) + Na_2SO_3
IV (28% $Na_2S_2O_3$ + 72% water) + Na_2SO_3
V (33% $Na_2S_2O_3$ + 67% water) + Na_2SO_3
VI (36% $Na_2S_2O_3$ + 64% water) + Na_2SO_3
VII (38% $Na_2S_2O_3$ + 62% water) + Na_2SO_3

ESTIMATED ERROR:

No estimates possible.

SOURCE AND PURITY OF MATERIALS:



COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-5]	Palkina, N.A.
2. Sodium thiosulfate; $Na_2S_2O_3$; [7772-04-7]	*Tr. Vornezh. Gos. Univ.* 1950, *17*, 61-88.
3. Water; H_2O; [7732-18-5]	

EXPERIMENTAL VALUES (continued):

Composition of equilibrium solutions

Na_2SO_3 mass %	$Na_2S_2O_3$ mass %	Na_2SO_3[a] mol/kg	$Na_2S_2O_3$[a] mol/kg	Solid[b] phase
Temperature = 10°C				
15.8	0.0	1.489	0.	
11.7	8.83	1.168	0.703	A
8.9	18.22	0.969	1.581	A
7.5	23.12	0.858	2.108	A
6.7	26.12	0.791	2.459	A
5.4	31.22	0.676	3.116	A
4.75	33.25	0.608	3.392	*
2.5	35.1	0.318	3.558	B
0.0	37.0	0.	3.715	
Temperature = 15°C				
18.2	0.0	1.765	0.	
13.7	8.63	1.399	0.703	A
10.6	17.88	1.176	1.581	A
9.1	22.47	1.055	2.077	A
8.1	25.73	0.971	2.459	A
6.7	30.79	0.850	3.116	A
5.9	33.87	0.777	3.557	A
5.7	34.3	0.754	3.616	*
1.9	37.32	0.248	3.884	B
0.0	39.1	0.	4.061	
Temperature = 20°C				
20.8	0.0	2.084	0.	
16.0	8.4	1.679	0.703	A
12.5	17.5	1.417	1.581	A
10.7	22.32	1.267	2.108	A
9.7	25.28	1.184	2.459	A
8.1	30.32	1.044	3.114	A
7.3	33.37	0.976	3.558	A
6.6	35.2	0.900	3.825	*
6.0	35.72	0.817	3.877	B
0.0	41.2	0.	4.432	
Temperature = 25°C				
23.5	0.0	2.437	0.	
18.5	8.15	2.001	0.703	A
14.5	17.1	1.682	1.581	A
12.5	21.47	1.502	2.057	A
11.6	24.75	1.446	2.459	A
9.8	29.76	1.286	3.114	A
8.7	32.86	1.181	3.557	A
8.2	34.88	1.143	3.876	A
7.8	35.8	1.097	4.015	*
0.0	43.5	0.	4.870	

[a] Molalities calculated by the compiler.

[b] Solid phases: A - "Solid solution of $Na_2SO_3.7H_2O$ and $Na_2S_2O_3.5H_2O$"
B - $Na_2S_2O_3.5H_2O$
* - A + B, liquid composition determined graphically

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7] 2. Sodium thiosulfate; $Na_2S_2O_3$; [7772-98-7] 3. Water; H_2O; [7732-18-5]	Mochalov, K.I.; Monina, S.S. *Uch. Zap. Perm. Univ.* 1970, *229*, 40-43.
VARIABLES: One temperature: 288 K Concentrations of the components	**PREPARED BY:** Mary R. Masson

EXPERIMENTAL VALUES:

Composition of saturated solutions

$Na_2S_2O_3.5H_2O$ mass %	$Na_2SO_3.7H_2O$ mass %	$Na_2S_2O_3$[a] mass %	Na_2SO_3[a] mass %	$Na_2S_2O_3$[b] mol/kg	Na_2SO_3[b] mol/kg	Solid[c] phase
0.0	36.5	0.0	18.2	0.0	1.765	A
14.4	28.0	9.2	14.0	0.758	1.446	A
32.4	19.0	20.6	9.5	1.864	1.078	A
48.8	13.0	31.1	6.5	3.152	0.826	A
55.0	12.5	35.0	6.2	3.765	0.837	A + B
56.5	8.5	36.0	4.2	3.808	0.557	B
60.0	4.0	38.2	2.0	4.040	0.265	B
63.6	0.0	40.5	0.0	4.305	0.0	B

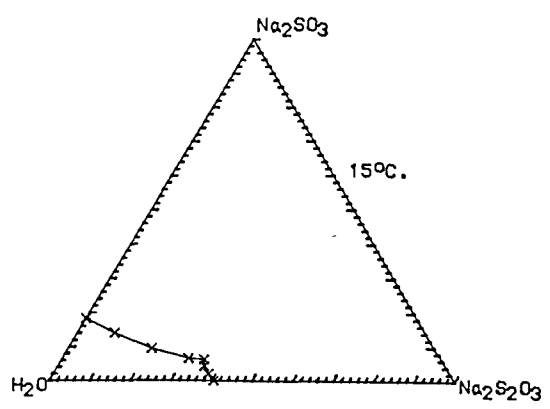
[a] Values calculated by the compiler.

[b] Molalities calculated by the compiler.

[c] Solid phases: A - $Na_2SO_3.7H_2O$, B - $Na_2S_2O_3.5H_2O$

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
An isothermal method.	
ESTIMATED ERROR: No estimates possible.	



COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [77757-83-5] 2. Sodium thiosulfate; $Na_2S_2O_3$; [7772-03-7] 3. Water; H_2O; [7732-18-5]	Wöhler, L.; Dierksen, J. *Z. Angew. Chem.* 1926, *39*, 33-36.
VARIABLES: Temperature: 296 - 353 K Concentrations of the components	PREPARED BY: Mary R. Masson

EXPERIMENTAL VALUES:

Composition of saturated solutions

t/°C	$Na_2S_2O_3$ mass %	Na_2SO_3 mass %	$Na_2S_2O_3$[a] mol/kg	Na_2SO_3[a] mol/kg
23	36.9	5.6	4.059	0.773
40	49.4	1.1	6.312	0.176
60	64.4	0.3	11.539	0.067
80	69.7	0.36	14.724	0.095

[a] Molalities calculated by the compiler.

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Sulfite and thiosulfate were determined by titration with iodine, and then with alkali, to Methyl Orange.	
	ESTIMATED ERROR: No estimates possible.
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7] 2. Ethanol; C_2H_5OH; [64-17-5] 3. Water; H_2O; [7732-18-5]	Klebanov, G.S.; Ostapkevich, N.A. *Zh. Neorg. Khim.* 1960, 5, 2329-2333; *Russ. J. Inorg. Chem. (Eng. Transl.)* 1960, 5, 1128-9.
VARIABLES: Two temperatures: 293 - 323 K Concentrations of the components	PREPARED BY: Mary R. Masson

EXPERIMENTAL VALUES: Composition of equilibrium solutions

Na_2SO_3 mass %	C_2H_5OH mass %	Na_2SO_3[a] mol/kg	C_2H_5OH[a] mol/kg	Solid[b] phase
Temperature = 20°C				
20.72	-	2.074	0.	A
13.44	7.68	1.352	2.113	A
4.33	25.66	0.491	7.956	A
1.63	36.90	0.210	13.030	A
0.97	41.00	0.133	15.336	A
0.71	45.12	0.104	18.080	A
0.50	48.39	0.078	20.551	A
0.34	51.27	0.056	22.998	A
0.12	58.72	0.023	30.967	A + B
0.10	62.43	0.021	36.165	B
0.08	70.01	0.021	50.807	B
0.02	84.46	0.010	118.125	B
Temperature = 50°C				
25.63	-	2.734	0.	B
17.44	7.28	1.838	2.099	B
12.01	14.61	1.299	4.322	B
6.48	23.87	0.738	7.439	B
2.45	37.20	0.322	13.380	B
1.46	44.44	0.214	17.830	B
0.57	54.63	0.101	26.469	B
0.29	60.28	0.058	33.184	B
0.22	64.31	0.049	39.355	B
0.02	81.10	0.008	93.240	B

[a] Molalities calculated by the compiler.

[b] Solid phases: A - $Na_2SO_3.7H_2O$, B - Na_2SO_3

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The isothermal method was used; the vessels were glass test tubes fitted with mercury seals, at 20°C, and with reflux condensers at 50°C. Alcohol was distilled off and determined iodometrically.	"Chemically pure" salts were used. Ethanol and water were redistilled twice.
	ESTIMATED ERROR: Temperature: ±0.1 K Analyses: no estimate possible.
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7] 2. Ethanol; C_2H_5OH; [64-17-5] 3. Water; H_2O; [7732-18-5]	Navrátil, J.; Nývlt, J. *Chem. Prům.* 1968, *18*, 612-4.
VARIABLES: Temperature: 276 - 310 K Ethanol concentration	PREPARED BY: Mary R. Masson

EXPERIMENTAL VALUES:

Solubility in water

t/°C	Atmosphere	Na_2SO_3 mass %	Na_2SO_3[a] mol/kg
12.1	air	15.2	1.422
14.9	air	16.6	1.579
19.5	air	18.7	1.825
26.5	air	22.1	2.251
27.6	air	23.0	2.370
29.8	air	24.6	2.589
16.1	N_2	17.5	1.683
22.5	N_2	19.5	1.922
24.2	N_2	21.3	2.147
31.2	N_2	25.8	2.759

Solubility in 10% aqueous ethanol

8.4	air	4.6	0.383
17.6	air	8.7	0.756
27.6	air	13.8	1.270

Solubility in 30% aqueous ethanol

7.8	air	0.98	0.079
16.0	air	1.9	0.154
24.5	air	3.7	0.305

Solubility in 20% aqueous ethanol

t/°C	Atmosphere	Na_2SO_3 mass %	Na_2SO_3[a] mol/kg
14.4	air	4.1	0.339
21.0	air	6.2	0.524
24.2	air	7.3	0.625
28.5	air	9.1	0.794
31.2	air	10.7	0.951
37.5	air	13.5	1.238
3.1	N_2	1.0	0.080
6.5	N_2	1.9	0.154
12.0	N_2	4.0	0.331
18.8	N_2	5.9	0.497
23.0	N_2	7.5	0.643
28.2	N_2	10.0	0.882
32.5	N_2	11.6	1.041
35.5	N_2	13.1	1.196

[a] Molalities calculated by the compiler.

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
An isothermal method.	Sodium sulfite heptahydrate was obtained from Lachema, Brno.
	ESTIMATED ERROR: No estimates possible.
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7] 2. Sodium hydroxide; NaOH; [1310-73-2] 3. Water; H_2O; [7732-18-5]	Hammick, D.L.; Currie, J.A. *J. Chem. Soc.* 1925, *127*, 1623-8.
VARIABLES: Concentrations of the components Temperature	PREPARED BY: Mary R. Masson

EXPERIMENTAL VALUES:

Composition of equilibrium solutions

NaOH mass %	Na_2SO_3 mass %	NaOH mol/kg	Na_2SO_3 mol/kg	Solid phase
Temperature = 0.15°C				
-	12.2	0.	1.102	A
3.0	9.0	0.852	0.811	A
9.0	5.2	2.622	0.481	A
16.9	2.8	5.262	0.277	A
21.9	2.21	7.214	0.231	A
23.3	2.2	7.819	0.234	A + B
25.4	1.3	8.663	0.141	B
26.6	0.7	9.147	0.076	B
27.1	0.4	9.345	0.044	B
27.9	0.1	9.688	0.011	B
29.1	0.1	10.275	0.011	B + C
29.5	-	10.461	0.	C
Temperature = 20°C				
-	21.2	0.	2.135	A
1.6	18.7	0.502	1.862	A
4.4	15.4	1.372	1.523	A
8.3	12.0	2.604	1.195	A
9.9	11.0	3.129	1.103	A
11.6	9.9	3.694	1.001	A
12.2	9.6	3.900	0.974	A
12.7	9.4	4.076	0.957	A
13.4	9.2	4.328	0.943	A
14.0	9.0	4.545	0.927	A + B

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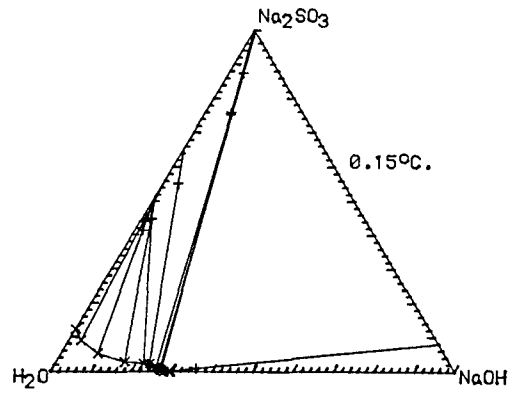


AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

Mixtures of the components of approx. known composition were made up in resistance-glass test-tubes, or in a silver vessel (for [NaOH] - 25%). The vessels were placed in a thermostat for 24-48 hr, until equilibrium was reached. The solution was separated from the moist solid by filtration, still in the thermostat. The solutions and the solids were analysed for sulfite by oxidation with hydrogen peroxide, decomposition of the excess by boiling, then determination of the sulfate formed as barium sulfate. Hydroxide was determined by titration, and water by difference.

Schreinemakers' method was then used to identify the solids.

SOURCE AND PURITY OF MATERIALS:

Sodium sulfite was prepared by passing sulfur dioxide into a solution of A.R. sodium carbonate (BDH), with exclusion of air. The solution was evaporated under hydrogen until a good crop of crystals was obtained. The washed and dried salt was tested for sulfate, and rejected if any was found. Carbonate-free sodium hydroxide solutions were prepared (1,2).

ESTIMATED ERROR:

Analyses: about ±0.5%
Temperatures: ±0.1°C, and ±0.05°C at 0.15°C

REFERENCES.

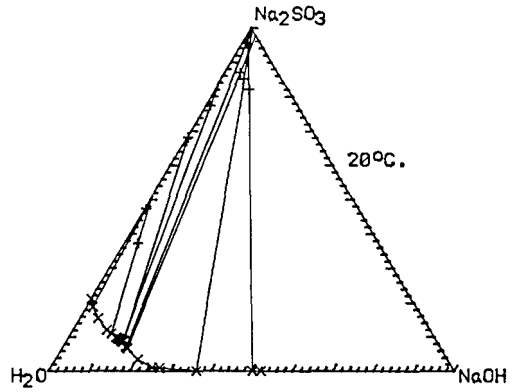
1. Cornog, J. *J. Am. Chem. Soc.* 1921, *43*, 2573.
2. Freeth, F.A. *Phil. Trans. A.* 1922, *223*, 35.

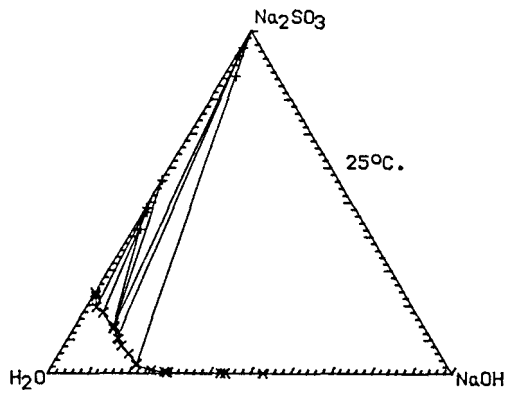
COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7]	Hammick, D.L.; Currie, J.A.
2. Sodium hydroxide; NaOH; [1310-73-2]	*J. Chem. Soc.* 1925, *127*, 1623-8.
3. Water; H_2O; [7732-18-5]	

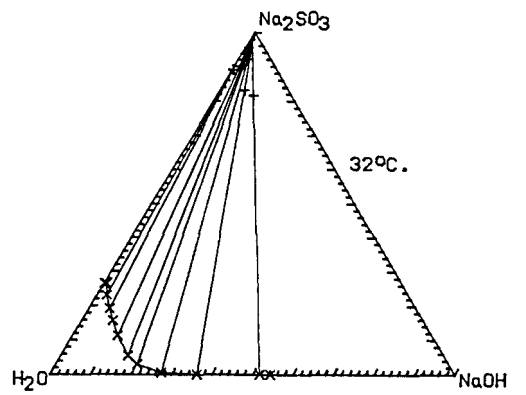
EXPERIMENTAL VALUES (continued):

Composition of equilibrium solutions

NaOH mass %	Na_2SO_3 mass %	NaOH mol/kg	Na_2SO_3 mol/kg	Solid phase
Temperature = 20°C (continued)				
13.8	8.6	4.446	0.879	A + B
15.5	7.0	5.000	0.717	B
16.0	6.7	5.175	0.688	B
20.2	3.5	6.619	0.364	B
24.9	1.1	8.412	0.118	B
26.8	1.0	9.280	0.110	B
36.3	0.1	14.269	0.012	B
50.1	trace	25.105	0.002	B
52.2**	-	27.301	0.	D
Temperature = 25°C				
-	23.6*	0.	2.451	A
0.7	22.5	0.228	2.324	A
2.5	19.3	0.799	1.958	A
5.0	17.7	1.617	1.817	A
9.7	13.0	3.137	1.334	A
9.8	13.2	3.182	1.360	A + B
9.6	13.8	3.133	1.429	A + B
12.2	10.2	3.930	1.043	B
12.6	10.1	4.075	1.037	B
14.2	8.2	4.575	0.838	B
17.2	5.8	5.584	0.598	B
20.7	2.9	6.774	0.301	B
20.7	2.5	6.738	0.258	B
25.2	1.0	8.537	0.108	B
28.7	0.5	10.134	0.056	B
29.4	0.3	10.455	0.034	B
42.7	0.1	18.663	0.014	B
43.9	trace	10.567	0.001	B
53.3[d]	-	28.533	0.	D
Temperature = 32°C				
-	26.5[c]	0.	2.861	B
0.6	26.4	0.205	2.869	B
2.3	23.1	0.771	2.457	B
5.1	19.1	1.682	1.999	B
7.6	15.7	2.477	1.624	B
11.1	11.2	3.571	1.144	B
16.5	5.4	5.282	0.549	B
20.1	2.9	6.526	0.299	B
27.2	0.6	9.418	0.066	B
36.2	0.1	14.207	0.012	B
51.8	0.001	26.868	0.000	B
54.4[d]	-	29.825	0.	D







[a] Molalities calculated by the compiler.

[b] Solid phases: A - $Na_2SO_3.7H_2O$, B - Na_2SO_3, C - $NaOH.4H_2O$, D - $NaOH.H_2O$

[c] Values taken from Lewis, N.B.; Rivett, A.C.D. *J. Chem. Soc.* 1924, *125*, 1156-67.

[d] Values taken from Pickering, S.U. *J. Chem. Soc.* 1893, *63*, 890.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Sodium sulfite; Na_2SO_3; [7757-83-7] 2. Sodium 2-naphtholate; $NaC_{10}H_7O$; [875-83-2] 3. Water; H_2O; [7732-18-5]	Teslo, S.P.; Gulyamov, Yu.M.; Odarich, V.F. *Vopr. Khim. Khim. Tekhnol.* 1979, 55, 92-4.
VARIABLES: Temperature: 313 - 371 K Concentrations of the components	PREPARED BY: Mary R. Masson

EXPERIMENTAL VALUES:

Composition of saturated solutions

[Sodium 2-naphtholate], g/l.	[Sodium sulfite], g/l. 40°C	50°C	60°C	70°C	80°C	90°C	98°C
54.44	235.62	214.83	200.97	189.88	180.18	177.41	172.02
98.71	205.13	177.41	167.71	162.16	155.23	151.07	148.30
134.64	185.72	166.32	153.23	149.69	135.83	130.28	128.90
148.90	171.86	152.46	144.14	138.60	126.12	120.59	117.81
197.42	119.75	125.29	111.99	95.36	87.60	84.55	71.77
259.78	99.79	88.70	76.51	69.85	63.20	56.55	-
321.55	-	-	46.71	45.74	44.54	42.97	-

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Isothermal saturation.	
	ESTIMATED ERROR: No estimates possible.
	REFERENCES.