

COMPONENTS: 1. Ammonium sulfite; $(\text{NH}_4)_2\text{SO}_3$; [10196-04-0] 2. Ammonia; NH_3 ; [7664-41-7] 3. Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Terres, E.; Hahn, E. <i>Das Gas- und Wasserfach</i> 1927, 70, 363-367.																																																																																																
VARIABLES: Four temperatures: 273 - 333 K Concentrations of the components	PREPARED BY: Mary R. Masson																																																																																																
EXPERIMENTAL VALUES: <u>Composition of equilibrium solutions</u> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">$(\text{NH}_4)_2\text{SO}_3$ mass %</th> <th style="text-align: center;">NH_3 mass %</th> <th style="text-align: center;">$(\text{NH}_4)_2\text{SO}_3^a$ mol/kg</th> <th style="text-align: center;">NH_3^a mol/kg</th> </tr> </thead> <tbody> <tr> <td colspan="4" style="text-align: center;"><u>Temperature = 0°C</u></td> </tr> <tr><td>32.93</td><td>0.0</td><td>4.227</td><td>0.</td></tr> <tr><td>26.11</td><td>3.97</td><td>3.215</td><td>3.334</td></tr> <tr><td>24.78</td><td>7.52</td><td>3.152</td><td>6.523</td></tr> <tr><td>24.34</td><td>8.41</td><td>3.116</td><td>7.343</td></tr> <tr><td>32.70</td><td>8.57</td><td>4.794</td><td>8.569</td></tr> <tr><td>40.81</td><td>10.26</td><td>7.181</td><td>12.313</td></tr> <tr><td>33.08</td><td>10.40</td><td>5.039</td><td>10.805</td></tr> <tr><td>26.91</td><td>10.43</td><td>3.698</td><td>9.774</td></tr> <tr><td>34.41</td><td>10.93</td><td>5.420</td><td>11.742</td></tr> <tr><td>31.89</td><td>12.11</td><td>4.903</td><td>12.698</td></tr> <tr><td>102.87?</td><td>13.94</td><td style="text-align: center;">—</td><td style="text-align: center;">—</td></tr> <tr><td>26.93</td><td>16.80</td><td>4.121</td><td>17.531</td></tr> <tr><td>33.47</td><td>14.38</td><td>5.526</td><td>16.192</td></tr> <tr><td>20.80</td><td>17.98</td><td>2.925</td><td>17.246</td></tr> <tr><td>32.28</td><td>18.08</td><td>5.599</td><td>21.387</td></tr> <tr><td>66.02</td><td>18.92</td><td>37.746</td><td>73.770</td></tr> <tr><td>71.08</td><td>19.02</td><td>61.820</td><td>112.813</td></tr> <tr><td>26.70</td><td>19.57</td><td>4.279</td><td>21.387</td></tr> <tr><td>47.96</td><td>20.20</td><td>12.970</td><td>37.253</td></tr> <tr><td>43.97</td><td>20.40</td><td>10.626</td><td>33.620</td></tr> <tr><td>38.09</td><td>20.76</td><td>7.970</td><td>29.624</td></tr> <tr><td>27.19</td><td>21.15</td><td>4.532</td><td>24.040</td></tr> </tbody> </table> <p style="text-align: right;">(continued on next page)</p>		$(\text{NH}_4)_2\text{SO}_3$ mass %	NH_3 mass %	$(\text{NH}_4)_2\text{SO}_3^a$ mol/kg	NH_3^a mol/kg	<u>Temperature = 0°C</u>				32.93	0.0	4.227	0.	26.11	3.97	3.215	3.334	24.78	7.52	3.152	6.523	24.34	8.41	3.116	7.343	32.70	8.57	4.794	8.569	40.81	10.26	7.181	12.313	33.08	10.40	5.039	10.805	26.91	10.43	3.698	9.774	34.41	10.93	5.420	11.742	31.89	12.11	4.903	12.698	102.87?	13.94	—	—	26.93	16.80	4.121	17.531	33.47	14.38	5.526	16.192	20.80	17.98	2.925	17.246	32.28	18.08	5.599	21.387	66.02	18.92	37.746	73.770	71.08	19.02	61.820	112.813	26.70	19.57	4.279	21.387	47.96	20.20	12.970	37.253	43.97	20.40	10.626	33.620	38.09	20.76	7.970	29.624	27.19	21.15	4.532	24.040
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METHOD APPARATUS/PROCEDURE: To a saturated solution of ammonium sulfite was added ammonia gas. After separation of the solid, the solution was analysed for NH_3 and SO_2 , then the mass % of ammonium sulfite and the excess amount of ammonia were calculated.	SOURCE AND PURITY OF MATERIALS: ESTIMATED ERROR: Temperature: ± 0.1 K Analyses: no estimate possible. REFERENCES:																																																																																																

COMPONENTS:		ORIGINAL MEASUREMENTS:	
1. Ammonium sulfite; $(\text{NH}_4)_2\text{SO}_3$; [10196-04-0]		Terres, E.; Hahn, E.	
2. Ammonia; NH_3 ; [7664-41-7]		<i>Das Gas- und Wasserfach</i> <u>1927</u> , 70, 363-367.	
3. Water; H_2O ; [7732-18-5]			
EXPERIMENTAL VALUES (continued):			
$(\text{NH}_4)_2\text{SO}_3$	NH_3	$(\text{NH}_4)_2\text{SO}_3^a$	NH_3^a
mass %	mass %	mol/kg	mol/kg
Temperature = 20°C			
36.60	0.0	4.971	0.
36.49	0.52	4.988	0.485
32.09	2.59	4.230	2.328
30.28	4.94	4.025	4.478
29.84	5.65	3.983	5.143
32.14	8.21	4.644	8.085
33.19	8.43	4.895	8.479
30.15	8.69	4.245	8.343
30.37	8.77	4.297	8.462
33.38	8.98	4.986	9.148
38.90	9.07	6.437	10.236
34.37	9.20	5.244	9.573
38.92	9.35	6.478	10.613
36.26	10.57	5.872	11.673
34.26	12.86	5.578	14.280
36.63	13.07	6.270	15.258
56.55	14.71	16.942	30.055
32.18	14.98	5.244	16.647
32.36	16.54	5.453	19.006
34.00	17.24	6.004	20.762
38.00	17.39	7.334	22.890
54.70	17.47	16.924	36.961
43.28	18.09	9.647	27.498
46.05	18.15	11.076	29.770
72.71	18.18	68.722	117.182
66.10	18.59	37.174	71.300
64.93	19.09	34.985	70.148
Temperature = 40°C			
42.50	1.05	6.483	1.092
40.01	2.28	5.969	2.320
37.24	4.92	5.544	4.995
37.70	5.74	5.739	5.959
36.00	6.27	5.369	6.378
32.55	7.93	4.709	7.823
55.60	9.06	13.546	15.054
31.95	9.53	4.701	9.563
32.42	9.79	4.830	9.948
37.08	9.81	6.011	10.846
31.56	9.84	4.637	9.860
36.20	10.03	5.797	10.953
39.90	10.16	6.879	11.946
35.30	10.41	5.599	11.259
38.06	10.30	6.346	11.712
37.03	10.49	6.075	11.737
31.82	10.54	4.753	10.737
38.37	11.50	6.590	13.471
39.30	11.84	6.926	14.229
39.33	12.00	6.958	14.478
55.23?	12.24	14.619	22.094
37.00	12.70	6.334	14.826
36.60	13.26	6.285	15.529
51.70?	13.34	12.733	22.406
37.27	14.07	6.595	16.979
37.86	14.26	6.808	17.488
36.12	14.58	6.308	17.366
36.05	15.03	6.345	18.041
44.33	15.44	9.488	22.536

(continued on next page)

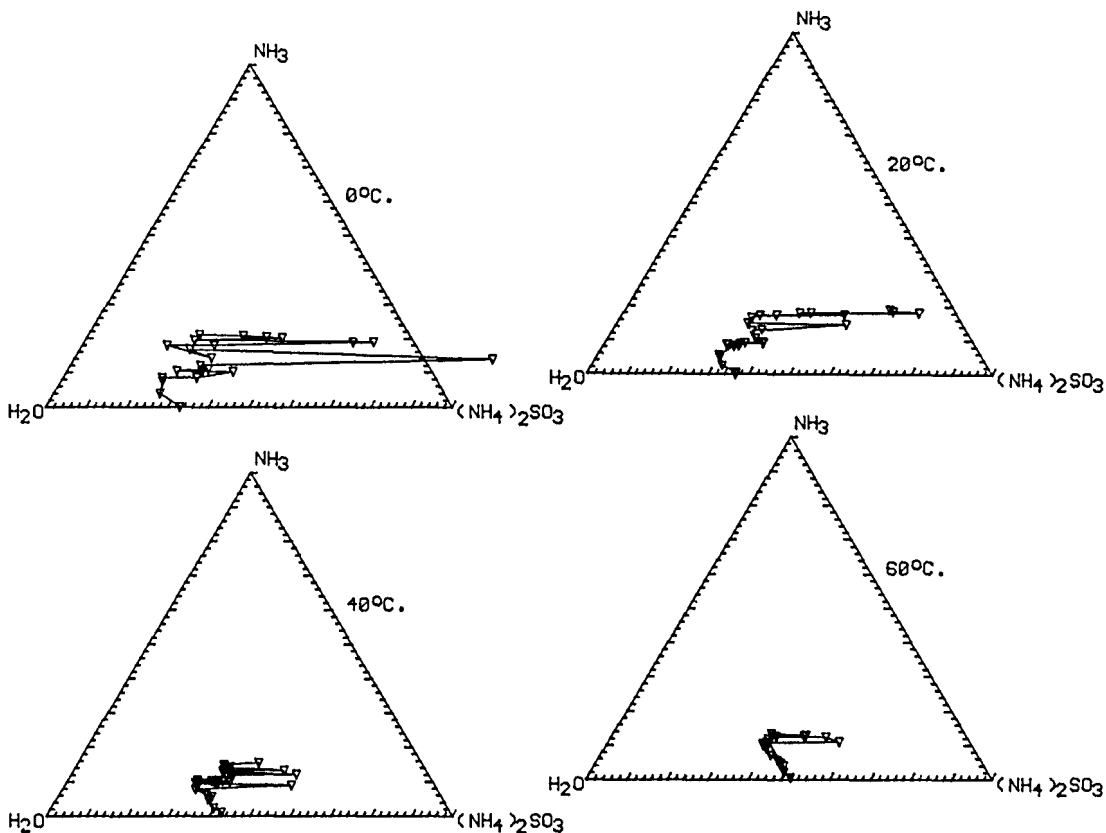
<p>COMPONENTS:</p> <ol style="list-style-type: none"> Ammonium sulfite; $(\text{NH}_4)_2\text{SO}_3$; [10196-04-0] Ammonia; NH_3; [7664-41-7] Water; H_2O; [7732-18-5] 	<p>ORIGINAL MEASUREMENTS:</p> <p>Terres, E.; Hahn, E.</p> <p><i>Das Gas- und Wasserfach</i> <u>1927</u>, 70, 363-367.</p>
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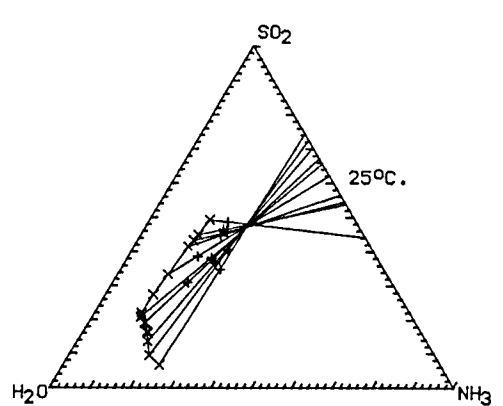
EXPERIMENTAL VALUES (continued):

$(\text{NH}_4)_2\text{SO}_3$ mass %	NH_3 mass %	$(\text{NH}_4)_2\text{SO}_3^a$ mol/kg	NH_3^a mol/kg
Temperature = 60°C			
50.07	0.53	8.727	0.630
47.58	2.18	8.154	2.548
46.68	4.05	8.158	4.827
45.25	4.77	7.795	5.604
45.60	4.78	7.913	5.657
39.01	11.68	6.812	13.909
44.33	5.55	7.616	6.502
41.87	7.11	7.066	8.183
39.80	9.03	6.697	10.362
38.73	9.79	6.478	11.167
38.86	10.16	6.563	11.703
38.46	10.23	6.454	11.707
38.43	10.49	6.478	12.059
39.14	10.82	6.735	12.697
56.92	10.87	15.216	19.816
52.95	12.29	13.116	20.761
39.54	12.53	7.103	15.351
40.68	12.54	7.480	15.741
47.34	12.66	10.190	18.585
47.68	12.90	10.414	19.216
38.99	13.36	7.045	16.464

^a Molalities calculated by the compiler

^b The solid phase was $(\text{NH}_4)_2\text{SO}_3 \cdot \text{H}_2\text{O}$ throughout.



COMPONENTS: 1. Ammonia; NH_3 ; [7664-41-7] 2. Sulfur dioxide; SO_2 ; [7446-09-5] 3. Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Hill, L.M. <i>J. Chem. Soc.</i> <u>1948</u> , 76-8.																																																																																										
VARIABLES: Concentrations of the components One temperature: 298 K	PREPARED BY: Mary R. Masson																																																																																										
EXPERIMENTAL VALUES: Composition of equilibrium solutions at 25°C <table border="1" data-bbox="111 534 697 997"> <thead> <tr> <th>NH_3</th> <th>SO_2</th> <th>SO_3</th> <th>NH_3^a</th> <th>SO_2^a</th> </tr> <tr> <th>mass %</th> <th>mass %</th> <th>mass %</th> <th>mol/kgt</th> <th>mol/kg</th> </tr> </thead> <tbody> <tr><td>23.8</td><td>6.5</td><td>0.2</td><td>20.051</td><td>1.456</td></tr> <tr><td>19.9</td><td>9.3</td><td>-</td><td>16.505</td><td>2.051</td></tr> <tr><td>17.4</td><td>13.5</td><td>-</td><td>14.786</td><td>3.050</td></tr> <tr><td>16.1</td><td>15.9</td><td>0.3</td><td>13.903</td><td>3.650</td></tr> <tr><td>15.8</td><td>16.4</td><td>0.1</td><td>13.684</td><td>3.776</td></tr> <tr><td>13.8</td><td>19.0</td><td>-</td><td>12.059</td><td>4.414</td></tr> <tr><td>13.8</td><td>19.2</td><td>0.1</td><td>12.095</td><td>4.473</td></tr> <tr><td>11.9</td><td>20.7</td><td>0.7</td><td>10.367</td><td>4.794</td></tr> <tr><td>12.1</td><td>21.0</td><td>-</td><td>10.620</td><td>4.900</td></tr> <tr><td>11.5</td><td>22.0</td><td>0.3</td><td>10.155</td><td>5.164</td></tr> <tr><td>11.8</td><td>27.3</td><td>0.2</td><td>11.378</td><td>6.998</td></tr> <tr><td>12.4</td><td>33.3</td><td>0.3</td><td>13.409</td><td>9.573</td></tr> <tr><td>13.4</td><td>41.4</td><td>0.8</td><td>17.408</td><td>14.298</td></tr> <tr><td>13.8</td><td>43.2</td><td>0.2</td><td>18.845</td><td>15.683</td></tr> <tr><td>14.1</td><td>44.9</td><td>0.4</td><td>20.194</td><td>17.095</td></tr> <tr><td>14.8</td><td>49.2</td><td>0.5</td><td>24.140</td><td>21.334</td></tr> </tbody> </table> <p data-bbox="111 1008 697 1068"> ^a Molalities calculated by the compiler. Solid phase: $2\text{NH}_3 \cdot \text{SO}_2 \cdot 2\text{H}_2\text{O}$ [= $(\text{NH}_4)_2\text{SO}_3 \cdot \text{H}_2\text{O}$] </p> 		NH_3	SO_2	SO_3	NH_3^a	SO_2^a	mass %	mass %	mass %	mol/kgt	mol/kg	23.8	6.5	0.2	20.051	1.456	19.9	9.3	-	16.505	2.051	17.4	13.5	-	14.786	3.050	16.1	15.9	0.3	13.903	3.650	15.8	16.4	0.1	13.684	3.776	13.8	19.0	-	12.059	4.414	13.8	19.2	0.1	12.095	4.473	11.9	20.7	0.7	10.367	4.794	12.1	21.0	-	10.620	4.900	11.5	22.0	0.3	10.155	5.164	11.8	27.3	0.2	11.378	6.998	12.4	33.3	0.3	13.409	9.573	13.4	41.4	0.8	17.408	14.298	13.8	43.2	0.2	18.845	15.683	14.1	44.9	0.4	20.194	17.095	14.8	49.2	0.5	24.140	21.334
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METHOD APPARATUS/PROCEDURE: Mixtures were prepared from the reagents in an 8-oz bottle fitted with a glass stirrer. The mixture was stirred at constant temperature under coal gas (but some oxidation still occurred). Seeding with solid was done when supersaturation occurred. Overnight (17 hr) was usually sufficient time for equilibration. Samples of liquid were separated and weighed. Sulfite was determined by titration with iodine, total sulfur gravimetrically as barium sulfate after oxidation of sulfite with bromine, alkalinity by titration with sulfuric acid to Methyl Orange, and ammonia by distillation from sodium hydroxide solution and collection in sulfuric acid, or by calculation from the other analyses (NH_3 = alkalinity + $\frac{1}{2}$ sulfite + sulfate).	SOURCE AND PURITY OF MATERIALS: Freshly distilled water, reagent ammonia solution (0.88), gaseous ammonia, and gaseous sulfur dioxide were the reagents used in this study. ESTIMATED ERROR: No estimates possible. REFERENCES:																																																																																										

(continued on next page)

<p>COMPONENTS:</p> <ol style="list-style-type: none"> 1. Ammonia; NH₃; [7664-41-7] 2. Sulfur dioxide; SO₂; [7446-09-5] 3. Water; H₂O; [7732-18-5] 	<p>ORIGINAL MEASUREMENTS:</p> <p>Hill, L.M.</p> <p><i>J. Chem. Soc.</i> <u>1948</u>, 76-8.</p>
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ADDITIONAL MATERIAL:

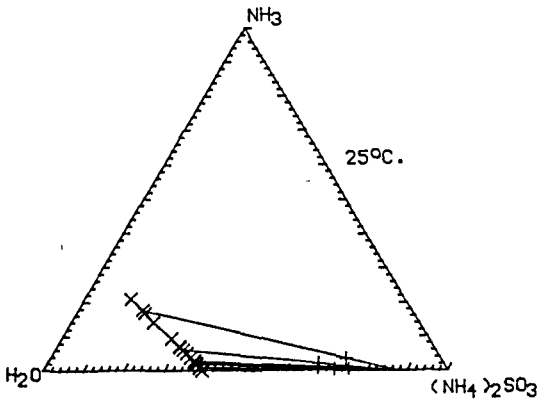
The original data have been recalculated by the compiler in order to facilitate comparison with other data.

(NH ₄) ₂ SO ₃		NH ₃	
mol/kg	mass %	mol/kg	mass %
1.456	11.58	17.133	19.97
2.051	16.43	12.403	14.57
3.050	23.58	8.686	9.85
3.650	27.59	6.603	7.32
3.776	28.42	6.132	6.77
4.414	32.70	3.231	3.51
4.473	33.02	3.149	3.41
4.794	35.46	0.779	0.85
4.900	35.95	0.820	0.88

(NH ₄) ₂ SO ₃		SO ₂	
mol/kg	mass %	mol/kg	mass %
5.078	36.97	0.086	0.35
5.689	37.87	1.309	4.81
6.704	39.68	2.869	9.37
8.704	42.67	5.594	15.13
9.423	43.86	6.260	16.07
10.097	44.74	6.998	17.10
12.07	46.80	9.264	19.81

OR

(NH ₄) ₂ SO ₃		(NH ₄) ₂ S ₂ O ₅	
mol/kg	mass %	mol/kg	mass %
4.992	36.32	0.086	0.97
4.380	29.14	1.309	13.52
3.835	22.68	2.869	26.35
3.110	15.23	5.594	42.55
3.163	14.71	6.260	45.21
3.099	13.72	6.998	48.12
2.806	10.87	9.264	55.74

COMPONENTS: 1. Ammonium sulfite; $(\text{NH}_4)_2\text{SO}_3$; [10196-04-0] 2. Ammonia; NH_3 ; [7664-41-7] 3. Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Ishikawa, F.; Hiroshi, H. <i>Bull. Inst. Phys. Chem. Research (Tokyo) 1931, 10, 166-72 (in Japanese); Sci. Repts. Tohoku Imp. University 1933, 22, 235-243 (in English).</i>																																																																																
VARIABLES: One temperature: 298 K Concentrations of the components	PREPARED BY: Mary R. Masson																																																																																
EXPERIMENTAL VALUES: <p style="text-align: center;"><u>Composition of equilibrium solutions at 25°C</u></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>$(\text{NH}_4)_2\text{SO}_3$</th> <th>$\text{NH}_3$</th> <th>$(\text{NH}_4)_2\text{SO}_3^a$</th> <th>$\text{NH}_3^a$</th> </tr> <tr> <th>mass %</th> <th>mass %</th> <th>mol/kg</th> <th>mol/kg</th> </tr> </thead> <tbody> <tr><td>39.29</td><td>-</td><td>5.572</td><td>0.</td></tr> <tr><td>38.30</td><td>0.70</td><td>5.406</td><td>0.674</td></tr> <tr><td>38.15</td><td>0.82</td><td>5.382</td><td>0.789</td></tr> <tr><td>36.98</td><td>1.75</td><td>5.197</td><td>1.677</td></tr> <tr><td>36.90</td><td>1.91</td><td>5.192</td><td>1.833</td></tr> <tr><td>36.15</td><td>2.40</td><td>5.065</td><td>2.293</td></tr> <tr><td>36.05</td><td>2.58</td><td>5.058</td><td>2.469</td></tr> <tr><td>35.97</td><td>2.67</td><td>5.047</td><td>2.555</td></tr> <tr><td>34.58</td><td>3.67</td><td>4.822</td><td>3.490</td></tr> <tr><td>33.01</td><td>4.94</td><td>4.581</td><td>4.675</td></tr> <tr><td>31.66</td><td>5.97</td><td>4.371</td><td>5.621</td></tr> <tr><td>30.51</td><td>6.64</td><td>4.180</td><td>6.204</td></tr> <tr><td>30.25</td><td>6.91</td><td>4.145</td><td>6.457</td></tr> <tr><td>27.17</td><td>9.20</td><td>3.677</td><td>8.490</td></tr> <tr><td>20.29</td><td>14.05</td><td>2.661</td><td>12.565</td></tr> <tr><td>16.82</td><td>16.70</td><td>2.178</td><td>14.751</td></tr> <tr><td>15.90</td><td>17.58</td><td>2.058</td><td>15.519</td></tr> <tr><td>11.51</td><td>20.78</td><td>1.464</td><td>18.021</td></tr> </tbody> </table> <p>^a Molality calculated by the compiler.</p>		$(\text{NH}_4)_2\text{SO}_3$	NH_3	$(\text{NH}_4)_2\text{SO}_3^a$	NH_3^a	mass %	mass %	mol/kg	mol/kg	39.29	-	5.572	0.	38.30	0.70	5.406	0.674	38.15	0.82	5.382	0.789	36.98	1.75	5.197	1.677	36.90	1.91	5.192	1.833	36.15	2.40	5.065	2.293	36.05	2.58	5.058	2.469	35.97	2.67	5.047	2.555	34.58	3.67	4.822	3.490	33.01	4.94	4.581	4.675	31.66	5.97	4.371	5.621	30.51	6.64	4.180	6.204	30.25	6.91	4.145	6.457	27.17	9.20	3.677	8.490	20.29	14.05	2.661	12.565	16.82	16.70	2.178	14.751	15.90	17.58	2.058	15.519	11.51	20.78	1.464	18.021
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METHOD APPARATUS/PROCEDURE: A sample of ammonia sulfite was placed in a closed vessel under an atmosphere of nitrogen, then a known amount of ammonia solution (oxygen-free) was introduced. Stirring in a thermostat for 4 hr was found to result in equilibrium being reached. A sample of the solution was removed with the aid of the pressure of nitrogen gas into a pipette fitted with stopcocks at both ends, and weighed and analysed as in the previous work by these authors. The moist solid was also analysed.	SOURCE AND PURITY OF MATERIALS: As before. 																																																																																
ESTIMATED ERROR: Temperature: ± 0.01 K Analyses: no estimate given (compiler - probably as before, r.s.d. < 0.2%).																																																																																	

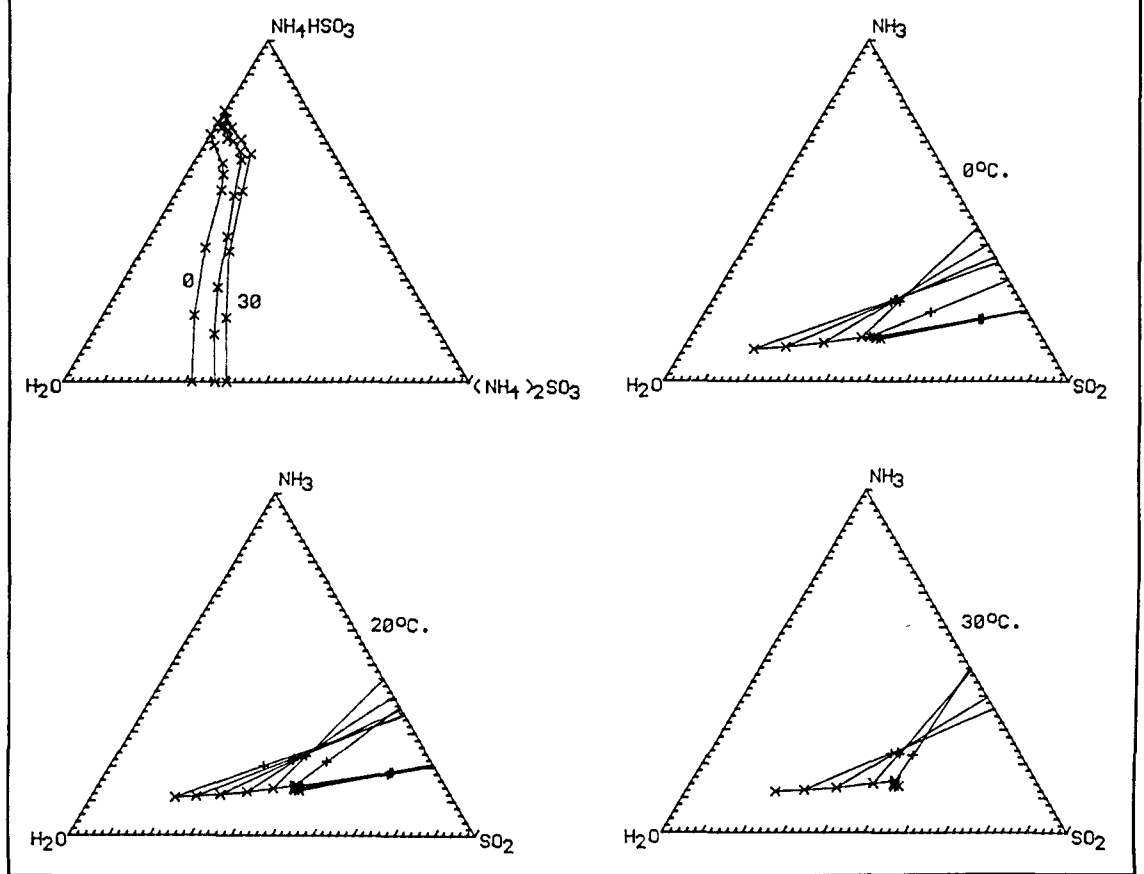
COMPONENTS:		ORIGINAL MEASUREMENTS:			
1. Ammonium sulfite; $(\text{NH}_4)_2\text{SO}_3$; [10196-04-0] 2. Ammonium pyrosulfite; $(\text{NH}_4)_2\text{S}_2\text{O}_5$; [32736-64-4] 3. Water; H_2O ; [7732-18-5]		Vasilenko, N.A. <i>Zh. Priklad. Khim.</i> 1949, 22, 338-41.			
VARIABLES:		PREPARED BY:			
Three temperatures: 273 - 303 K Concentrations of the components		Mary R. Masson			
EXPERIMENTAL VALUES:		<u>Composition of equilibrium solutions</u>			
$(\text{NH}_4)_2\text{SO}_3$ mass %	NH_4HSO_3 mass %	$(\text{NH}_4)_2\text{SO}_3^a$ mol/kg	$\text{NH}_4\text{HSO}_3^a$ mol/kg	$(\text{NH}_4)_2\text{S}_2\text{O}_5^b$ mass %	Solid ^c phase
<u>Temperature = 0°C</u>					
31.71	0.0	3.998	0.	0.0	A
22.58	19.50	3.357	3.397	17.73	A
15.40	39.17	2.919	8.699	35.61	A
10.78	56.29	2.819	17.247	51.17	A
9.06	60.76	2.585	20.313	55.24	A + B
7.20	63.99	2.152	22.410	58.17	B
2.48	69.18	0.753	24.630	62.89	B
0.0	72.38	0.	26.441	65.80	B
<u>Temperature = 20°C</u>					
37.40	0.0	5.144	0.	0.0	A
30.24	13.99	4.669	2.531	12.72	A
24.26	27.75	4.353	5.834	25.23	A
18.19	42.50	3.984	10.909	38.64	A
14.79	54.54	4.152	17.943	49.58	A
11.31	65.04	4.118	27.748	59.13	A + B
9.73	67.56	3.689	30.016	61.42	B
6.48	70.57	2.431	31.026	64.16	B
4.61	71.27	1.646	29.813	64.79	B
3.54	73.84	1.348	32.937	67.13	B
1.71	74.26	0.613	31.181	67.51	B
0.0	75.95	0.	31.864	69.05	B
(continued on next page)					
AUXILIARY INFORMATION					
METHOD APPARATUS/PROCEDURE:			SOURCE AND PURITY OF MATERIALS:		
An isothermal procedure was used. Data expressed in terms of NH_3 and SO_2 were also presented in the paper.					
			ESTIMATED ERROR:		
			No estimates possible.		
			REFERENCES:		

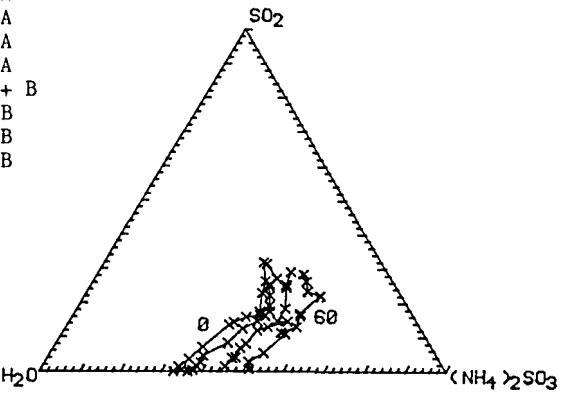
<p>COMPONENTS:</p> <ol style="list-style-type: none"> 1. Ammonium sulfite; $(\text{NH}_4)_2\text{SO}_3$; [10196-04-0] 2. Ammonium pyrosulfite; $(\text{NH}_4)_2\text{S}_2\text{O}_5$; [32736-64-4] 3. Water; H_2O; [7732-18-5] 	<p>ORIGINAL MEASUREMENTS:</p> <p>Vasilenko, N.A.</p> <p>Zh. Priklad. Khim. 1949, 22, 338-41.</p>
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EXPERIMENTAL VALUES (continued):

$(\text{NH}_4)_2\text{SO}_3$ mass %	NH_4HSO_3 mass %	$(\text{NH}_4)_2\text{SO}_3^a$ mol/kg	$\text{NH}_4\text{HSO}_3^a$ mol/kg	$(\text{NH}_4)_2\text{S}_2\text{O}_5^b$ mass %	Solid ^c phase
<u>Temperature = 30°C</u>					
40.30	0.0	5.812	0.	0.0	A
30.77	18.81	5.255	3.764	17.10	A
21.79	38.26	4.696	9.663	34.78	A
16.13	55.94	4.973	20.208	50.86	A
12.75	66.73	5.350	32.812	60.67	A + B
8.21	70.98	3.397	34.415	64.53	B
4.09	74.45	1.641	35.004	67.68	B
1.72	76.85	0.691	36.183	69.87	B
0.0	79.31	0.	38.677	72.10	B

a Molalities calculated by the compiler.
 b Calculated by the compiler.
 c Solid phases: A - $(\text{NH}_4)_2\text{SO}_3 \cdot \text{H}_2\text{O}$, B - $(\text{NH}_4)_2\text{S}_2\text{O}_5$



COMPONENTS: 1. Ammonium sulfite; $(\text{NH}_4)_2\text{SO}_3$; [10196-04-0] 2. Sulfur dioxide; SO_2 ; [7446-09-5] 3. Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Terres, E.; Hahn, E. <i>Das Gas- und Wasserfach</i> <u>1927</u> , 70, 363-367.																																																																											
VARIABLES: Concentrations of the components Four temperatures: 273 - 333 K	PREPARED BY: Mary R. Masson																																																																											
EXPERIMENTAL VALUES: <u>Composition of equilibrium solutions</u> <table border="1" data-bbox="113 524 683 937"> <thead> <tr> <th>$(\text{NH}_4)_2\text{SO}_3$ mass %</th> <th>SO_2 mass %</th> <th>$(\text{NH}_4)_2\text{SO}_3^a$ mol/kg</th> <th>SO_2^a mol/kg</th> <th>Solid^b phase</th> </tr> </thead> <tbody> <tr><td colspan="5"><u>Temperature = 0°C</u></td></tr> <tr><td>32.93</td><td>0.0</td><td>4.227</td><td>0.</td><td>A</td></tr> <tr><td>34.64</td><td>0.50</td><td>4.599</td><td>0.120</td><td>A</td></tr> <tr><td>33.57</td><td>1.30</td><td>4.438</td><td>0.312</td><td>A</td></tr> <tr><td>35.04</td><td>3.44</td><td>4.904</td><td>0.873</td><td>A</td></tr> <tr><td>36.63</td><td>6.99</td><td>5.594</td><td>1.935</td><td>A</td></tr> <tr><td>39.77</td><td>13.60</td><td>7.344</td><td>4.553</td><td>A</td></tr> <tr><td>40.55</td><td>14.37</td><td>7.745</td><td>4.976</td><td>A</td></tr> <tr><td>42.78</td><td>15.86</td><td>8.906</td><td>5.986</td><td>A</td></tr> <tr><td>45.83</td><td>16.50</td><td>10.475</td><td>6.838</td><td>A</td></tr> <tr><td>45.28</td><td>17.50</td><td>10.475</td><td>7.340</td><td>A + B</td></tr> <tr><td>43.17</td><td>22.87</td><td>10.945</td><td>10.513</td><td>B</td></tr> <tr><td>42.35</td><td>26.34</td><td>11.646</td><td>13.132</td><td>B</td></tr> <tr><td>39.14</td><td>31.87</td><td>11.625</td><td>17.161</td><td>B</td></tr> </tbody> </table> 		$(\text{NH}_4)_2\text{SO}_3$ mass %	SO_2 mass %	$(\text{NH}_4)_2\text{SO}_3^a$ mol/kg	SO_2^a mol/kg	Solid ^b phase	<u>Temperature = 0°C</u>					32.93	0.0	4.227	0.	A	34.64	0.50	4.599	0.120	A	33.57	1.30	4.438	0.312	A	35.04	3.44	4.904	0.873	A	36.63	6.99	5.594	1.935	A	39.77	13.60	7.344	4.553	A	40.55	14.37	7.745	4.976	A	42.78	15.86	8.906	5.986	A	45.83	16.50	10.475	6.838	A	45.28	17.50	10.475	7.340	A + B	43.17	22.87	10.945	10.513	B	42.35	26.34	11.646	13.132	B	39.14	31.87	11.625	17.161	B
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METHOD APPARATUS/PROCEDURE: To a saturated solution of ammonium sulfite was added sulfur dioxide gas. After separation of the solid, the solution was analysed for NH_3 and SO_2 , then the mass % of ammonium sulfite and the excess amount of sulfur dioxide were calculated.	SOURCE AND PURITY OF MATERIALS: 																																																																											
	ESTIMATED ERROR: Temperature: 0.1 K Analyses: no estimate possible.																																																																											
	REFERENCES: 																																																																											

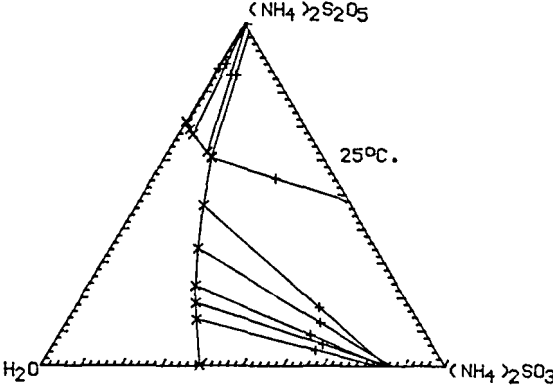
COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ammonium sulfite; $(\text{NH}_4)_2\text{SO}_3$; [10196-04-0]	Terres, E.; Hahn, E.
2. Sulfur dioxide; SO_2 ; [7446-09-5]	<i>Das Gas- und Wasserfach</i> <u>1927</u> , 70, 363-367.
3. Water; H_2O ; [7732-18-5]	

EXPERIMENTAL VALUES (continued):

$(\text{NH}_4)_2\text{SO}_3$ mass %	SO_2 mass %	$(\text{NH}_4)_2\text{SO}_3^a$ mol/kg	SO_2^a mol/kg	Solid ^b phase
<u>Temperature = 20°C</u>				
36.50	0.0	4.949	0.	A
37.56	0.33	5.207	0.083	A
37.66	1.66	5.344	0.427	A
38.36	2.49	5.584	0.657	A
37.97	4.44	5.677	1.204	A
42.18	8.24	7.325	2.594	A
43.61	12.43	8.542	4.414	A
46.10	14.67	10.118	5.837	A
47.13	16.27	11.088	6.939	A
47.77	17.45	11.826	7.832	A + B
46.88	19.14	11.879	8.793	B
45.49	22.09	12.082	10.636	B
43.86	24.91	12.092	12.451	B
43.78	25.38	12.223	12.847	B
44.74	27.09	13.675	15.012	B
40.11	31.43	12.135	17.239	B
<u>Temperature = 40°C</u>				
44.92	1.43	7.209	0.416	A
45.43	3.79	7.703	1.165	A
46.34	3.93	8.023	1.234	A
46.03	6.69	8.383	2.209	A
46.80	8.00	8.915	2.763	A
47.53	11.90	10.087	4.579	A
49.59	12.91	11.386	5.374	A
53.70	14.50	14.540	7.118	A + B
51.08	14.72	12.860	6.719	A
51.18	18.28	14.429	9.344	B
48.39	24.44	15.335	14.042	B
47.92	25.13	15.310	14.556	B
47.97	25.25	15.423	14.719	B
47.25	29.02	17.144	19.090	B
<u>Temperature = 60°C</u>				
51.25	0.66	9.176	0.214	A
50.02	2.74	9.117	0.905	A
52.52	5.18	10.691	1.912	A
54.98	10.77	13.822	4.909	A
53.71	11.29	13.213	5.035	A
56.64	12.92	16.021	6.626	A
55.87	16.19	17.218	9.046	B
55.57	16.82	17.330	9.510	B
57.83	22.12	24.835	17.222	A + B
54.22	23.22	20.694	16.067	B
52.50	26.12	21.143	19.071	B
50.67	28.32	20.766	21.042	B

^a Molalities calculated by the compiler.

^b Solid phases: A - $(\text{NH}_4)_2\text{SO}_3 \cdot \text{H}_2\text{O}$, B - NH_4HSO_3

COMPONENTS: 1. Ammonium sulfite; $(\text{NH}_4)_2\text{SO}_3$; [10196-04-0] 2. Sulfur dioxide; SO_2 ; [7446-099-5] 3. Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Ishikawa, F.; Hiroshi, H. <i>Bull. Inst. Phys. Chem. Research (Tokyo)</i> 1931 , <i>10</i> , 166-72 (in Japanese); <i>Sci. Repts. Tohoku Imp. University</i> 1933 , <i>22</i> , 235-243 (in English).																																																																																				
VARIABLES: One temperature: 298 K Concentrations of the components	PREPARED BY: Mary R. Masson																																																																																				
EXPERIMENTAL VALUES: <u>Composition of equilibrium solutions at 25°C</u> (a). $(\text{NH}_4)_2\text{SO}_3 - (\text{NH}_4)_2\text{S}_2\text{O}_5 - \text{H}_2\text{O}$ system <table border="1" data-bbox="130 541 672 930"> <thead> <tr> <th>$(\text{NH}_4)_2\text{SO}_3$</th> <th>$(\text{NH}_4)_2\text{S}_2\text{O}_5$</th> <th>$(\text{NH}_4)_2\text{SO}_3^a$</th> <th>$(\text{NH}_4)_2\text{S}_2\text{O}_5^a$</th> </tr> <tr> <th>mass %</th> <th>mass %</th> <th>mol/kg</th> <th>mol/kg</th> </tr> </thead> <tbody> <tr><td>39.29</td><td>-</td><td>5.572</td><td>0.</td></tr> <tr><td>31.75</td><td>13.44</td><td>4.988</td><td>1.361</td></tr> <tr><td>29.12</td><td>18.38</td><td>4.776</td><td>1.943</td></tr> <tr><td>26.66</td><td>23.24</td><td>4.582</td><td>2.574</td></tr> <tr><td>21.63</td><td>34.22</td><td>4.218</td><td>4.301</td></tr> <tr><td>16.49</td><td>46.79</td><td>3.867</td><td>7.071</td></tr> <tr><td>11.70</td><td>60.63</td><td>3.641</td><td>12.160</td></tr> <tr><td>11.49</td><td>60.94</td><td>3.588</td><td>12.266</td></tr> <tr><td>9.74</td><td>62.36</td><td>3.006</td><td>12.404</td></tr> <tr><td>3.54</td><td>67.55</td><td>1.054</td><td>12.966</td></tr> <tr><td>1.99</td><td>69.13</td><td>0.593</td><td>13.284</td></tr> <tr><td>0.33</td><td>70.87</td><td>0.099</td><td>13.656</td></tr> <tr><td>-</td><td>71.33</td><td>0.</td><td>13.807</td></tr> </tbody> </table> (b). $(\text{NH}_4)_2\text{S}_2\text{O}_5 - \text{SO}_2 - \text{H}_2\text{O}$ system <table border="1" data-bbox="130 991 672 1165"> <thead> <tr> <th>$(\text{NH}_4)_2\text{S}_2\text{O}_5$</th> <th>$\text{SO}_2$</th> <th>$(\text{NH}_4)_2\text{S}_2\text{O}_5^a$</th> <th>$\text{SO}_2^a$</th> </tr> <tr> <th>mass %</th> <th>mass %</th> <th>mol/kg</th> <th>mol/kg</th> </tr> </thead> <tbody> <tr><td>71.33</td><td>-</td><td>13.807</td><td>0.</td></tr> <tr><td>70.57</td><td>1.64</td><td>14.092</td><td>0.921</td></tr> <tr><td>69.86</td><td>2.82</td><td>14.190</td><td>1.611</td></tr> <tr><td>69.26</td><td>3.86</td><td>14.299</td><td>2.242</td></tr> </tbody> </table>  <p>^a Molalities calculated by the compiler.</p>		$(\text{NH}_4)_2\text{SO}_3$	$(\text{NH}_4)_2\text{S}_2\text{O}_5$	$(\text{NH}_4)_2\text{SO}_3^a$	$(\text{NH}_4)_2\text{S}_2\text{O}_5^a$	mass %	mass %	mol/kg	mol/kg	39.29	-	5.572	0.	31.75	13.44	4.988	1.361	29.12	18.38	4.776	1.943	26.66	23.24	4.582	2.574	21.63	34.22	4.218	4.301	16.49	46.79	3.867	7.071	11.70	60.63	3.641	12.160	11.49	60.94	3.588	12.266	9.74	62.36	3.006	12.404	3.54	67.55	1.054	12.966	1.99	69.13	0.593	13.284	0.33	70.87	0.099	13.656	-	71.33	0.	13.807	$(\text{NH}_4)_2\text{S}_2\text{O}_5$	SO_2	$(\text{NH}_4)_2\text{S}_2\text{O}_5^a$	SO_2^a	mass %	mass %	mol/kg	mol/kg	71.33	-	13.807	0.	70.57	1.64	14.092	0.921	69.86	2.82	14.190	1.611	69.26	3.86	14.299	2.242
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METHOD APPARATUS/PROCEDURE: A sample of ammonium sulfite was placed in a closed vessel under an atmosphere of nitrogen, then a known amount of oxygen-free water was added. A known volume of dried sulfur dioxide gas (from a cylinder) was introduced through a tube. Stirring in a thermostat for 4 hr was found to result in equilibrium being reached. A sample of the solution was removed with the aid of the pressure of nitrogen gas, into a pipette fitted with a stopcock at both ends, and weighed and analysed as in the previous work by these authors. The moist solid was also analysed.	SOURCE AND PURITY OF MATERIALS: As before																																																																																				
ESTIMATED ERROR: Temperature: ± 0.01 K Analyses: no estimate given (compiler - probably as before, r.s.d. < 0.2%).	REFERENCES:																																																																																				

COMPONENTS: 1. Ammonium sulfite; $(\text{NH}_4)_2\text{SO}_3$; [10196-04-0] 2. Ammonium sulfate; $(\text{NH}_4)_2\text{SO}_4$; [7783-20-2] 3. Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Vasilenko, N.A. <i>Zh. Priklad. Khim.</i> <u>1950</u> , 23, 472-81.																																																																																																																																																											
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METHOD/APPARATUS/PROCEDURE: A polythermal procedure was used, based on the following systems: I (4.9% aq. Y) + Z II (10.0% aq. Y) + Z III (14.4% aq. Y) + Z IV (18.4% aq. Y) + Z V (22.0% aq. Y) + Z VI (24.7% aq. Y) + Z VII (32.8% aq. Y) + Z VIII (22.3% Y + 28.1% Z) + water where Y = $(\text{NH}_3)_2\text{SO}_3$ and Z = $(\text{NH}_4)_2\text{SO}_4$	<p style="text-align: center;"> Equilibrium with $(\text{NH}_4)_2\text{SO}_4$ Equilibrium with ice </p>																																																																																																																																																											

COMPONENTS:		ORIGINAL MEASUREMENTS:		
1. Ammonium sulfite; $(\text{NH}_4)_2\text{SO}_3$; [10196-04-0]		Vasilenko, N.A.		
2. Ammonium sulfate; $(\text{NH}_4)_2\text{SO}_4$; [7783-20-2]		Zh. Priklad. Khim. 1950, 23, 472-81.		
3. Water; H_2O ; [7732-18-5]				
EXPERIMENTAL VALUES (continued):				
$(\text{NH}_4)_2\text{SO}_4$	$(\text{NH}_4)_2\text{SO}_3$	$(\text{NH}_4)_2\text{SO}_4^a$	$(\text{NH}_4)_2\text{SO}_3^a$	Solid ^b
mass %	mass %	mol/kg	mol/kg	phase
<u>Temperature = -10°C</u>				
40.0	0.0	5.045	0.	A
37.5	3.1	4.778	0.449	A
34.5	6.5	4.425	0.949	A
32.0	9.8	4.161	1.450	A
29.8	12.9	3.936	1.938	A
29.2	13.0	3.823	1.937	A + B
21.8	17.2	2.705	2.428	B
21.0	17.4	2.580	2.432	B
14.0	21.3	1.638	2.835	B
28.0	0.0	2.943	0.	C
22.5	3.8	2.310	0.444	C
18.0	8.3	1.848	0.970	C
14.3	11.3	1.455	1.308	C
13.0	12.6	1.322	1.458	C
7.8	17.0	0.785	1.946	C
2.5	21.4	0.249	2.421	C
0.0	24.0	0.	2.719	C
<u>Temperature = 0°C</u>				
41.0	0.0	5.259	0.	A
38.5	3.1	4.989	0.457	A
35.8	6.4	4.687	0.953	A
33.0	9.7	4.358	1.458	A
30.8	12.8	4.133	1.954	A
28.5	15.5	3.851	2.383	A + B
27.8	15.9	3.737	2.432	B
23.5	18.6	3.072	2.766	B
21.3	19.5	2.723	2.836	B
0.0	32.3	0.	4.108	B
<u>Temperature = +10°C</u>				
42.0	0.0	5.480	0.	A
39.3	3.0	5.154	0.448	A
36.8	6.3	4.894	0.953	A
34.3	9.5	4.619	1.455	A
32.0	12.5	4.363	1.939	A
29.6	15.5	4.080	2.431	A
28.0	17.8	3.910	2.828	A
27.5	18.5	3.854	2.950	A + B
25.3	20.0	3.500	3.148	B
7.3	30.5	0.888	4.222	B
0.0	35.0	0.	4.636	B
<u>Temperature = +20°C</u>				
42.8	0.0	5.663	0.	A
40.3	2.9	5.369	0.440	A
37.8	6.2	5.108	0.953	A
35.3	9.3	4.822	1.445	A
33.0	12.3	4.566	1.936	A
30.8	15.2	4.316	2.424	A
29.0	17.6	4.110	2.838	A
26.8	21.2	3.900	3.510	A
26.3	21.8	3.835	3.617	A + B
16.6	27.4	2.243	4.213	B
0.0	37.7	0.	5.210	B

^a Molalities calculated by the compiler.

^b Solid phases: A - $(\text{NH}_4)_2\text{SO}_4$, B - $(\text{NH}_4)_2\text{SO}_3 \cdot \text{H}_2\text{O}$, C - ice

COMPONENTS: 1. Ammonium sulfite; $(\text{NH}_4)_2\text{SO}_3$; [10196-04-0] 2. Ammonium sulfate; $(\text{NH}_4)_2\text{SO}_4$; [7783-20-2] 3. Water; H_2O ; [7732-18-5]		ORIGINAL MEASUREMENTS: Terres, E.; Heinsen, A. <i>Das Gas- und Wasserfach</i> <u>1927</u> , 70, 1157-61.		
VARIABLES: Concentrations of the components Four temperatures: 273 - 333 K		PREPARED BY: Mary R. Masson		
EXPERIMENTAL VALUES:				
$(\text{NH}_4)_2\text{SO}_4$	$(\text{NH}_4)_2\text{SO}_3$	$(\text{NH}_4)_2\text{SO}_4^a$	$(\text{NH}_4)_2\text{SO}_3^a$	Solid ^b
mass %	mass %	mol/kg	mol/kg	phase
<u>Temperature = 0°C</u>				
42.8	0.0	5.663	0.	A
37.7	6.92	5.152	1.076	A
32.4	13.54	4.536	2.157	A
30.83	15.12	4.317	2.409	A
30.50	15.97	4.312	2.569	A
30.17	16.13	4.252	2.586	A + B
22.25	20.23	2.927	3.028	B
15.50	24.14	1.943	3.444	B
11.08	26.57	1.345	3.669	B
0.0	32.4	0.	4.127	B
<u>Temperature = 20°C</u>				
44.5	0.0	6.068	0.	A
41.45	4.32	5.784	0.686	A
40.84	5.29	5.737	0.846	A
36.73	9.91	5.209	1.599	A
36.47	10.21	5.176	1.649	A
34.22	14.4	5.040	2.413	A
32.08	15.92	4.669	2.636	A
28.54	21.57	4.329	3.723	A
28.27	21.58	4.266	3.705	A
27.67	22.08	4.167	3.783	A
27.75	22.46	4.218	3.884	A + B
(continued on next page)				
AUXILIARY INFORMATION				
METHOD APPARATUS/PROCEDURE: To the saturated solution of one salt was added various amounts of the other. After equilibrium was reached, ammonia was determined by the Kjeldahl method, sulfite by titrimetry, and sulfate gravimetrically.		SOURCE AND PURITY OF MATERIALS:		
		ESTIMATED ERROR: Temperature: ± 0.1 K Analyses: no estimates possible.		
		REFERENCES:		

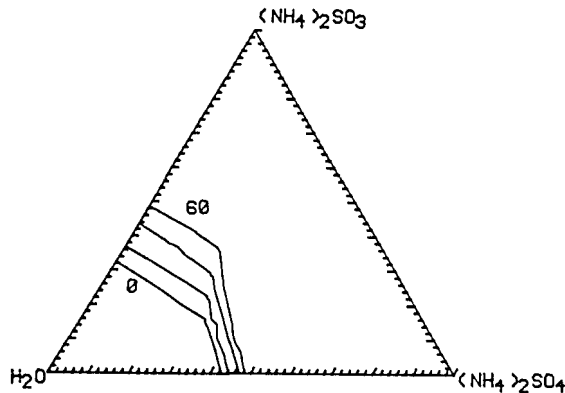
COMPONENTS: 1. Ammonium sulfite; $(\text{NH}_4)_2\text{SO}_3$; [10196-04-0] 2. Ammonium sulfate; $(\text{NH}_4)_2\text{SO}_4$; [7783-20-2] 3. Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Terres, E.; Heinsen, A. <i>Das Gas- und Wasserfach</i> <u>1927</u> , 70, 1157-61.
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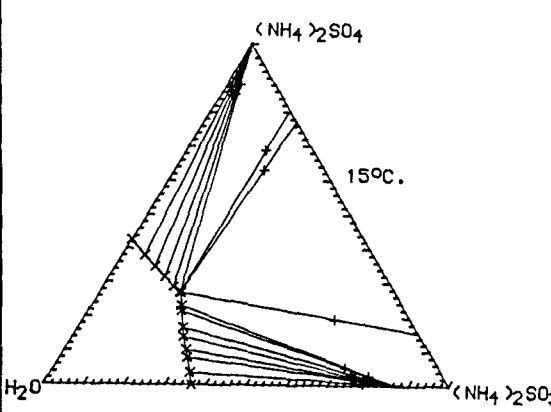
EXPERIMENTAL VALUES (continued):

$(\text{NH}_4)_2\text{SO}_4$ mass %	$(\text{NH}_4)_2\text{SO}_3$ mass %	$(\text{NH}_4)_2\text{SO}_4^a$ mol/kg	$(\text{NH}_4)_2\text{SO}_3^a$ mol/kg	Solid ^b phase
<u>Temperature = 20°C (continued)</u>				
20.58	26.32	2.933	4.268	B
17.74	27.8	2.465	4.395	B
12.00	30.77	1.587	4.629	B
0.0	36.93	0.	5.042	B
<u>Temperature = 40°C</u>				
47.17	0.0	6.757	0.	A
40.45	8.83	6.035	1.499	A
39.75	9.5	5.927	1.612	A
34.86	16.16	5.386	2.841	A
28.46	24.36	4.565	4.446	A
26.01	28.24	4.302	5.315	A
25.60	28.37	4.209	5.307	A
25.07	28.77	4.110	5.367	A
25.09	29.04	4.139	5.451	A + B
23.19	30.29	3.772	5.606	B
16.69	34.08	2.566	5.961	B
15.53	34.8	2.366	6.033	B
12.71	36.93	1.910	6.314	B
9.91	38.05	1.441	6.296	B
8.39	39.01	1.207	6.386	B
0.0	43.56	0.	6.645	B
<u>Temperature = 60°C</u>				
48.40	0.0	7.098	0.	A
44.44	6.14	6.805	1.070	A
41.63	8.86	6.363	1.541	A
39.36	11.98	6.121	2.120	A
38.19	14.12	6.060	2.549	A
31.64	23.22	5.304	4.429	A
30.22	25.19	5.129	4.864	A
24.03	35.37	4.479	7.501	A
23.48	36.02	4.387	7.658	A
22.51	36.85	4.192	7.807	A + B
16.01	40.54	2.788	8.034	B
14.51	41.57	2.500	8.150	B
0.0	48.67	0.	8.164	B

^a Molalities calculated by the compiler.

^b Solid phases: A - ammonium sulfate, B - ammonium sulfite



COMPONENTS: 1. Ammonium sulfite; $(\text{NH}_4)_2\text{SO}_3$; [10196-04-0] 2. Ammonium sulfate; $(\text{NH}_4)_2\text{SO}_4$; [7783-20-2] 3. Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Ishikawa, F.; Murooka, T. <i>Bull. Inst. Phys. Chem. Research (Tokyo)</i> 1929, 8, 75-88 (in Japanese); <i>Sci. Repts.</i> <i>Tohoku Imp. University</i> 1933, 22, 220-234 (in English).																																																																																										
VARIABLES: Temperature: 251 - 373 K Concentrations of the components	PREPARED BY: Mary R. Masson																																																																																										
EXPERIMENTAL VALUES: Compositions of equilibrium solutions at 15°C <table border="1" data-bbox="156 538 720 1036"> <thead> <tr> <th>$(\text{NH}_4)_2\text{SO}_3$ mass %</th> <th>$(\text{NH}_4)_2\text{SO}_4$ mass %</th> <th>$(\text{NH}_4)_2\text{SO}_3^a$ mol/kg</th> <th>$(\text{NH}_4)_2\text{SO}_4^a$ mol/kg</th> <th>Solid^b phase</th> </tr> </thead> <tbody> <tr><td>-</td><td>42.52</td><td>0.</td><td>5.598</td><td>A</td></tr> <tr><td>5.45</td><td>38.08</td><td>0.831</td><td>5.103</td><td>A</td></tr> <tr><td>9.60</td><td>34.82</td><td>1.487</td><td>4.741</td><td>A</td></tr> <tr><td>13.63</td><td>31.68</td><td>2.146</td><td>4.384</td><td>A</td></tr> <tr><td>17.15</td><td>28.80</td><td>2.732</td><td>4.032</td><td>A</td></tr> <tr><td>19.70</td><td>27.22</td><td>3.196</td><td>3.881</td><td>A</td></tr> <tr><td>19.70</td><td>27.23</td><td>3.196</td><td>3.883</td><td>A + B</td></tr> <tr><td>19.74</td><td>27.23</td><td>3.205</td><td>3.886</td><td>A + B</td></tr> <tr><td>19.75</td><td>27.13</td><td>3.201</td><td>3.865</td><td>A + B</td></tr> <tr><td>21.92</td><td>23.38</td><td>3.450</td><td>3.235</td><td>B</td></tr> <tr><td>22.81</td><td>21.76</td><td>3.543</td><td>2.971</td><td>B</td></tr> <tr><td>25.65</td><td>16.94</td><td>3.847</td><td>2.233</td><td>B</td></tr> <tr><td>27.11</td><td>14.19</td><td>3.977</td><td>1.829</td><td>B</td></tr> <tr><td>29.73</td><td>10.31</td><td>4.269</td><td>1.301</td><td>B</td></tr> <tr><td>31.22</td><td>7.97</td><td>4.421</td><td>0.992</td><td>B</td></tr> <tr><td>34.10</td><td>3.64</td><td>4.716</td><td>0.442</td><td>B</td></tr> <tr><td>36.40</td><td>-</td><td>4.928</td><td>0.</td><td>B</td></tr> </tbody> </table> <p>(continued on next page)</p>		$(\text{NH}_4)_2\text{SO}_3$ mass %	$(\text{NH}_4)_2\text{SO}_4$ mass %	$(\text{NH}_4)_2\text{SO}_3^a$ mol/kg	$(\text{NH}_4)_2\text{SO}_4^a$ mol/kg	Solid ^b phase	-	42.52	0.	5.598	A	5.45	38.08	0.831	5.103	A	9.60	34.82	1.487	4.741	A	13.63	31.68	2.146	4.384	A	17.15	28.80	2.732	4.032	A	19.70	27.22	3.196	3.881	A	19.70	27.23	3.196	3.883	A + B	19.74	27.23	3.205	3.886	A + B	19.75	27.13	3.201	3.865	A + B	21.92	23.38	3.450	3.235	B	22.81	21.76	3.543	2.971	B	25.65	16.94	3.847	2.233	B	27.11	14.19	3.977	1.829	B	29.73	10.31	4.269	1.301	B	31.22	7.97	4.421	0.992	B	34.10	3.64	4.716	0.442	B	36.40	-	4.928	0.	B
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AUXILIARY INFORMATION																																																																																											
METHOD APPARATUS/PROCEDURE: A simple saturation technique was used - details similar to other work by these authors. <div style="text-align: center; margin-top: 20px;">  </div>	SOURCE AND PURITY OF MATERIALS: Ammonium sulfite - prepared as in previous work. Ammonium sulfate (Kahlbaum, zur Analyse) was recrystallized from an ammoniacal solution. The crystals were dried over phosphorus pentoxide then by heating for several hr at 120°C. <table border="1" data-bbox="720 1595 1285 1740"> <tbody> <tr> <td>ESTIMATED ERROR:</td> </tr> <tr> <td>Temperature: $\pm 0.02^\circ\text{C}$ (up to 80°C) $\pm 0.05^\circ\text{C}$ (above 80°C)</td> </tr> <tr> <td>Analyses: r.s.d. approx. 0.2% max.</td> </tr> </tbody> </table> REFERENCES:	ESTIMATED ERROR:	Temperature: $\pm 0.02^\circ\text{C}$ (up to 80°C) $\pm 0.05^\circ\text{C}$ (above 80°C)	Analyses: r.s.d. approx. 0.2% max.																																																																																							
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Analyses: r.s.d. approx. 0.2% max.																																																																																											

COMPONENTS:

1. Ammonium sulfite; $(\text{NH}_4)_2\text{SO}_3$; [10196-04-0]
2. Ammonium sulfate; $(\text{NH}_4)_2\text{SO}_4$; [7783-20-2]
3. Water; H_2O ; [7732-18-5]

ORIGINAL MEASUREMENTS:

Ishikawa, F.; Murooka, T.

Bull. Inst. Phys. Chem. Research (Tokyo) 1929, 8, 75-88 (in Japanese); *Sci. Repts. Tohoku Imp. University* 1933, 22, 220-234 (in English).

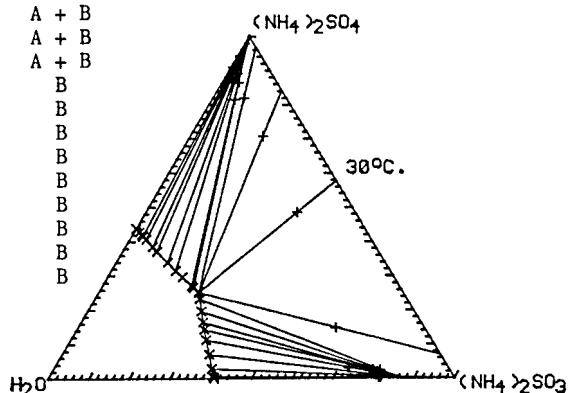
EXPERIMENTAL VALUES (continued):

Compositions of equilibrium solutions at 15°C

$(\text{NH}_4)_2\text{SO}_3$	$(\text{NH}_4)_2\text{SO}_4$	$(\text{NH}_4)_2\text{SO}_3^a$	$(\text{NH}_4)_2\text{SO}_4^a$	Solid ^b
mass %	mass %	mol/kg	mol/kg	phase
-	43.87	0.	5.915	A
1.23	42.91	0.190	5.813	A
2.23	42.05	0.345	5.711	A
2.74	41.68	0.424	5.675	A
4.00	40.65	0.622	5.558	A
6.70	38.55	1.054	5.329	A
8.41	37.13	1.330	5.160	A
12.66	33.88	2.039	4.796	A
15.83	31.46	2.586	4.517	A
18.41	29.60	3.049	4.309	A
21.93	27.12	3.706	4.028	A
22.58	26.61	3.826	3.963	A
24.62	25.23	4.227	3.807	A + B
24.66	25.17	4.232	3.797	A + B
24.64	25.20	4.230	3.802	A + B
24.63	25.23	4.230	3.808	A + B
25.87	23.31	4.383	3.471	B
28.04	19.61	4.612	2.835	B
30.03	16.41	4.828	2.319	B
31.33	14.30	4.962	1.990	B
33.33	11.19	5.173	1.526	B
36.19	6.99	5.484	0.931	B
38.86	2.83	5.738	0.367	B
40.43	0.52	5.895	0.067	B
40.77	-	5.927	0.	B

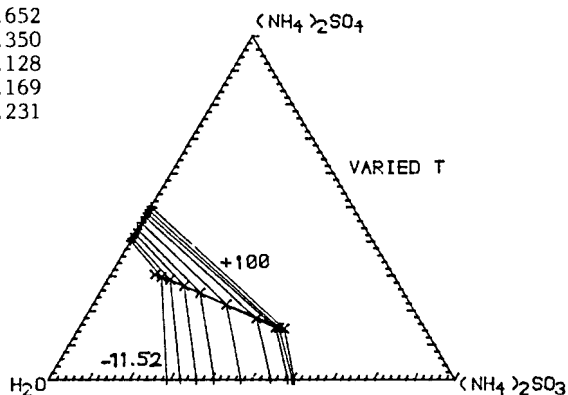
^a Molalities calculated by the compiler.

^b Solid phases: A - $(\text{NH}_4)_2\text{SO}_4$,
B - $(\text{NH}_4)_2\text{SO}_3 \cdot \text{H}_2\text{O}$



Compositions of solutions saturated with ammonium sulfite and ammonium sulfate at various temperatures.

t/°C	$(\text{NH}_4)_2\text{SO}_3$	$(\text{NH}_4)_2\text{SO}_4$	$(\text{NH}_4)_2\text{SO}_3^a$	$(\text{NH}_4)_2\text{SO}_4^a$
	mass %	mass %	mol/kg	mol/kg
-21.5	10.89	30.57	1.602	3.952
-21.2	10.95	30.55	1.612	3.952
-11.52	12.88	29.85	1.936	3.944
0	15.41	29.05	2.389	3.958
15	19.72	27.20	3.199	3.878
30	24.64	25.21	4.230	3.804
50	32.75	21.89	6.217	3.652
70	42.28	17.71	9.099	3.350
80	48.26	15.13	11.350	3.128
90	49.14	15.01	11.802	3.169
100	50.53	14.80	12.549	3.231



COMPONENTS:			ORIGINAL MEASUREMENTS:			
1. Ammonium sulfite; $(\text{NH}_4)_2\text{SO}_3$; [10196-04-0]			Labash, J.A.; Lusby, G.R.			
2. Ammonium chloride; NH_4Cl ; [12125-02-9]			Can. J. Chem. <u>1955</u> , 33, 774-86.			
3. Water; H_2O ; [7732-18-5]						
VARIABLES:			PREPARED BY:			
Concentrations of the components Two temperatures: 293 - 333 K			Mary R. Masson			
EXPERIMENTAL VALUES: <u>Compositions of equilibrium solutions at 20°C</u>						
NH_4Cl	$(\text{NH}_4)_2\text{SO}_3$	$(\text{NH}_4)_2\text{SO}_4$	NH_4Cl^a	$(\text{NH}_4)_2\text{SO}_3^a$	$(\text{NH}_4)_2\text{SO}_4^a$	Solid ^b
mass %	mass %	mass %	mol/kg	mol/kg	mol/kg	phase
27.26	0.	0.	7.006	0.	0.	A
24.70	5.25	0.45	6.635	0.649	0.049	A
22.45	10.00	1.06	6.312	1.295	0.121	A
20.08	15.52	0.	5.829	2.075	0.	A
18.39	19.13	0.	5.503	2.636	0.	A
16.61	23.57	1.20	5.297	3.462	0.155	A + B
16.57	23.64	1.15	5.283	3.471	0.148	A + B
15.36	24.55	0.90	4.851	3.571	0.115	B
9.66	28.85	0.	2.937	4.040	0.	B
5.13	32.63	0.	1.541	4.514	0.	B
0.	37.34	0.49	0.	5.171	0.060	B
(continued on next page)						
AUXILIARY INFORMATION						
METHOD APPARATUS/PROCEDURE:			SOURCE AND PURITY OF MATERIALS:			
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. Samples were withdrawn, after settling, through a pipette plugged with cotton wool. Weighed samples were 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 solution to excess of iodine solution, and back-titrating with thiosulfate. Total sulfate was determined as barium sulfate, ammonium by (1), and chloride by addition of excess of silver nitrate and back-titration with ammonium thiocyanate.			(NH ₄) ₂ SO ₃ was freshly prepared from ammonia and sulfur dioxide gases. Ammonium chloride was of analytical reagent grade.			
			ESTIMATED ERROR:			
			Temperature: ±0.1 K Analyses: 0.2% for sulfite, ammonium and chloride, 0.4% for total sulfate.			
			REFERENCES:			
			1. Sutton, F. <i>Volumetric Analysis</i> , 12th Ed., Blakiston, Philadelphia, <u>1935</u> , 75.			

<p>COMPONENTS:</p> <p>1. Ammonium sulfite; $(\text{NH}_4)_2\text{SO}_3$; [10196-04-0]</p> <p>2. Ammonium chloride; NH_4Cl; [12125-02-9]</p> <p>3. Water; H_2O; [7732-18-5]</p>	<p>ORIGINAL MEASUREMENTS:</p> <p>Labash, J.A.; Lusby, G.R.</p> <p><i>Can. J. Chem.</i> <u>1955</u>, 33, 774-86.</p>
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EXPERIMENTAL VALUES (continued):

Compositions of equilibrium solutions at 60°C, expressed as mass %.

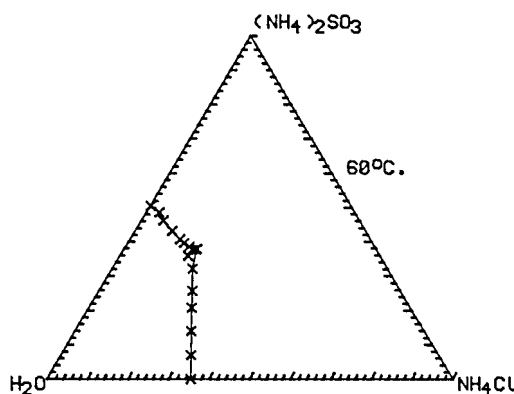
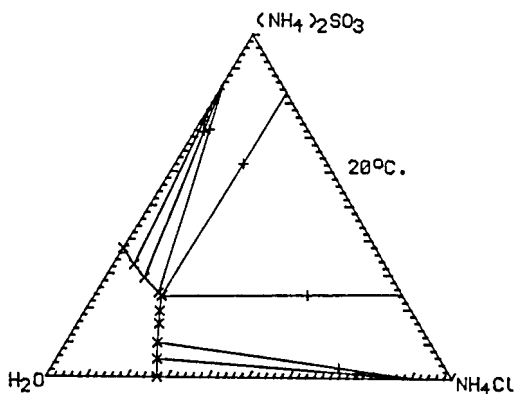
NH_4Cl	$(\text{NH}_4)_2\text{SO}_3$	$(\text{NH}_4)_2\text{SO}_4$	$(\text{NH}_4)\text{HSO}_3$	NH_3	Solid ^b phase
35.37	-	-	-	-	A
32.04	6.95	-	-	-	A
28.56	13.97	-	0.23	-	A
25.35	20.75	-	0.09	-	A
22.98	25.75	-	0.22	-	A
19.82	32.06	-	0.43	-	A
17.84	37.72	0.91	-	-	A + B
17.82	37.86	0.99	-	-	A + B
17.71	37.7	-	0.17	-	B
16.90	37.6	-	-	0.22	B
13.82	39.6	-	-	0.02	B
15.64	38.5	-	-	-	B
12.29	40.7	0.89	-	-	B
9.05	43.1	-	-	0.02	B
5.35	46.2	-	-	0.05	B
3.14	48.6	-	0.51	-	B
0.0	50.48	-	0.13	-	B

Compositions of equilibrium solutions expressed as molalities, mol/kg^a

10.23	-	-	-	-
9.82	0.98	-	-	-
9.33	2.10	-	0.041	-
8.81	3.32	-	0.017	-
8.42	4.34	-	0.043	-
7.77	5.79	-	0.091	-
7.66	7.46	0.158	-	-
7.69	7.52	0.173	-	-
7.45	7.31	-	0.039	-
6.98	7.15	-	-	0.29
5.55	7.32	-	-	0.025
6.38	7.23	-	-	-
4.98	7.60	0.146	-	-
3.54	7.76	-	-	0.025
2.07	8.22	-	-	0.06
1.23	8.76	-	0.108	-
0.0	8.80	-	0.027	-

^a Molalities calculated by the compiler.

^b Solid phases: A - NH_4Cl ,
 B - $(\text{NH}_4)_2\text{SO}_3 \cdot \text{H}_2\text{O}$



COMPONENTS: 1. Ammonium sulfite; $(\text{NH}_4)_2\text{SO}_3$; [10196-04-0] 2. Ammonium thiosulfate; $(\text{NH}_4)_2\text{S}_2\text{O}_3$; [7783-18-8] 3. Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Terres, E.; Overdick, F.; <i>Das Gas- und Wasserfach</i> <u>1928</u> , 71, 106-110.																																																																																																									
VARIABLES: Concentrations of the components One temperature: 298 K	PREPARED BY: Mary R. Masson																																																																																																									
EXPERIMENTAL VALUES: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">$(\text{NH}_4)_2\text{S}_2\text{O}_3$</th> <th style="text-align: center;">$(\text{NH}_4)_2\text{SO}_3$</th> <th style="text-align: center;">$(\text{NH}_4)_2\text{S}_2\text{O}_3^a$</th> <th style="text-align: center;">$(\text{NH}_4)_2\text{SO}_3^a$</th> <th style="text-align: center;">Solid^b</th> </tr> <tr> <th style="text-align: center;">mass %</th> <th style="text-align: center;">mass %</th> <th style="text-align: center;">mol/kg</th> <th style="text-align: center;">mol/kg</th> <th style="text-align: center;">phase</th> </tr> </thead> <tbody> <tr><td>64.10</td><td>0.0</td><td>12.048</td><td>0.</td><td>A</td></tr> <tr><td>58.25</td><td>7.60</td><td>11.510</td><td>1.916</td><td>A</td></tr> <tr><td>55.80</td><td>9.15</td><td>10.742</td><td>2.248</td><td>A</td></tr> <tr><td>55.63</td><td>10.78</td><td>11.175</td><td>2.763</td><td>A + B</td></tr> <tr><td>48.75</td><td>13.80</td><td>8.784</td><td>3.173</td><td>B</td></tr> <tr><td>44.55</td><td>15.65</td><td>7.553</td><td>3.386</td><td>B</td></tr> <tr><td>44.20</td><td>15.80</td><td>7.456</td><td>3.401</td><td>B</td></tr> <tr><td>40.40</td><td>18.05</td><td>6.561</td><td>3.740</td><td>B</td></tr> <tr><td>35.70</td><td>20.15</td><td>5.456</td><td>3.930</td><td>B</td></tr> <tr><td>35.30</td><td>20.70</td><td>5.413</td><td>4.051</td><td>B</td></tr> <tr><td>32.00</td><td>22.20</td><td>4.715</td><td>4.174</td><td>B</td></tr> <tr><td>30.30</td><td>23.50</td><td>4.425</td><td>4.380</td><td>B</td></tr> <tr><td>26.45</td><td>24.75</td><td>3.657</td><td>4.367</td><td>B</td></tr> <tr><td>22.25</td><td>26.90</td><td>2.953</td><td>4.555</td><td>B</td></tr> <tr><td>17.05</td><td>28.40</td><td>2.109</td><td>4.483</td><td>B</td></tr> <tr><td>16.20</td><td>30.40</td><td>2.047</td><td>4.902</td><td>B</td></tr> <tr><td>12.10</td><td>32.15</td><td>1.465</td><td>4.965</td><td>B</td></tr> <tr><td>4.90</td><td>34.50</td><td>0.546</td><td>4.902</td><td>B</td></tr> <tr><td>0.00</td><td>37.10</td><td>0.</td><td>5.079</td><td>B</td></tr> </tbody> </table> <p>^a Molalities calculated by the compiler. ^b Solid phases: A - ammonium thiosulfate, B - ammonium sulfite</p> <p>Compiler's note: some other tables of data are given, but no temperature is stated, and it is not clear whether they refer to solubility studies or not.</p>		$(\text{NH}_4)_2\text{S}_2\text{O}_3$	$(\text{NH}_4)_2\text{SO}_3$	$(\text{NH}_4)_2\text{S}_2\text{O}_3^a$	$(\text{NH}_4)_2\text{SO}_3^a$	Solid ^b	mass %	mass %	mol/kg	mol/kg	phase	64.10	0.0	12.048	0.	A	58.25	7.60	11.510	1.916	A	55.80	9.15	10.742	2.248	A	55.63	10.78	11.175	2.763	A + B	48.75	13.80	8.784	3.173	B	44.55	15.65	7.553	3.386	B	44.20	15.80	7.456	3.401	B	40.40	18.05	6.561	3.740	B	35.70	20.15	5.456	3.930	B	35.30	20.70	5.413	4.051	B	32.00	22.20	4.715	4.174	B	30.30	23.50	4.425	4.380	B	26.45	24.75	3.657	4.367	B	22.25	26.90	2.953	4.555	B	17.05	28.40	2.109	4.483	B	16.20	30.40	2.047	4.902	B	12.10	32.15	1.465	4.965	B	4.90	34.50	0.546	4.902	B	0.00	37.10	0.	5.079	B
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