

| COMPONENTS: 1. Ammonium selenite; $(\text{NH}_4)_2\text{SeO}_3$; [7783-19-9] 2. Water; H_2O ; [7732-18-5] | ORIGINAL MEASUREMENTS: Janickis, J. <i>Z. Anorg. Allgem. Chem.</i> <u>1934</u> , 218, 89-103. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|---|---|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|------|-------|-------|------|-------|-------|------|-------|-------|------|-------|-------|------|-------|--------|------|-------|--------|
| VARIABLES: Temperature: 253- 343 K | PREPARED BY: Mary R. Masson | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EXPERIMENTAL VALUES: <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">$t/^\circ\text{C}$</th> <th style="text-align: center;">$(\text{NH}_4)_2\text{SeO}_3$ mass %</th> <th style="text-align: center;">$(\text{NH}_4)_2\text{SeO}_3^a$ mol/kg</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">-20.0</td><td style="text-align: center;">45.12</td><td style="text-align: center;">5.043</td></tr> <tr><td style="text-align: center;">- 8.5</td><td style="text-align: center;">47.18</td><td style="text-align: center;">5.479</td></tr> <tr><td style="text-align: center;">+ 1.0</td><td style="text-align: center;">49.21</td><td style="text-align: center;">5.943</td></tr> <tr><td style="text-align: center;">14.0</td><td style="text-align: center;">51.99</td><td style="text-align: center;">6.642</td></tr> <tr><td style="text-align: center;">25.0</td><td style="text-align: center;">54.70</td><td style="text-align: center;">7.406</td></tr> <tr><td style="text-align: center;">32.0</td><td style="text-align: center;">56.00</td><td style="text-align: center;">7.806</td></tr> <tr><td style="text-align: center;">35.2</td><td style="text-align: center;">57.13</td><td style="text-align: center;">8.174</td></tr> <tr><td style="text-align: center;">43.0</td><td style="text-align: center;">59.90</td><td style="text-align: center;">9.162</td></tr> <tr><td style="text-align: center;">50.0</td><td style="text-align: center;">62.31</td><td style="text-align: center;">10.140</td></tr> <tr><td style="text-align: center;">70.0</td><td style="text-align: center;">69.08</td><td style="text-align: center;">13.703</td></tr> </tbody> </table> <p>^a Molalities calculated by the compiler. Solid phase: $(\text{NH}_4)_2\text{SeO}_3 \cdot \text{H}_2\text{O}$</p> | | $t/^\circ\text{C}$ | $(\text{NH}_4)_2\text{SeO}_3$ mass % | $(\text{NH}_4)_2\text{SeO}_3^a$ mol/kg | -20.0 | 45.12 | 5.043 | - 8.5 | 47.18 | 5.479 | + 1.0 | 49.21 | 5.943 | 14.0 | 51.99 | 6.642 | 25.0 | 54.70 | 7.406 | 32.0 | 56.00 | 7.806 | 35.2 | 57.13 | 8.174 | 43.0 | 59.90 | 9.162 | 50.0 | 62.31 | 10.140 | 70.0 | 69.08 | 13.703 |
| $t/^\circ\text{C}$ | $(\text{NH}_4)_2\text{SeO}_3$ mass % | $(\text{NH}_4)_2\text{SeO}_3^a$ mol/kg | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -20.0 | 45.12 | 5.043 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| - 8.5 | 47.18 | 5.479 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| + 1.0 | 49.21 | 5.943 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14.0 | 51.99 | 6.642 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25.0 | 54.70 | 7.406 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32.0 | 56.00 | 7.806 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35.2 | 57.13 | 8.174 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 43.0 | 59.90 | 9.162 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50.0 | 62.31 | 10.140 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70.0 | 69.08 | 13.703 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AUXILIARY INFORMATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| METHOD APPARATUS/PROCEDURE: For each temperature, a saturated solution was prepared by stirring the salt in water inside a stoppered 4-cm diameter test-tube. Small samples of solution were removed at intervals for analysis, in order to test for attainment of equilibrium. The time required varied between 1 and 15 hr. The solutions were analysed for SeO_2 by the method of Norris and Fay (1). | SOURCE AND PURITY OF MATERIALS: ESTIMATED ERROR: Temperature: -20 - 0°C $\pm 0.2^\circ\text{C}$, 0 - 60°C $\pm 0.1^\circ\text{C}$, 60 - 110°C $\pm 0.3^\circ\text{C}$. REFERENCES: 1. Norris, J.F.; Fay, H. <i>Amer. Chem. J.</i> <u>1896</u> , 18, 703; <u>1900</u> , 23, 119. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| COMPONENTS: 1. Ammonium selenite; $(\text{NH}_4)_2\text{SeO}_3$; [7783-19-9] 2. Water; H_2O ; [7732-18-5] | ORIGINAL MEASUREMENTS: Janickis, J.; Gutmanaite, H. <i>Z. Anorg. Allgem. Chem.</i> <u>1936</u> , 227, 1-16. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|---|--|--|---|----------------|--------|------|-------|--------|-----|--------|------|-------|--------|---|--------|-----|------|--------|---|--------|-----|------|--------|---|-------|-----|------|-------|---|-------|---|-------|-------|---|-------|---|-------|-------|---|--------|-------|-------|------|---|-------|-------|------|------|--|
| VARIABLES: Temperature: 251 - 273 K Composition | PREPARED BY: Mary R. Masson | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EXPERIMENTAL VALUES: <p style="text-align: center;">Composition of equilibrium solutions</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">$t/^\circ\text{C}$</th> <th style="text-align: center;">$(\text{NH}_4)_2\text{SeO}_3$ mol/dm³</th> <th style="text-align: center;">$(\text{NH}_4)_2\text{SeO}_3$ mass %</th> <th style="text-align: center;">$(\text{NH}_4)_2\text{SeO}_3^a$ mol/kg</th> <th style="text-align: center;">Solid phase</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">-0.105</td><td style="text-align: center;">0.02</td><td style="text-align: center;">0.326</td><td style="text-align: center;">0.0201</td><td style="text-align: center;">ice</td></tr> <tr><td style="text-align: center;">-0.260</td><td style="text-align: center;">0.05</td><td style="text-align: center;">0.812</td><td style="text-align: center;">0.0502</td><td style="text-align: center;">"</td></tr> <tr><td style="text-align: center;">-0.470</td><td style="text-align: center;">0.1</td><td style="text-align: center;">1.62</td><td style="text-align: center;">0.1007</td><td style="text-align: center;">"</td></tr> <tr><td style="text-align: center;">-0.875</td><td style="text-align: center;">0.2</td><td style="text-align: center;">3.20</td><td style="text-align: center;">0.2028</td><td style="text-align: center;">"</td></tr> <tr><td style="text-align: center;">-2.06</td><td style="text-align: center;">0.5</td><td style="text-align: center;">7.75</td><td style="text-align: center;">0.516</td><td style="text-align: center;">"</td></tr> <tr><td style="text-align: center;">-4.08</td><td style="text-align: center;">1</td><td style="text-align: center;">14.80</td><td style="text-align: center;">1.066</td><td style="text-align: center;">"</td></tr> <tr><td style="text-align: center;">-8.81</td><td style="text-align: center;">2</td><td style="text-align: center;">27.24</td><td style="text-align: center;">2.296</td><td style="text-align: center;">"</td></tr> <tr><td style="text-align: center;">-15.95</td><td style="text-align: center;">3.173</td><td style="text-align: center;">39.88</td><td style="text-align: center;">4.07</td><td style="text-align: center;">"</td></tr> <tr><td style="text-align: center;">-21.9</td><td style="text-align: center;">satd.</td><td style="text-align: center;">44.8</td><td style="text-align: center;">4.98</td><td style="text-align: center;">ice + $(\text{NH}_4)_2\text{SeO}_3 \cdot \text{H}_2\text{O}$</td></tr> </tbody> </table> <p>^a Molalities calculated by the compiler.</p> | | $t/^\circ\text{C}$ | $(\text{NH}_4)_2\text{SeO}_3$ mol/dm ³ | $(\text{NH}_4)_2\text{SeO}_3$ mass % | $(\text{NH}_4)_2\text{SeO}_3^a$ mol/kg | Solid phase | -0.105 | 0.02 | 0.326 | 0.0201 | ice | -0.260 | 0.05 | 0.812 | 0.0502 | " | -0.470 | 0.1 | 1.62 | 0.1007 | " | -0.875 | 0.2 | 3.20 | 0.2028 | " | -2.06 | 0.5 | 7.75 | 0.516 | " | -4.08 | 1 | 14.80 | 1.066 | " | -8.81 | 2 | 27.24 | 2.296 | " | -15.95 | 3.173 | 39.88 | 4.07 | " | -21.9 | satd. | 44.8 | 4.98 | ice + $(\text{NH}_4)_2\text{SeO}_3 \cdot \text{H}_2\text{O}$ |
| $t/^\circ\text{C}$ | $(\text{NH}_4)_2\text{SeO}_3$ mol/dm ³ | $(\text{NH}_4)_2\text{SeO}_3$ mass % | $(\text{NH}_4)_2\text{SeO}_3^a$ mol/kg | Solid phase | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -0.105 | 0.02 | 0.326 | 0.0201 | ice | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -0.260 | 0.05 | 0.812 | 0.0502 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -0.470 | 0.1 | 1.62 | 0.1007 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -0.875 | 0.2 | 3.20 | 0.2028 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -2.06 | 0.5 | 7.75 | 0.516 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -4.08 | 1 | 14.80 | 1.066 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -8.81 | 2 | 27.24 | 2.296 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -15.95 | 3.173 | 39.88 | 4.07 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -21.9 | satd. | 44.8 | 4.98 | ice + $(\text{NH}_4)_2\text{SeO}_3 \cdot \text{H}_2\text{O}$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AUXILIARY INFORMATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| METHOD APPARATUS/PROCEDURE: Freezing points of prepared solutions were measured by use of a Beckman-type apparatus (1). Determinations were repeated until the desired reproducibility was attained. Each reported value is the mean of at least three determinations. | SOURCE AND PURITY OF MATERIALS: Ammonium selenite was prepared by neutralization of selenious acid with ammonia solution. ESTIMATED ERROR: Temperature reproducibility 0.5% REFERENCES: 1. Ostwald, W.; Luther, R. <i>Hand- und Hilfsbuch zur Ausföhrung physikochemischer Messungen</i> , 5th Ed., Akademische Verlag., Leipzig, <u>1931</u> . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |