| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Potassium dihydrogenarsenate; $KH_2AsO_4$; [7784-41-0]<br>(3) Water; $H_2O$; [7732-18-5] | Muthmann, W.; Kuntze, O.<br>Z. *Kryst.* 1894, *23*, 368-76. |
| **VARIABLES:**<br>Composition at 7°C. | **PREPARED BY:**<br>J. Eysseltová |

**EXPERIMENTAL VALUES:**

Composition of saturated solutions in the $KH_2PO_4$-$KH_2AsO_4$-$H_2O$ system at 7°C.

| $d$ / g cm$^{-3}$ | $KH_2PO_4$ concn.[a] | $KH_2PO_4$ concn.[b] | $KH_2PO_4$ mass%[c] | $KH_2PO_4$ mol/kg[c] | $KH_2AsO_4$ concn.[a] | $KH_2AsO_4$ concn.[b] | $KH_2AsO_4$ mass%[c] | $KH_2AsO_4$ mol/kg[c] | $H_2O$ mass%[c] |
|---|---|---|---|---|---|---|---|---|---|
| 1.1634 | 249.86 | 1834.9 | 21.48 | 2.00 | ---- | ---- | 0 | 0 | 78.52 |
| 1.1720 | 220.02 | 1615.4 | 18.77 | 1.76 | 37.60 | 208.7 | 3.20 | 0.22 | 78.01 |
| 1.1773 | 204.83 | 1504.3 | 17.39 | 1.64 | 59.84 | 332.1 | 5.08 | 0.36 | 77.51 |
| 1.1848 | 181.08 | 1329.8 | 15.28 | 1.45 | 92.10 | 511.3 | 7.77 | 0.56 | 76.94 |
| 1.1903 | 160.24 | 1176.8 | 13.46 | 1.29 | 120.80 | 670.6 | 10.14 | 0.73 | 76.38 |
| 1.1971 | 137.61 | 1010.6 | 11.49 | 1.11 | 151.39 | 840.4 | 13.64 | 0.92 | 75.85 |
| 1.2004 | 111.36 | 815.6 | 9.27 | 0.89 | 179.74 | 997.8 | 14.97 | 1.09 | 75.74 |
| 1.1999 | 80.89 | 594.7 | 6.74 | 0.65 | 205.69 | 1141.6 | 17.13 | 1.25 | 76.11 |
| 1.2000 | 51.09 | 375.2 | 4.25 | 0.41 | 234.05 | 1299.3 | 19.50 | 1.42 | 76.23 |
| 1.2009 | 29.17 | 214.2 | 2.42 | 0.23 | 256.20 | 1425.5 | 21.33 | 1.55 | 76.25 |
| 1.1955 | ---- | ---- | 0 | 0 | 282.37 | 1567.5 | 23.61 | 1.71 | 76.39 |

[a] The concentration unit is: g/1000 ml.

[b] The concentration unit is: mg mol/1000 ml.

[c] These values were calculated by the compiler.

COMMENT: The solid phases were solid solutions.

AUXILIARY INFORMATION

**METHOD/APPARATUS/PROCEDURE:**

Cool saturated solutions were mixed in a volume ratio of 1:9, 2:8,..., 9:1. Solid components were added to the mixtures. The mixtures were then heated to dissolve the solid phase and placed in a cellar. Supersaturated solutions were formed and seeded with a residue obtained by evaporation of a drop of the respective solution. The contents of the pycnometers used for density measurements were evaporated and the residue was dried at 100°C in a dry box. The arsenic content of the residue was then determined gravimetrically as $As_2S_5$.

**SOURCE AND PURITY OF MATERIALS:**

No information is given.

**ESTIMATED ERROR:**

No details are given except that the temperature interval was 6.8 to 7.2°C.

**REFERENCES:**

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Potassium acetate; $CH_3CO_2K$; [127-08-2]<br>(3) Water; $H_2O$; [7732-18-5] | Apfel, O.<br>Dissertation, Technical University, Darmstadt 1911. |
| **VARIABLES:**<br>Composition at 25°C. | **PREPARED BY:**<br>J. Eysseltová |

**EXPERIMENTAL VALUES:**

Composition of saturated solutions in the $KH_2PO_4$-$CH_3CO_2K$-$H_2O$ system at 25°C.

| $PO_4^{3-}$ conc[b] | $CH_3CO_2^-$ conc[b] | $KH_2PO_4$[a] mass% | $KH_2PO_4$[a] mol/kg | $CH_3CO_2K$[a] mass% | $CH_3CO_2K$[a] mol/kg |
|---|---|---|---|---|---|
| 1.28 | 0.50 | 17.42 | 1.65 | 4.91 | 0.64 |
| 1.06 | 0.98 | 14.43 | 1.40 | 9.62 | 1.29 |

[a] These values were calculated by the compiler.

[b] The concentration unit is: mol/1000 g of solution.

AUXILIARY INFORMATION

| METHOD/APPARATUS/PROCEDURE: | SOURCE AND PURITY OF MATERIALS: |
|---|---|
| The isothermal method was used. Equilibrium was checked by repeated analysis. The solid and liquid phases were separated from each other by filtration through a platinum mat. Phosphate content was determined gravimetrically as $Mg_2P_2O_7$, potassium was determined gravimetrically as $KClO_4$. | No information is given. |
| | **ESTIMATED ERROR:**<br>No information is given. |
| | **REFERENCES:** |

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Potassium carbonate; $K_2CO_3$; [584-08-7]<br>(3) Water; $H_2O$; [7732-18-5] | Apfel, O.<br>Dissertation, Technical University, Darmstadt 1911. |
| **VARIABLES:** | **PREPARED BY:** |
| Composition at 25°C. | J. Eysseltová |

**EXPERIMENTAL VALUES:**

Composition of saturated solutions in the $KH_2PO_4$-$K_2CO_3$-$H_2O$ system at 25°C.

| $PO_4^{3-}$ | $CO_3^{2-}$ | $KH_2PO_4$ [a] | | $K_2CO_3$ [a] | |
|---|---|---|---|---|---|
| conc [b] | conc [b] | mass% | mol/kg | mass% | mol/kg |
| 1.69 | 0.12 | 23.00 | 2.24 | 1.66 | 0.16 |
| 2.34 | 0.415 | 31.86 | 3.75 | 5.74 | 0.66 |

[a] These values were calculated by the compiler.

[b] The concentration unit is: mol/1000 g of solution.

COMMENT: The author observed a vigorous evolution of $CO_2$, and, therefore, expresses doubt about the establishment of equilibrium in the system.

AUXILIARY INFORMATION

| METHOD/APPARATUS/PROCEDURE: | SOURCE AND PURITY OF MATERIALS: |
|---|---|
| The isothermal method was used. The solid and liquid phases were separated from each other by filtration through a platinum wire mat. Analyses were done gravimetrically: phosphorus as $Mg_2P_2O_7$, and potassium as $KClO_4$. | No information is given. |
| | **ESTIMATED ERROR:**<br>No information is given. |
| | **REFERENCES:** |

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Dipotassium sulfate; $K_2SO_4$; [7778-80-5]<br>(3) Water; $H_2O$; [7732-18-5] | Apfel, O.<br>Dissertation, Technical University, Darmstadt, 1911. |
| **VARIABLES:**<br>Composition at 25°C. | **PREPARED BY:**<br>J. Eysseltová |

**EXPERIMENTAL VALUES:**

Composition of saturated solutions in the $KH_2PO_4$-$K_2SO_4$-$H_2O$ system at 25°C.

| $PO_4^{3-}$ conc.[b] | $SO_4^{2-}$ concn.[b] | $KH_2PO_4$[a] mass% | $KH_2PO_4$[a] mol/kg | $K_2SO_4$[a] mass% | $K_2SO_4$[a] mol/kg |
|---|---|---|---|---|---|
| 1.47 | ---- | 19.87 | 1.82 | ---- | ---- |
| 1.43 | 0.08 | 19.46 | 1.81 | 1.39 | 0.10 |
| 1.34 | 0.18 | 18.24 | 1.70 | 3.14 | 0.23 |
| 1.30 | 0.36 | 17.69 | 1.71 | 6.27 | 0.47 |
| 1.24 | 0.39 | 16.88 | 1.62 | 6.80 | 0.51 |
| 1.25 | 0.39 | 17.01 | 1.64 | 6.80 | 0.51 |
| 1.23 | 0.36 | 16.74 | 1.60 | 6.27 | 0.47 |

[a] These values were calculated by the compiler.

[b] The concentration unit is: mol/1000 g solution.

AUXILIARY INFORMATION

| METHOD/APPARATUS/PROCEDURE: | SOURCE AND PURITY OF MATERIALS: |
|---|---|
| The isothermal method was used. Equilibrium was checked by repeated analysis. The liquid and solid phases were separated from each other by filtration through a platinum wire mat. Analysis was done gravimetrically. Phosphate was determined as $Mg_2P_2O_7$, potassium was determined as $KClO_4$, and sulfate was determined as $BaSO_4$. | No details are given. |
| | **ESTIMATED ERROR:**<br>No information is given. |
| | **REFERENCES:** |

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Potassium nitrate; $KNO_3$; [7757-79-1]<br>(3) Water; $H_2O$; [7732-18-5] | Apfel, O.<br>Dissertation, Technical University, Darmstadt, 1911. |
| **VARIABLES:** | **PREPARED BY:** |
| Composition at 25°C. | J. Eysseltová |

**EXPERIMENTAL VALUES:**

Composition of saturated solutions in the $KH_2PO_4$-$KNO_3$-$H_2O$ system at 25°C.

| $PO_4^{3-}$ concn.[b] | $NO_3^-$ concn.[b] | $KH_2PO_4$[a] mass% | $KH_2PO_4$[a] mol/kg | $KNO_3$[a] mass% | $KNO_3$[a] mol/kg |
|---|---|---|---|---|---|
| 1.20 | 0.55 | 16.33 | 1.54 | 5.56 | 0.70 |
| 1.03 | 1.19 | 14.01 | 1.39 | 12.03 | 1.61 |

[a] These values were calculated by the compiler.

[b] The concentration unit is: mol/1000 g of solution.

AUXILIARY INFORMATION

| METHOD/APPARATUS/PROCEDURE: | SOURCE AND PURITY OF MATERIALS: |
|---|---|
| The isothermal method was used. Equilibrium was checked by repeated analysis of the liquid phase. The liquid and solid phases were separated from each other by filtration through a platinum wire mat. Analyses were done gravimetrically: phosphate as $Mg_2P_2O_7$, and potassium as $KClO_4$. | No information is given. |
| | **ESTIMATED ERROR:**<br>Nothing is stated. |
| | **REFERENCES:** |

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Hydrogen peroxide; $H_2O_2$; [7722-84-1]<br>(3) Water; $H_2O$; [7732-18-5] | Menzel, H.; Gabler, C.<br>*Z. Anorg. Chem.* 1929, 177, 187-214. |
| **VARIABLES:** | **PREPARED BY:** |
| Composition at 0°C. | J. Eysseltová |

**EXPERIMENTAL VALUES:**

Solubility in the $KH_2PO_4$-$H_2O_2$-$H_2O$ system at 0°C.

| | $H_2O_2$ | | $KH_2PO_4$ | |
|---|---|---|---|---|
| mol P : mol $O_2^{2-}$ | g/1000 g soln | mol/kg | g/1000 g soln | mol/kg |
| 1 : 0 | ----- | ---- | 124.8 | 1.047 |
| 1 : 1.69 | 65.90 | 2.506 | 160.7 | 1.527 |
| 1 : 1.78 | 82.42 | 3.313 | 186.7 | 1.876 |

AUXILIARY INFORMATION

**METHOD/APPARATUS/PROCEDURE:**

Equilibrium was reached isothermally in an ice-water bath. Repeated analyses were made to check the equilibrium. The dihydrogenphosphate ion content was determined gravimetrically as ammonium phosphomolybdate. The hydrogen peroxide content was determined by titration with potassium permanganate.

**SOURCE AND PURITY OF MATERIALS:**

Kahlbaum $KH_2PO_4$ intended for use in enzyme investigation according to Soerensen was used. The $H_2O_2$ was the purest Merck reagent grade.

**ESTIMATED ERROR:**

The temperature was controlled to within ± 0.1 K. No other details are given.

**REFERENCES:**

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Potassium chloride; KCl; [7447-40-7]<br>(3) Water; $H_2O$; [7732-18-5] | Askenasy, P.; Nessler, F.<br>*Z. Anorg. Chem.* 1930, *189*, 305-28. |
| **VARIABLES:**<br>Composition at 0°C. | **PREPARED BY:**<br>J. Eysseltová |

**EXPERIMENTAL VALUES:**

The 0°C isotherm for the $KH_2PO_4$-KCl-$H_2O$ system.

| | $KH_2PO_4$ | | | KCl | | | $H_2O$ | | |
|---|---|---|---|---|---|---|---|---|---|
| $d$ g/cm$^3$ | conc[b] | mass%[a] | mol/kg[a] | conc[b] | mass%[a] | mol/kg[a] | conc[b] | mass%[a] | solid[c] phase |
| 1.1151 | 100 | 15.5 | 1.35 | 0 | 0 | 0 | 4125 | 84.5 | A |
| 1.1158 | 91.9 | 14.6 | 1.28 | 18.1 | 1.77 | 0.28 | 3540 | 83.6 | " |
| 1.1179 | 68.3 | 13.0 | 1.04 | 31.7 | 3.31 | 0.53 | 3320 | 83.7 | " |
| 1.1183 | 55.1 | 12.0 | 1.07 | 44.9 | 5.37 | 0.87 | 2860 | 82.6 | " |
| 1.1199 | 37.3 | 10.2 | 0.93 | 62.7 | 9.44 | 1.58 | 2210 | 80.3 | " |
| 1.1427 | 27.0 | 8.70 | 0.82 | 73.0 | 12.9 | 2.21 | 1840 | 78.4 | " |
| 1.1750 | 7.9 | 3.21 | 0.31 | 92.1 | 20.6 | 3.63 | 1415 | 76.2 | A + B |
| 1.1690 | 4.2 | 1.72 | 0.16 | 95.8 | 21.5 | 3.76 | 1420 | 76.8 | B |
| 1.1420 | 0 | 0 | 0 | 100 | 22.3 | 3.85 | 1440 | 77.7 | " |

[a] These values were calculated by the compiler.

[b] The concentration unit is: mol/100 mol of solute.

[c] The solid phases are: A = $KH_2PO_4$; B = KCl.

AUXILIARY INFORMATION

| METHOD/APPARATUS/PROCEDURE: | SOURCE AND PURITY OF MATERIALS: |
|---|---|
| The isothermal method was used. The mixtures were agitated in a thermostat for 2 to 4 days. No information is given about the analytical procedures. The solid phase was separated from the liquid by centrifuging and analyzed. | No information is given. |
| | **ESTIMATED ERROR:**<br>The only information given is that the temperature was controlled to within ± 0.1 K. |
| | **REFERENCES:** |

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Ammonium dihydrogenphosphate; $NH_4H_2PO_4$; [7722-76-1]<br>(3) Water; $H_2O$; [7732-18-5] | Askenasy, P.; Nessler, F.<br>*Z. Anorg. Chem.* 1930, *189*, 305-28. |
| **VARIABLES:**<br>Composition at 0°C. | **PREPARED BY:**<br>J. Eysseltová |

**EXPERIMENTAL VALUES:**

Composition of saturated solutions in the $KH_2PO_4$-$NH_4H_2PO_4$-$H_2O$ system at 0°C.

| $d$ / g cm$^{-3}$ | $KH_2PO_4$ conc.[a] | $KH_2PO_4$ mass%[b] | $KH_2PO_4$ mol/kg[b] | $NH_4H_2PO_4$ conc.[a] | $NH_4H_2PO_4$ mass%[b] | $NH_4H_2PO_4$ mol/kg[b] | $H_2O$ conc.[a] | $H_2O$ mass%[b] |
|---|---|---|---|---|---|---|---|---|
| 1.1151 | 100 | 15.5 | 1.35 | 0 | 0 | 0 | 4125 | 85.5 |
| 1.1169 | 80.6 | 14.7 | 1.32 | 19.4 | 3.6 | 0.32 | 3400 | 81.7 |
| 1.1393 | 67.4 | 13.8 | 1.27 | 32.6 | 7.0 | 0.62 | 2950 | 79.2 |
| 1.1472 | 54.7 | 12.8 | 1.20 | 45.3 | 10.2 | 0.89 | 2540 | 77.0 |
| 1.1577 | 49.3 | 12.4 | 1.17 | 50.7 | 12.2 | 1.21 | 2325 | 75.4 |
| 1.1571 | 44.2 | 11.4 | 1.10 | 55.8 | 13.7 | 1.38 | 2240 | 74.9 |
| 1.1603 | 38.1 | 10.2 | 0.89 | 61.9 | 15.7 | 1.61 | 2130 | 74.1 |
| 1.1604 | 36.4 | 9.8 | 0.86 | 63.6 | 16.1 | 1.67 | 2120 | 74.1 |
| 1.1611 | 35.2 | 9.6 | 0.83 | 64.8 | 16.4 | 1.71 | 2105 | 74.0 |
| 1.1574 | 31.2 | 8.4 | 0.82 | 68.8 | 17.1 | 1.73 | 2130 | 74.5 |
| 1.1568 | 26.4 | 7.0 | 0.67 | 73.6 | 17.6 | 1.86 | 2200 | 76.4 |
| 1.1447 | 18.2 | 4.6 | 0.44 | 81.8 | 18.7 | 1.99 | 2280 | 76.7 |
| 1.1350 | 15.3 | 2.8 | 0.36 | 84.7 | 19.7 | 2.00 | 2350 | 77.5 |
| 1.1312 | 12.4 | 3.0 | 0.28 | 87.6 | 18.6 | 1.97 | 2450 | 78.4 |
| 1.1043 | 0 | 0 | 0 | 100 | 18.6 | 1.97 | 2815 | 81.4 |

[a] The concentration unit is: mol/100 mol of solute.

[b] These values were calculated by the compiler.

**AUXILIARY INFORMATION**

| METHOD/APPARATUS/PROCEDURE: | SOURCE AND PURITY OF MATERIALS: |
|---|---|
| Mixtures of salts and water were shaken in a thermostat for 2-4 days. The solid phase was isolated by centrifuging and analyzed. No details about the analytical procedures are given. | No information is given. |
| | **ESTIMATED ERROR:**<br>The temperature was controlled to within ± 0.1 K. No other information is given. |
| | **REFERENCES:** |

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Potassium chloride; KCl; [7747-40-7]<br>(3) Water; $H_2O$; [7732-18-5] | Krasil'shtschikov, A.I.<br>*Izv. In-ta Fiz.-khim. Anal.* 1933, 6, 159-68. |
| **VARIABLES:**<br>Temperature and composition. | **PREPARED BY:**<br>J. Eysseltová |

**EXPERIMENTAL VALUES:**

Solubility isotherms in the $KH_2PO_4$-KCl-$H_2O$ system.

| No | $t$/°C. | $d$ / g cm$^{-3}$ | $KH_2PO_4$ conc[a] | $KH_2PO_4$ conc[b] | $KH_2PO_4$ mass% | KCl conc[a] | KCl conc[b] | KCl mass% | $H_2O$ mass% | $H_2O$ conc[b] | solid phase[c] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 1.094 | 19.3 | 100 | 12.7 | ---- | ---- | ---- | 87.30 | 687.4 | A |
| 2 | 0 | 1.095 | 16.0 | 81.4 | 10.5 | 6.6 | 18.6 | 2.4 | 87.10 | 675.2 | " |
| 3 | 0 | 1.097 | 11.7 | 54.7 | 7.6 | 17.7 | 45.3 | 1.3 | 91.10 | 619.4 | " |
| 4 | 0 | 1.165 | 4.3 | 10.7 | 2.5 | 65.8 | 89.3 | 20.9 | 76.60 | 327.3 | A + B |
| 5 | 0 | 1.156 | ---- | ---- | ---- | 69.0 | 100 | 22.2 | 77.80 | 350.4 | B |
| 6 | 25 | 1.147 | 32.9 | 100 | 19.92 | ---- | ---- | ---- | 80.08 | 402.0 | A |
| 7 | 25 | 1.144 | 30.1 | 92.6 | 18.28 | 4.3 | 7.4 | 1.45 | 80.27 | 406.8 | " |
| 8 | 25 | 1.137 | 22.4 | 70.1 | 13.65 | 17.4 | 29.9 | 5.83 | 80.52 | 413.3 | " |
| 9 | 25 | 1.138 | 21.0 | 65.3 | 12.75 | 20.6 | 35.0 | 6.87 | 80.38 | 409.6 | " |
| 10 | 25 | 1.139 | 19.8 | 60.2 | 11.98 | 23.9 | 39.8 | 7.92 | 80.10 | 402.5 | " |
| 11 | 25 | 1.140 | 18.3 | 54.6 | 11.05 | 27.8 | 45.4 | 9.18 | 79.77 | 394.3 | " |
| 12 | 25 | 1.148 | 14.5 | 39.6 | 8.54 | 40.3 | 60.4 | 13.05 | 78.41 | 363.2 | " |
| 13 | 25 | 1.179 | 8.8 | 18.2 | 4.83 | 71.3 | 81.8 | 21.67 | 73.50 | 277.4 | " |
| 14 | 25 | 1.196 | 6.5 | 12.6 | 3.57 | 83.9 | 87.4 | 24.82 | 71.61 | 252.2 | A + B |
| 15 | 25 | 1.184 | 2.7 | 5.3 | 1.44 | 85.8 | 94.7 | 25.81 | 72.75 | 267.0 | B |
| 16 | 25 | 1.179 | ---- | ---- | ---- | 86.8 | 100 | 26.40 | 73.60 | 278.0 | " |
| 17 | 50 | ----- | 54.3 | 100 | 29.10 | ---- | ---- | ---- | 60.90 | 243.7 | A |
| 18 | 50 | ----- | 38.1 | 75.5 | 20.8 | 22.6 | 24.7 | 6.8 | 72.40 | 262.3 | " |
| 19 | 50 | ----- | 23.2 | 45.7 | 12.7 | 50.4 | 54.3 | 15.1 | 72.20 | 260.0 | " |
| 20 | 50 | ----- | 10.2 | 15.96 | 5.23 | 99.0 | 84.04 | 27.5 | 67.23 | 205.2 | A + B |
| 21 | 50 | ----- | ---- | ---- | ---- | 104.0 | 100 | 30.1 | 69.90 | 232.2 | B |

[a] The concentration unit is: mol/1000 mol $H_2O$.
[b] The concentration unit is: g/100 g salts.
[c] The solid phases are: A = $KH_2PO_4$; B = KCl.

AUXILIARY INFORMATION

| METHOD/APPARATUS/PROCEDURE: | SOURCE AND PURITY OF MATERIALS: |
|---|---|
| The isothermal method was used, with 12-15 hours being allowed for equilibration. Chloride ion content was determined argentimetrically, the amount of total salts was determined by evaporating and drying a sample of the saturated solution. | Kahlbaum $KH_2PO_4$ was used. The source of the KCl is not specified. |
| | **ESTIMATED ERROR:**<br>The temperature was controlled to within ± 0.1 K. |
| | **REFERENCES:** |

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Potassium chloride; KCl; [7747-40-7]<br>(3) Water; $H_2O$; [7732-18-5] | Krasil'shtschikov, A.I.<br>*Izv. In-ta Fiz.-khim. Anal.* 1933, 6, 159-68. |

EXPERIMENTAL VALUES cont'd:

The compiler has recalculated the above results to give the following:

| No | $KH_2PO_4$ mol/kg | KCl mol/kg | No | $KH_2PO_4$ mol/kg | KCl mol/kg | No | $KH_2PO_4$ mol/kg | KCl mol/kg |
|---|---|---|---|---|---|---|---|---|
| 1 | 1.068 | ----- | 6 | 1.827 | ----- | 17 | 3.015 | ----- |
| 2 | 0.885 | 0.369 | 7 | 1.673 | 0.242 | 18 | 2.110 | 1.259 |
| 3 | 0.612 | 0.191 | 8 | 1.245 | 0.971 | 19 | 1.292 | 2.805 |
| 4 | 0.239 | 3.659 | 9 | 1.166 | 1.146 | 20 | 0.571 | 5.494 |
| 5 | ----- | 3.827 | 10 | 1.098 | 1.326 | 21 | ----- | 5.775 |
| | | | 11 | 1.017 | 1.543 | | | |
| | | | 12 | 0.800 | 2.232 | | | |
| | | | 13 | 0.482 | 3.954 | | | |
| | | | 14 | 0.366 | 4.648 | | | |
| | | | 15 | 0.145 | 4.758 | | | |
| | | | 16 | ----- | 4.810 | | | |

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Ammonium dihydrogenphosphate; $NH_4H_2PO_4$; [7722-76-1]<br>(3) Water; $H_2O$; [7732-18-5] | 1. Dombrovskaya, N.S.; Zvorykin, A.J. *Kaliy* **1937**, *2*, 24-8.<br>2. Zvorykin, A.J.; Kuznetsov, V.G. *Izv. AN SSSR. ser. khim.* **1938**, 195-201. |
| **VARIABLES:** | **PREPARED BY:** |
| Temperature and composition. | J. Eysseltová |

**EXPERIMENTAL VALUES:**

The solubility in the $KH_2PO_4$-$NH_4H_2PO_4$-$H_2O$ system has been reported by Zvorykin and co-workers in 2 publications. Source paper (1) reports the solubility isotherms at 25 and 50°C. Source paper (2) repeats only the data at 50°C. The solubility data are:

| | $KH_2PO_4$ | | $NH_4H_2PO_4$ | | | $KH_2PO_4$ | | $NH_4H_2PO_4$ | |
|---|---|---|---|---|---|---|---|---|---|
| $t$/°C | mass% | mol/kg[a] | mass% | mol/kg[a] | $t$/°C | mass% | mol/kg[a] | mass% | mol/kg[a] |
| 25 | 20.42 | 1.88 | ---- | ---- | 25 | 7.98 | 0.88 | 25.42 | 3.31 |
| 25 | 19.12 | 1.92 | 7.87 | 0.93 | 25 | ---- | ---- | 29.45 | 3.62 |
| 25 | 18.52 | 1.85 | 8.04 | 0.95 | 50 | 28.09 | 2.87 | ---- | ---- |
| 25 | 18.14 | 1.85 | 9.98 | 1.20 | 50 | 25.23 | 2.83 | 9.49 | 1.26 |
| 25 | 17.66 | 1.80 | 10.44 | 1.26 | 50 | 18.97 | 2.52 | 25.91 | 4.08 |
| 25 | 17.94 | 1.84 | 10.52 | 1.27 | 50 | 15.92 | 2.12 | 29.12 | 4.60 |
| 25 | 16.78 | 1.75 | 13.09 | 1.62 | 50 | 14.38 | 1.93 | 30.96 | 4.92 |
| 25 | 14.80 | 1.60 | 17.47 | 2.24 | 50 | 11.79 | 1.57 | 33.22 | 5.25 |
| 25 | 12.74 | 1.40 | 20.82 | 2.72 | 50 | 7.69 | 0.98 | 35.19 | 5.35 |
| 25 | 10.17 | 1.12 | 23.16 | 3.01 | 50 | 3.45 | 0.43 | 38.42 | 5.74 |
| 25 | 10.02 | 1.09 | 22.93 | 2.97 | 50 | ---- | ---- | 39.88 | 5.76 |

[a] The mol/kg $H_2O$ values were calculated by the compiler.

(continued next page)

AUXILIARY INFORMATION

| METHOD/APPARATUS/PROCEDURE: | SOURCE AND PURITY OF MATERIALS: |
|---|---|
| The isothermal method was used. The mixtures were agitated continuously in a thermostat for 2-5 days. Equilibrium was checked by repeated analysis. Potassium was determined as $KClO_4$, nitrogen was determined by the Kjeldahl method, and phosphorus was determined as $Mg_2P_2O_7$. | No information is given. |
| | **ESTIMATED ERROR:**<br>The temperature was controlled to within ± 0.1 K. |
| | **REFERENCES:** |

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0] | 1. Dombrovskaya, N.S.; Zvorykin, A.J. *Kaliy* 1937, 2, 24-8. |
| (2) Ammonium dihydrogenphosphate; $NH_4H_2PO_4$; [7722-76-1] | 2. Zvorykin, A.J.; Kuznetsov, V.G. *Izv. AN SSSR. ser. khim.* 1938, 195-201. |
| (3) Water; $H_2O$; [7732-18-5] | |

EXPERIMENTAL VALUES cont'd:

COMMENTS: The authors also express the composition of the saturated solutions in units other than mass% and mol/kg. These are given below.

| | $KH_2PO_4$ | | | $NH_4H_2PO_4$ | | | $H_2O$ | | |
|---|---|---|---|---|---|---|---|---|---|
| $t$/°C | mol% | conc.[a] | conc.[b] | mol% | conc.[a] | conc.[b] | mass% | mol% | concn.[b] |
| 25 | 3.28 | 33.91 | 100 | ---- | ---- | ---- | 79.58 | 96.72 | 2949 |
| 25 | 3.22 | 34.64 | 67.2 | 1.61 | 16.87 | 32.8 | 73.01 | 95.17 | 1941 |
| 25 | 3.17 | 33.37 | 66.07 | 1.63 | 17.14 | 33.93 | 73.44 | 95.20 | 1980 |
| 25 | 3.16 | 33.34 | 60.54 | 2.06 | 21.74 | 39.46 | 71.88 | 94.78 | 1816 |
| 25 | 3.08 | 32.50 | 58.84 | 2.15 | 22.73 | 41.16 | 71.90 | 94.77 | 1810 |
| 25 | 3.14 | 33.19 | 59.04 | 2.18 | 23.03 | 40.96 | 71.54 | 94.68 | 1779 |
| 25 | 2.98 | 31.66 | 52.02 | 2.75 | 29.22 | 47.98 | 70.13 | 94.27 | 1643 |
| 25 | 2.70 | 28.92 | 41.72 | 3.78 | 40.39 | 58.28 | 67.73 | 93.52 | 1443 |
| 25 | 2.36 | 25.37 | 34.09 | 4.56 | 49.05 | 65.91 | 66.44 | 93.08 | 1344 |
| 25 | 1.88 | 20.18 | 27.07 | 5.06 | 54.38 | 72.93 | 66.67 | 93.06 | 1344 |
| 25 | 1.83 | 19.63 | 26.88 | 4.98 | 53.45 | 73.12 | 67.05 | 93.19 | 1368 |
| 25 | 1.47 | 15.85 | 20.99 | 5.55 | 59.74 | 79.01 | 66.60 | 92.98 | 1325 |
| 25 | ---- | ----- | ----- | 6.13 | 65.36 | 100 | 70.55 | 93.87 | 1530 |
| 50 | 4.91 | 51.69 | 100 | ---- | ----- | ----- | 71.91 | 95.09 | 1935 |
| 50 | 4.76 | 51.15 | 69.23 | 2.12 | 22.76 | 30.77 | 65.28 | 93.12 | 1354 |
| 50 | 4.07 | 45.56 | 38.22 | 6.58 | 73.69 | 67.77 | 55.12 | 89.35 | 839 |
| 50 | 3.41 | 38.33 | 31.62 | 7.40 | 82.97 | 68.38 | 54.96 | 89.19 | 825 |
| 50 | 3.10 | 34.81 | 27.71 | 7.89 | 95.01 | 72.29 | 54.66 | 89.01 | 810 |
| 50 | 2.52 | 28.35 | 23.18 | 8.42 | 94.52 | 77.26 | 54.99 | 89.10 | 817.4 |
| 50 | 1.60 | 17.82 | 15.58 | 8.66 | 96.45 | 84.37 | 57.12 | 89.74 | 874.7 |
| 50 | 0.71 | 7.86 | 7.05 | 9.31 | 103.5 | 92.95 | 58.13 | 89.98 | 898 |
| 50 | ---- | ----- | ----- | 9.41 | 102.7 | 100 | 60.12 | 91.59 | 974 |

[a] The concentration unit is: mol/1000 mol $H_2O$.

[b] The concentration unit is: mol/100 mol solute.

The authors state that the composition of the solution which is in equilibrium with a solid phase of the same composition is:
30.41 mol $KH_2PO_4$/100 mol solute and 69.59 mol $NH_4H_2PO_4$/100 mol solute at 25°C.
and
26.19 mol $KH_2PO_4$/100 mol solute and 73.81 mol $NH_4H_2PO_4$/100 mol solute at 50°C.

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Potassium nitrate; $KNO_3$; [7757-79-1]<br>(3) Water; $H_2O$; [7732-18-5] | Bergman, A.G.; Bochkarev, N.F.<br>*Izv. Akad. Nauk SSSR* 1938, 237-65. |
| **VARIABLES:** | **PREPARED BY:** |
| Temperature and composition. | J. Eysseltová |

**EXPERIMENTAL VALUES:**

Solubility isotherms in the $KH_2PO_4$-$KNO_3$-$H_2O$ system.

| | $KH_2PO_4$ | | | $KNO_3$ | | | $H_2O$ | | |
|---|---|---|---|---|---|---|---|---|---|
| $t$/°C. | mass% | conc.[a] | mol/kg[b] | mass% | conc.[a] | mol/kg[b] | mass% | conc.[a] | solid phase[c] |
| 0 | 0 | 0 | 0 | 11 | 100 | 1.22 | 89 | 4532 | A |
| 0 | 3.6 | 21.0 | 0.30 | 9.9 | 79.0 | 1.13 | 86.5 | 3872 | " |
| 0 | 6.0 | 32.4 | 0.52 | 9.3 | 67.6 | 1.08 | 84.7 | 3457 | " |
| 0 | 9.0 | 44.0 | 0.80 | 8.5 | 56.0 | 1.01 | 82.5 | 3053 | " |
| 0 | 9.8 | 46.5 | 0.88 | 8.4 | 53.5 | 1.01 | 81.8 | 2929 | A + B |
| 0 | 10.5 | 65.3 | 0.90 | 4.2 | 34.7 | 0.48 | 85.3 | 4013 | B |
| 0 | 11.8 | 100 | 0.98 | 0 | 0 | 0 | 88.2 | 5628 | " |
| 10 | 0 | 0 | 0 | 16.6 | 100 | 1.98 | 83.4 | 2823 | A |
| 10 | 3.4 | 14.2 | 0.30 | 15.3 | 85.8 | 1.86 | 81.3 | 2564 | " |
| 10 | 8.6 | 32.5 | 0.80 | 13.2 | 67.5 | 1.66 | 78.2 | 2238 | " |
| 10 | 10.2 | 37.1 | 0.97 | 12.8 | 62.9 | 1.64 | 77 | 2116 | A + B |
| 10 | 11.2 | 48.0 | 1.02 | 8.9 | 52.0 | 1.10 | 79.9 | 2594 | B |
| 10 | 12.6 | 65.5 | 1.12 | 5.0 | 34.5 | 0.60 | 82.4 | 3221 | " |
| 10 | 15 | 100 | 1.29 | 0 | 0 | 0 | 85 | 4290 | " |
| 20 | 0 | 0 | 0 | 23.0 | 100 | 2.95 | 77.0 | 1875 | A |
| 20 | 3.0 | 9.3 | 0.29 | 21.6 | 90.7 | 2.83 | 75.4 | 1773 | " |
| 20 | 8.0 | 23.9 | 0.80 | 19.0 | 76.1 | 2.57 | 73.0 | 1640 | " |
| 20 | 10.4 | 30.0 | 1.06 | 17.9 | 70.0 | 2.46 | 71.7 | 1573 | A + B |
| 20 | 10.8 | 33.2 | 1.08 | 16.1 | 66.8 | 2.17 | 73.1 | 1705 | B |
| 20 | 13.2 | 53.0 | 1.24 | 8.7 | 77.0 | 1.10 | 78.1 | 2369 | " |
| 20 | 14.6 | 65.2 | 1.34 | 5.8 | 34.8 | 0.72 | 79.6 | 2694 | " |
| 20 | 18.2 | 100 | 1.63 | 0 | 0 | 0 | 81.8 | 3388 | " |

(continued next page)

**AUXILIARY INFORMATION**

| METHOD/APPARATUS/PROCEDURE: | SOURCE AND PURITY OF MATERIALS: |
|---|---|
| A visual polythermic method was used. The isotherms were obtained by interpolation. No details are given. | Chemically pure $KH_2PO_4$ and $KNO_3$ were recrystallized twice before being used. |
| | **ESTIMATED ERROR:**<br>No details are given. |
| | **REFERENCES:** |

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0] | Bergman, A.G.; Bochkarev, N.F. |
| (2) Potassium nitrate; $KNO_3$; [7757-79-1] | *Izv. Akad. Nauk SSSR* 1938, 237-65. |
| (3) Water; $H_2O$; [7732-18-5] | |

EXPERIMENTAL VALUES cont'd:

Solubility isotherms in the $KH_2PO_4$-$KNO_3$-$H_2O$ system.

| | $KH_2PO_4$ | | | $KNO_3$ | | | $H_2O$ | | |
|---|---|---|---|---|---|---|---|---|---|
| $t$/°C. | mass% | conc.[a] | mol/kg[b] | mass% | conc.[a] | mol/kg[b] | mass% | conc.[a] | solid phase[c] |
| 30 | 0 | 0 | 0 | 31.0 | 100 | 4.44 | 69.0 | 1248 | A |
| 30 | 2.8 | 6.8 | 0.30 | 28.8 | 93.1 | 4.16 | 68.4 | 1241 | " |
| 30 | 7.4 | 17.6 | 0.81 | 25.6 | 82.4 | 3.77 | 67.0 | 1211 | " |
| 30 | 10.9 | 26.1 | 1.21 | 23.2 | 73.9 | 3.48 | 65.9 | 1180 | A + B |
| 30 | 12.2 | 36.6 | 1.24 | 15.8 | 63.4 | 2.17 | 72 | 1624 | B |
| 30 | 15.8 | 58.3 | 1.53 | 8.4 | 41.7 | 1.09 | 75.8 | 2114 | " |
| 30 | 17 | 65.1 | 1.63 | 6.8 | 34.9 | 0.88 | 76.2 | 2203 | " |
| 30 | 21.4 | 100 | 2.00 | 0 | 0 | 0 | 78.6 | 2779 | " |

[a] The concentration unit is: mol/100 mol of solute.

[b] The mol/kg $H_2O$ values were calculated by the compiler.

[c] The solid phases are: A = $KNO_3$; B = $KH_2PO_4$.

Ternary eutectic point: temperature is -3.8°C.
composition is 7 mass% $KNO_3$ (0.84 mol/kg-compiler)
9.3 mass% $KH_2PO_4$ (0.82 mol/kg-compiler)

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Urea; $CH_4N_2O$; [57-13-6]<br>(3) Water; $H_2O$; [7732-18-5] | Polosin, V.A.; Shakhparonov, M.I.<br>*Zh. Obshch. Khim.* 1947, *17*, 397-401. |
| **VARIABLES:**<br>Temperature and composition. | **PREPARED BY:**<br>J. Eysseltová |

**EXPERIMENTAL VALUES:**

Part 1. Solubility isotherms in the $KH_2PO_4$-urea-$H_2O$ system.

| | $KH_2PO_4$ | | | $CO(NH_2)_2$ | | | $H_2O$ | | |
|---|---|---|---|---|---|---|---|---|---|
| $t$/°C. | mass% | conc[b] | mol/kg[a] | mass% | conc[b] | mol/kg[a] | mass% | conc[b] | solid phase |
| -10 | 0 | 0 | 0.00 | 30.70 | 100 | 7.37 | 69.30 | 752 | ice |
| -10 | 2.00 | 1.50 | 0.21 | 29.70 | 98.50 | 7.24 | 69.30 | 765 | " |
| -10 | 2.92 | 4.60 | 0.30 | 27.10 | 95.40 | 6.44 | 69.98 | 820 | " |
| -10 | 6.86 | 11.20 | 0.72 | 23.80 | 88.80 | 5.71 | 69.34 | 859 | " |
| -10 | 7.60 | 10.70 | 0.86 | 27.72 | 89.30 | 7.13 | 64.68 | 694 | $KH_2PO_4$ |
| -10 | 6.16 | 7.80 | 0.72 | 31.60 | 92.20 | 8.45 | 62.24 | 602 | urea |
| -10 | 2.69 | 3.50 | 0.30 | 32.60 | 96.50 | 8.38 | 64.71 | 638 | " |
| -10 | 0 | 0 | 0.00 | 33.50 | 100 | 8.38 | 66.50 | 660 | " |
| 0 | 12.15 | 100 | 1.01 | 0 | 0 | 0.00 | 87.85 | 5460 | $KH_2PO_4$ |
| 0 | 10.65 | 34.50 | 0.97 | 8.93 | 65.50 | 1.84 | 80.42 | 1967 | " |
| 0 | 9.85 | 19.60 | 1.01 | 18.10 | 80.40 | 4.18 | 71.95 | 1065 | " |
| 0 | 8.80 | 12.50 | 1.01 | 27.36 | 87.50 | 7.13 | 63.84 | 680 | " |
| 0 | 5.60 | 6.10 | 0.72 | 37.70 | 93.90 | 11.07 | 56.70 | 470 | urea |
| 0 | 2.45 | 2.70 | 0.30 | 38.80 | 97.30 | 10.99 | 58.75 | 491 | " |
| 0 | 0 | 0 | 0.00 | 39.80 | 100 | 11.00 | 60.20 | 520 | " |
| +10 | 14.95 | 100 | 1.29 | 0 | 0 | 0.00 | 85.06 | 4300 | $KH_2PO_4$ |
| +10 | 13.25 | 40.30 | 1.24 | 8.67 | 59.70 | 1.84 | 78.08 | 1793 | " |
| +10 | 11.60 | 22.50 | 1.20 | 17.68 | 77.50 | 4.16 | 70.72 | 1033 | " |
| +10 | 10.00 | 14.10 | 1.16 | 27.00 | 85.90 | 7.13 | 63.00 | 669 | " |
| +10 | 8.20 | 8.90 | 1.09 | 36.70 | 91.10 | 11.08 | 55.10 | 455 | " |
| +10 | 7.40 | 7.20 | 1.06 | 41.65 | 92.80 | 13.62 | 50.95 | 377 | " |

(continued next page)

AUXILIARY INFORMATION

| METHOD/APPARATUS/PROCEDURE: | SOURCE AND PURITY OF MATERIALS: |
|---|---|
| A polythermic method was used in the temperature range -12.9 to 35°C. | No information is given. |
| | **ESTIMATED ERROR:**<br>No information is given. |
| | **REFERENCES:** |

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0] | Polosin, V.A.; Shakhparonov, M.I. |
| (2) Urea; $CH_4N_2O$; [57-13-6] | *Zh. Obshch. Khim.* 1947, *17*, 397-401. |
| (3) Water; $H_2O$; [7732-18-5] | |

EXPERIMENTAL VALUES cont'd:

Part 1. Solubility isotherms in the $KH_2PO_4$-urea-$H_2O$ system.

| | $KH_2PO_4$ | | | $CO(NH_2)_2$ | | | $H_2O$ | | |
|---|---|---|---|---|---|---|---|---|---|
| $t$/°C. | mass% | conc[b] | mol/kg[a] | mass% | conc[b] | mol/kg[a] | mass% | conc[b] | solid phase |
| +10 | 5.06 | 4.80 | 0.72 | 43.70 | 95.20 | 14.19 | 51.24 | 371 | urea |
| +10 | 2.20 | 2.10 | 0.30 | 45.10 | 97.90 | 14.24 | 52.70 | 380 | " |
| +10 | 0 | 0 | 0.00 | 46.00 | 100 | 14.18 | 54.00 | 391 | " |
| +20 | 18.20 | 100 | 1.63 | 0 | 0 | 0.00 | 81.80 | 3398 | $KH_2PO_4$ |
| +20 | 15.85 | 45.40 | 1.53 | 8.41 | 54.60 | 1.84 | 75.74 | 1639 | " |
| +20 | 10.40 | 25.50 | 1.05 | 17.32 | 74.50 | 3.98 | 69.28 | 993 | " |
| +20 | 11.40 | 15.80 | 1.35 | 26.58 | 84.20 | 7.13 | 62.02 | 654 | " |
| +20 | 9.20 | 10.00 | 1.24 | 36.30 | 90.00 | 11.08 | 54.50 | 449 | " |
| +20 | 8.00 | 7.90 | 1.16 | 41.40 | 92.10 | 13.62 | 50.60 | 375 | " |
| +20 | 7.60 | 6.80 | 1.20 | 46.20 | 93.20 | 16.65 | 46.20 | 311 | " |
| +20 | 4.57 | 3.80 | 0.72 | 49.20 | 96.20 | 17.71 | 46.23 | 300 | urea |
| +20 | 1.97 | 1.70 | 0.30 | 50.60 | 98.30 | 17.76 | 47.43 | 306 | " |
| +20 | 0 | 0 | 0.00 | 51.80 | 100 | 17.89 | 48.20 | 310 | " |
| +25 | 19.80 | 100 | 1.81 | 0 | 0 | 0.00 | 80.20 | 3056 | $KH_2PO_4$ |
| +25 | 17.10 | 45.40 | 1.68 | 8.29 | 54.60 | 1.85 | 74.61 | 1639 | " |
| +25 | 14.40 | 27.20 | 1.54 | 17.12 | 72.80 | 4.16 | 68.48 | 972 | " |
| +25 | 12.20 | 17.00 | 1.45 | 26.34 | 83.00 | 7.18 | 61.46 | 645 | " |
| +25 | 9.70 | 10.60 | 1.31 | 36.10 | 89.40 | 11.08 | 54.20 | 446 | " |
| +25 | 8.50 | 8.40 | 1.24 | 41.15 | 91.60 | 13.60 | 50.45 | 374 | " |
| +25 | 8.00 | 7.10 | 1.27 | 46.00 | 93.20 | 16.65 | 46.00 | 309 | " |
| +25 | 4.32 | 3.40 | 0.72 | 52.00 | 96.60 | 19.82 | 43.69 | 269 | urea |
| +25 | 1.86 | 1.50 | 0.30 | 53.40 | 98.50 | 19.87 | 44.74 | 275 | " |
| +25 | 0 | 0 | 0.00 | 54.50 | 100 | 19.94 | 45.50 | 278 | " |
| +35 | 22.90 | 100 | 2.18 | 0 | 0 | 0.00 | 77.10 | 2545 | $KH_2PO_4$ |
| +35 | 19.70 | 52.00 | 2.00 | 8.03 | 48.00 | 1.85 | 72.27 | 1440 | " |
| +35 | 16.70 | 30.80 | 1.84 | 16.66 | 69.20 | 4.16 | 66.64 | 924 | " |
| +35 | 14.40 | 19.39 | 1.76 | 25.80 | 80.70 | 7.13 | 60.20 | 627 | " |
| +35 | 11.20 | 12.20 | 1.54 | 35.50 | 87.80 | 11.09 | 53.30 | 435 | " |
| +35 | 9.80 | 9.60 | 1.45 | 40.55 | 90.40 | 13.61 | 49.65 | 368 | " |
| +35 | 8.70 | 7.80 | 1.40 | 40.65 | 92.20 | 16.65 | 45.65 | 306 | " |
| +35 | 8.00 | 6.30 | 1.41 | 50.60 | 93.70 | 20.35 | 41.40 | 256 | " |
| +35 | 3.82 | 2.80 | 0.72 | 57.50 | 97.20 | 24.75 | 39.68 | 226 | urea |
| +35 | 1.64 | 1.20 | 0.30 | 59.00 | 98.80 | 24.95 | 39.36 | 218 | " |
| +35 | 0 | 0 | 0.00 | 59.50 | 100 | 24.46 | 40.50 | 227 | " |

Part 2. Monovariant and invariant points.

| | $KH_2PO_4$ | | | $CO(NH_2)_2$ | | | $H_2O$ | | |
|---|---|---|---|---|---|---|---|---|---|
| $t$/°C | mass% | concn[b] | mol/kg[a] | mass% | concn[b] | mol/kg[a] | mass% | concn[b] | solid phases |
| -5.1 | 9.40 | 31.40 | 0.84 | 9.06 | 68.60 | 1.85 | 81.50 | 2057 | ice |
| -8.5 | 8.30 | 16.70 | 0.83 | 18.34 | 83.30 | 4.16 | 73.36 | 1111 | " |
| -12.0 | 7.30 | 10.40 | 0.82 | 27.81 | 89.60 | 7.13 | 64.89 | 696 | " |
| +0.6 | 7.20 | 7.80 | 0.94 | 37.10 | 92.20 | 11.09 | 55.70 | 460 | urea + $KH_2PO_4$ |
| +8.6 | 7.31 | 7.10 | 1.05 | 41.70 | 92.90 | 13.61 | 51.00 | 377 | " " |
| +18.2 | 7.60 | 6.80 | 1.20 | 46.20 | 93.20 | 16.65 | 46.20 | 311 | " |
| +27.5 | 7.80 | 6.10 | 1.38 | 50.70 | 93.90 | 20.34 | 41.50 | 255 | " |
| -11.7 | 2.74 | 3.70 | 0.30 | 31.15 | 96.30 | 7.84 | 65.76 | 670 | urea + ice |
| +10.0 | 2.20 | 2.10 | 0.30 | 45.10 | 97.90 | 14.24 | 52.70 | 380 | α-urea + β-urea |
| -12.8 | 6.31 | 8.50 | 0.72 | 29.90 | 91.50 | 7.80 | 63.79 | 649 | urea + ice |
| +2.0 | 5.48 | 5.80 | 0.72 | 39.20 | 54.20 | 11.79 | 55.32 | 442 | α-urea + β-urea |
| -10.8 | 0 | 0 | 0.00 | 33.30 | 100 | 8.20 | 67.00 | 676 | urea + ice |
| +22.5 | 0 | 0 | 0.00 | 53.30 | 100 | 19.00 | 46.70 | 292 | α-urea + β-urea |
| -2.4 | 11.70 | 100 | 0.97 | 0 | 0 | 0.00 | 88.30 | 5700 | ice + $KH_2PO_4$ |
| -12.9 | 7.00 | 90.60 | 0.81 | 29.70 | 9.40 | 7.81 | 63.30 | 643 | ice+urea+$KH_2PO_4$ |
| +1.0 | 7.20 | 7.90 | 0.85 | 37.50 | 92.10 | 11.29 | 55.90 | 482 | α-urea + β-urea + $KH_2PO_4$ |

[a] The mol/kg $H_2O$ values were calculated by the compiler.

[b] The concentration unit is: mol/100 mol of salts.

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Ammonium dihydrogenphosphate; $NH_4H_2PO_4$; [7722-76-1]<br>(3) Water; $H_2O$; [7732-18-5] | Kuznetsov, D.I.; Kozhukhovskij, A.A.; Borovaya, F.E.<br>*Zh. Prikl. Khim.* 1948, *21*, 1278-81 |
| **VARIABLES:**<br>Composition at 25°C. | **PREPARED BY:**<br>J. Eysseltová |

**EXPERIMENTAL VALUES:**

Solubility in the $KH_2PO_4$-$NH_4H_2PO_4$-$H_2O$ system at 25°C.

| $KH_2PO_4$ | | $NH_4H_2PO_4$ | | $H_2O$ | vapor press |
|---|---|---|---|---|---|
| mass% | mol/kg[a] | mass% | mol/kg[a] | mass% | mm Hg |
| 20.21 | 1.86 | ---- | 0 | 79.79 | 22.66 |
| 17.53 | 1.72 | 7.85 | 0.91 | 74.62 | 22.08 |
| 16.19 | 1.68 | 13.05 | 1.60 | 70.76 | 21.90 |
| 15.48 | 1.65 | 15.84 | 2.00 | 69.68 | 21.84 |
| 14.27 | 1.53 | 17.53 | 2.23 | 67.20 | ---- |
| 13.08 | 1.43 | 20.12 | 2.61 | 66.80 | 21.61 |
| 7.97 | 0.86 | 24.48 | 3.15 | 67.55 | 21.95 |
| ---- | 0.00 | 28.85 | 3.52 | 71.15 | 22.00 |

[a] The mol/kg $H_2O$ values were calculated by the compiler.

AUXILIARY INFORMATION

| METHOD/APPARATUS/PROCEDURE: | SOURCE AND PURITY OF MATERIALS: |
|---|---|
| The method has been described elsewhere (1). The nitrogen content was determined by using the Kjeldahl method, potassium was determined as $KClO_4$ after removal of the $NH_3$, and phosphorus was weighed as $NH_4MgPO_4 \cdot 6H_2O$. The vapor pressure was measured using the apparatus described by Vrevskiy (2). | The $KH_2PO_4$ and $NH_4H_2PO_4$ were recrystallized three times before use and dried at 100°C. |
| | **ESTIMATED ERROR:**<br>No information is given. |

**REFERENCES:**

1. Kuznetsov, D.I.; Kozhukhovaskij, A.A. *Zh. Prikl. Khim.* 1936, 9, 185.
2. Vrevskiy, M.S.; Zavaritskiy, N.N.; Sharlova, L.E. *Zh. Russ. Fiz. Khim. Obshch.* 1923, 54, 360.

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Dipotassium sulfate, $K_2SO_4$; [7778-80-5]<br>(3) Water; $H_2O$; [7732-18-5] | Bel'teschev, F.V.<br>*Trudy Beloruss. S.-Kh. Akad.* 1953, *19*, 145-9. |
| **VARIABLES:**<br>Temperature and composition. | **PREPARED BY:**<br>J. Eysseltová |

**EXPERIMENTAL VALUES:**

The following sections were studied in the binary salt-water systems:

No 1 (4% $KH_2PO_4$ + 96% $H_2O$) -$K_2SO_4$
No 2 (9% $KH_2PO_4$ + 91% $H_2O$) -$K_2SO_4$
No 3 (3% $K_2SO_4$ + 97% $H_2O$) -$KH_2PO_4$
No 4 (5% $K_2SO_4$ + 95% $H_2O$) -$KH_2PO_4$
No 5 (12% $KH_2PO_4$ + 88% $H_2O$) -$K_2SO_4$
No 6 (16% $KH_2PO_4$ + 84% $H_2O$) -$K_2SO_4$

Solubility isotherms at various temperatures.

| sect No | $KH_2PO_4$ mass% | $KH_2PO_4$ concn[a] | $KH_2PO_4$ mol/kg[b] | $K_2SO_4$ mass% | $K_2SO_4$ concn[a] | $K_2SO_4$ mol/kg[b] | $H_2O$ mass% | $H_2O$ concn[a] | solid[c] phase |
|---|---|---|---|---|---|---|---|---|---|
| | | | | temp. = 0°C. | | | | | |
| bin. | 0 | 0 | 0 | 6.9 | 100 | 0.42 | 93.1 | 13238 | A |
| 1 | 3.8 | 30.43 | 0.30 | 5.6 | 69.57 | 0.35 | 90.6 | 10932 | " |
| 2 | 8.6 | 54.38 | 0.72 | 4.4 | 45.62 | 0.29 | 86.9 | 8461 | " |
| | 10.8 | 61.90 | 0.93 | 4.2 | 38.1 | 0.28 | 85.0 | 7488 | A + B |
| 3 | 11.3 | 73.2 | 0.96 | 2.6 | 26.8 | 0.17 | 86.1 | 8534 | B |
| bin. | 12.2 | 100 | 1.02 | 0 | 0 | 0 | 87.8 | 11077 | " |

(continued next page)

AUXILIARY INFORMATION

**METHOD/APPARATUS/PROCEDURE:**

A visual polythermic method was used (1). The isotherms were constructed by interpolation.

**SOURCE AND PURITY OF MATERIALS:**

Chemically pure $KH_2PO_4$ and $K_2SO_4$ were recrystallized twice.

**ESTIMATED ERROR:**

No information is given.

**REFERENCES:**

1. Bel'tschev, F.V.; Bergman, A.G. *Zh. Prikl. Khim.* 1944, *17*, 9.

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0] | Bel'tschev, F.V. |
| (2) Dipotassium sulfate; $K_2SO_4$; [7778-80-5] | *Trudy Belorussk. S.-Kh. Akad.* 1953, *19*, 145-9. |
| (3) Water; $H_2O$; [7732-18-5] | |

EXPERIMENTAL VALUES cont'd:

The following sections were studied in the binary salt-water systems:

No 1 (4% $KH_2PO_4$ + 96% $H_2O$) -$K_2SO_4$
No 2 (9% $KH_2PO_4$ + 91% $H_2O$) -$K_2SO_4$
No 3 (3% $K_2SO_4$ + 97% $H_2O$) -$KH_2PO_4$
No 4 (5% $K_2SO_4$ + 95% $H_2O$) -$KH_2PO_4$
No 5 (12% $KH_2PO_4$ + 88% $H_2O$) -$K_2SO_4$
No 6 (16% $KH_2PO_4$ + 84% $H_2O$) -$K_2SO_4$

Solubility isotherms at various temperatures.

| sect No | $KH_2PO_4$ mass% | $KH_2PO_4$ concn[a] | $KH_2PO_4$ mol/kg[b] | $K_2SO_4$ mass% | $K_2SO_4$ concn[a] | $K_2SO_4$ mol/kg[b] | $H_2O$ mass% | $H_2O$ concn[a] | solid phase[c] |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | temp. = 10°C. | | | | |
| bin. | 0 | 0 | 0 | 8.4 | 100 | 0.52 | 91.6 | 10591 | A |
| 1 | 3.8 | 25.91 | 0.31 | 7.1 | 74.09 | 0.45 | 89.1 | 9157 | " |
| 2 | 8.4 | 47.62 | 0.21 | 5.8 | 52.38 | 0.38 | 85.8 | 7558 | " |
| 5 | 11.4 | 59.42 | 1.00 | 5.1 | 40.58 | 0.35 | 83.5 | 6526 | " |
| | 14.3 | 64.06 | 1.29 | 4.8 | 36.0 | 0.34 | 81.9 | 6060 | A + B |
| 4 | 13.4 | 67.12 | 1.19 | 4.3 | 32.88 | 0.29 | 82.3 | 6257 | B |
| 3 | 14.0 | 78.46 | 1.23 | 2.4 | 21.54 | 0.16 | 83.6 | 7138 | " |
| bin. | 14.9 | 100 | 1.28 | 0 | 0 | 0 | 85.1 | 8746 | " |
| | | | | | temp. = 20°C. | | | | |
| bin. | 0 | 0 | 0 | 9.8 | 100 | 0.62 | 90.2 | 8939 | A |
| 1 | 3.7 | 22.58 | 0.30 | 8.5 | 77.42 | 0.55 | 87.8 | 7859 | " |
| 2 | 8.3 | 42.25 | 0.72 | 7.2 | 57.75 | 0.48 | 84.5 | 6605 | " |
| 5 | 11.2 | 52.56 | 0.99 | 6.5 | 47.44 | 0.45 | 82.3 | 5855 | " |
| | 16.0 | 66.66 | 1.49 | 5.2 | 33.34 | 0.37 | 78.8 | 5028 | A + B |
| 4 | 16.3 | 71.08 | 1.50 | 4.2 | 28.92 | 0.30 | 79.5 | 5316 | B |
| 5 | 17.0 | 81.58 | 1.54 | 2.4 | 18.42 | 0.17 | 80.6 | 5813 | " |
| bin. | 17.8 | 100 | 1.59 | 0 | 0 | 0 | 82.2 | 7018 | " |
| | | | | | temp. = 30°C. | | | | |
| bin. | 0 | 0 | 0 | 11.4 | 100 | 0.73 | 88.6 | 7566 | A |
| 1 | 3.6 | 18.57 | 0.30 | 10.0 | 81.43 | 0.66 | 86.47 | 6850 | " |
| 2 | 8.2 | 38.46 | 0.72 | 8.4 | 61.54 | 0.57 | 83.4 | 5934 | " |
| 5 | 11.1 | 48.19 | 1.00 | 7.6 | 51.81 | 0.53 | 81.3 | 5436 | " |
| 6 | 15.0 | 59.78 | 1.40 | 6.4 | 40.22 | 0.40 | 78.6 | 4742 | " |
| | 18.6 | 68.0 | 1.82 | 6.6 | 32.0 | 0.50 | 75.8 | 4207 | A + B |
| 4 | 19.1 | 75.26 | 1.82 | 4.0 | 24.74 | 0.29 | 76.9 | 4589 | B |
| 5 | 19.8 | 85.58 | 1.86 | 2.2 | 14.12 | 0.16 | 78.0 | 5094 | " |
| bin. | 21 | 100 | 1.95 | 0 | 0 | 0 | 79 | 5693 | " |

[a] The concentration unit is: mol/100 mol solute.

[b] These values were calculated by the compiler.

[c] The solid phases are: A = $K_2SO_4$; B = $KH_2PO_4$.

(continued next page)

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Dipotassium sulfate; $K_2SO_4$; [7778-80-5]<br>(3) Water; $H_2O$; [7732-18-5] | Bel'tschev, F.V.<br>*Trudy Beloruss. S.-Kh. Akad.* 1953, *19*, 145-9. |

EXPERIMENTAL VALUES cont'd:

Composition and crystallization temperature of the monovariant points.

| sect No. | $KH_2PO_4$ mass% | $KH_2PO_4$ concn[a] | $KH_2PO_4$ mol/kg | $K_2SO_4$ mass% | $K_2SO_4$ concn[a] | $K_2SO_4$ mol/kg | $H_2O$ mass% | $H_2O$ concn[a] | $t$/°C. | solid phases[b] |
|---|---|---|---|---|---|---|---|---|---|---|
| bin. | 11.4 | 100 | 0.94 | 0 | 0 | 0 | 88.6 | 11708 | -2.4 | A + B |
| 3 | 10.7 | 67.24 | 0.90 | 2.6 | 32.76 | 0.17 | 86.7 | 8297 | -2.6 | A + B |
| | 10.3 | 62.29 | 0.88 | 4.2 | 38.71 | 0.28 | 85.5 | 7655 | -3.1 | A + B + C |
| 2 | 8.6 | 55.35 | 0.72 | 4.3 | 44.64 | 0.28 | 87.1 | 8626 | -2.7 | B + C |
| 1 | 3.8 | 31.11 | 0.30 | 5.4 | 68.89 | 0.34 | 90.8 | 11198 | -1.7 | B + C |
| bin. | 0 | 0 | 0 | 6.6 | 100 | 0.40 | 93.4 | 13531 | -1.5 | B + C |

[a] The concentration unit is: mol/100 mol of solute.

[b] The solid phases are: A = $KH_2PO_4$; B = ice; C = $K_2SO_4$.

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Potassium chloride; KCl; [7747-40-7]<br>(3) Water; $H_2O$; [7732-18-5] | Brunisholz, G.; Bodmer, M.<br>*Helv. Chim. Acta* 1963, *46*, 288, 2566-74. |
| **VARIABLES:** | **PREPARED BY:** |
| Temperature and composition. | J. Eysseltová |

**EXPERIMENTAL VALUES:**

Solubility isotherms in the $KH_2PO_4$-KCl-$H_2O$ system.

| $K^+$ | $Cl^-$ | $H_2O$ | | $KH_2PO_4$ [b] | | KCl [b] | | solid [c] |
|---|---|---|---|---|---|---|---|---|
| ion% | ion% | conc [a] | mass% | mass% | mol/kg | mass% | mol/kg | phase |
| | | | | temp. = 0°C. | | | | |
| 93.84 | 90.73 | 1358 | 77.28 | 1.32 | 0.12 | 21.38 | 3.71 | A |
| 88.55 | 82.76 | 1271 | 76.69 | 2.62 | 0.25 | 20.68 | 2.62 | A + B |
| 77.07 | 65.48 | 1627 | 81.95 | 4.38 | 0.39 | 13.66 | 2.23 | B |
| 62.12 | 42.81 | 1888 | 85.45 | 6.52 | 0.58 | 8.02 | 1.25 | " |
| 61.23 | 41.55 | 1901 | 85.61 | 6.63 | 0.56 | 7.75 | 1.21 | " |
| 48.13 | 21.91 | 1919 | 86.96 | 8.91 | 0.75 | 4.11 | 0.63 | " |
| 47.66 | 20.99 | 1925 | 87.06 | 9.00 | 0.76 | 3.93 | 0.60 | " |
| 33.33 | 0 | 1778 | 87.58 | 12.41 | 1.04 | 0.00 | 0.00 | " |
| | | | | temp. = 25°C. | | | | |
| 93.02 | 89.62 | 1057 | 72.67 | 1.79 | 0.18 | 25.52 | 4.71 | A |
| 87.18 | 80.71 | 972 | 71.73 | 3.58 | 0.36 | 24.67 | 4.61 | A + B |
| 75.03 | 62.02 | 1158 | 76.65 | 6.33 | 0.60 | 17.00 | 2.97 | B |
| 60.00 | 40.00 | 1248 | 79.74 | 9.66 | 0.89 | 10.58 | 1.78 | " |
| 46.23 | 18.86 | 1177 | 80.63 | 14.01 | 1.27 | 5.35 | 0.89 | " |
| 33.33 | 0 | 1012 | 80.06 | 19.93 | 1.82 | 0.00 | 0.00 | " |
| | | | | temp. = 50°C. | | | | |
| 100 | 100 | 967.4 | 70.01 | 0.00 | 0.00 | 29.98 | 5.74 | A |
| 84.91 | 77.30 | 783.1 | 67.47 | 4.92 | 0.53 | 27.59 | 5.48 | A + B |
| 69.54 | 54.28 | 885.7 | 72.25 | 9.40 | 0.95 | 18.34 | 3.40 | B |
| 51.26 | 26.93 | 834.0 | 73.82 | 16.30 | 1.62 | 9.87 | 1.79 | " |
| 33.00 | 0 | 624.4 | 71.30 | 28.70 | 2.96 | 0.00 | 0.00 | " |

(continued next page)

**AUXILIARY INFORMATION**

**METHOD/APPARATUS/PROCEDURE:**

A previously described method was used (1). The analytical procedures were the following: chloride was titrated potentiometrically with $AgNO_3$; $H_2PO_4^-$ was converted to $H_3PO_4$ by ion exchange and then titrated acidimetrically using chlorophenol red as indicator; potassium was determined gravimetrically as $KClO_4$ or as the tetraphenylborate; water was determined by difference.

**SOURCE AND PURITY OF MATERIALS:**

No information is given.

**ESTIMATED ERROR:**

No information is given.

**REFERENCES:**

1. Flatt, R. *Chimia* 1962, *6*, 62.

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Potassium chloride; KCl; [7747-40-7]<br>(3) Water; $H_2O$; [7732-18-5] | Brunisholz, G.; Bodmer, M.<br>*Helv. Chim. Acta* 1963, *46*, 288, 2566-74. |

EXPERIMENTAL VALUES cont'd:

Solubility isotherma in the $KH_2PO_4$-KCl-$H_2O$ system.

| $K^+$ | $Cl^-$ | $H_2O$ | $KH_2PO_4$[b] | | | KCl[b] | | |
|---|---|---|---|---|---|---|---|---|
| ion% | ion% | conc[a] | mass% | mass% | mol/kg | mass% | mol/kg | solid phase[c] |
| | | | temp. = 75°C. | | | | | |
| 91.90 | 87.85 | 753.0 | 65.61 | 2.66 | 0.29 | 31.71 | 6.48 | A |
| 87.12 | 80.67 | 704.9 | 64.80 | 4.47 | 0.50 | 30.71 | 6.35 | " |
| 80.43 | 70.61 | 629.5 | 63.19 | 7.43 | 0.86 | 29.36 | 6.23 | A + B |
| 70.92 | 56.43 | 659.5 | 65.74 | 10.94 | 1.22 | 23.30 | 4.75 | B |
| 55.65 | 33.40 | 615.0 | 66.76 | 18.22 | 2.00 | 15.01 | 3.01 | " |
| 46.30 | 19.56 | 563.3 | 66.50 | 23.93 | 2.64 | 9.56 | 1.92 | " |
| 33.00 | 0 | 400.7 | 61.38 | 38.61 | 4.62 | 0.00 | 0.00 | " |

[a] The concentration unit is: mol $H_2O$/100 g equiv of the salts.

[b] These values were calculated by the compiler.

[c] The solid phases are: A = KCl; B = $KH_2PO_4$.

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Potassium chloride; KCl; [7747-40-7]<br>(3) Water; $H_2O$; [7732-18-5] | Filipescu, L.<br>*Rev. Chim. (Bucharest)* 1971, *22*, 533-40. |
| **VARIABLES:**<br>Composition and temperature. | **PREPARED BY:**<br>J. Eysseltová |

**EXPERIMENTAL VALUES:** Solubility isotherms in the $KH_2PO_4$-KCl-$H_2O$ system.

| $t$/°C | $g^d\ cm^{-3}$ | $PO_4^{3-}$ concn[a] | $Cl^-$ concn[a] | $H_2O$ M[b] | $KH_2PO_4$[c] mass% | $KH_2PO_4$[c] mol/kg | KCl[c] mass% | KCl[c] mol/kg | solid[d] phase |
|---|---|---|---|---|---|---|---|---|---|
| 20 | 1.175 | 0.0000 | 0.4591 | 1210.0 | 0.00 | 0.00 | 25.50 | 4.59 | A |
| 20 | ----- | 0.0301 | 0.4526 | 1149.6 | 1.01 | 0.10 | 24.97 | 4.52 | " |
| 20 | ----- | 0.0691 | 0.4443 | 1082.0 | 2.30 | 0.23 | 24.31 | 4.44 | " |
| 20 | 1.170 | 0.1009 | 0.4358 | 1035.1 | 3.33 | 0.33 | 23.70 | 4.35 | A + B |
| 20 | ----- | 0.1387 | 0.4256 | 1106.6 | 4.55 | 0.46 | 22.99 | 4.25 | B |
| 20 | ----- | 0.1753 | 0.2789 | 1223.1 | 6.17 | 0.58 | 16.15 | 2.78 | " |
| 20 | ----- | 0.2275 | 0.2021 | 1293.2 | 8.23 | 0.75 | 12.01 | 2.02 | " |
| 20 | ----- | 0.2774 | 0.1472 | 1308.3 | 10.18 | 0.92 | 8.88 | 1.47 | " |
| 20 | ----- | 0.3443 | 0.0898 | 1278.3 | 12.77 | 1.14 | 5.47 | 0.89 | " |
| 20 | ----- | 0.4186 | 0.0380 | 1216.6 | 15.58 | 1.39 | 2.32 | 0.38 | " |
| 20 | 1.131 | 0.4855 | 0.0000 | 1144.2 | 18.04 | 0.01 | 0.00 | 0.00 | " |
| 40 | 1.187 | 0.0000 | 0.5399 | 1028.9 | 0.00 | 0.00 | 28.70 | 5.39 | A |
| 40 | ----- | 0.0214 | 0.5366 | 994.5 | 0.68 | 0.07 | 28.37 | 5.36 | " |
| 40 | ----- | 0.0872 | 0.5223 | 911.4 | 2.76 | 0.29 | 27.25 | 5.22 | " |
| 40 | 1.185 | 0.1370 | 0.5126 | 855.3 | 4.30 | 0.45 | 26.46 | 5.12 | A + B |
| 40 | ----- | 0.2197 | 0.3757 | 933.0 | 7.22 | 0.73 | 20.30 | 3.75 | B |
| 40 | ----- | 0.3131 | 0.2701 | 952.6 | 10.57 | 1.04 | 14.99 | 2.70 | " |
| 40 | ----- | 0.4438 | 0.1644 | 913.3 | 15.20 | 1.47 | 9.25 | 1.64 | " |
| 40 | ----- | 0.6008 | 0.0655 | 833.2 | 20.62 | 2.00 | 3.69 | 0.65 | " |
| 40 | ----- | 0.7348 | 0.0000 | 756.1 | 25.00 | 2.44 | 0.00 | 0.00 | " |

(continued next page)

## AUXILIARY INFORMATION

**METHOD/APPARATUS/PROCEDURE:**

The mixtures were equilibrated isothermally for 5 hours while being stirred by a stream of inert gas. The potassium content was determined by using a flame photometer, the dihydrogenphosphate was determined acidimetrically using thymolphthalein as indicator, and chloride was determined mercurimetrically.

**SOURCE AND PURITY OF MATERIALS:**

The KCl and the $KH_2PO_4$ were recrystallized three times before being used.

**ESTIMATED ERROR:**

The temperature at 20 and 40°C were controlled to within ± 0.05°C while the temperatures at 60 and 80°C were controlled to within ± 0.1°C.

**REFERENCES:**

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0] | Filipescu, L. |
| (2) Potassium chloride; KCl; [7747-40-7] | *Rev. Chim. (Bucharest)* 1971, *22*, 533-40. |
| (3) Water; $H_2O$; [7732-18-5] | |

EXPERIMENTAL VALUES cont'd:

Solubility isotherms in the $KH_2PO_4$-KCl-$H_2O$ system.

| $t$/°C | $d$/g cm$^{-3}$ | $PO_4^{3-}$ concn[a] | $Cl^-$ concn[a] | $H_2O$ M[b] | $KH_2PO_4$[c] mass% | $KH_2PO_4$[c] mol/kg | KCl[c] mass% | KCl[c] mol/kg | solid[d] phase |
|---|---|---|---|---|---|---|---|---|---|
| 60 | 1.201 | 0.0000 | 0.6151 | 903.1 | 0.00 | 0.00 | 31.44 | 6.15 | A |
| 60 | ----- | 0.0643 | 0.6059 | 828.9 | 1.96 | 0.21 | 30.50 | 6.05 | " |
| 60 | ----- | 0.1539 | 0.5908 | 746.0 | 4.62 | 0.51 | 29.16 | 5.90 | " |
| 60 | 1.204 | 0.1931 | 0.5832 | 715.6 | 5.75 | 0.64 | 28.56 | 5.83 | A + B |
| 60 | ----- | 0.2604 | 0.4695 | 761.1 | 8.04 | 0.86 | 23.84 | 4.69 | B |
| 60 | ----- | 0.3771 | 0.3342 | 781.0 | 12.04 | 1.25 | 17.54 | 3.34 | " |
| 60 | ----- | 0.5116 | 0.2388 | 740.3 | 16.45 | 1.70 | 12.62 | 2.38 | " |
| 60 | ----- | 0.7121 | 0.1424 | 650.1 | 22.60 | 2.37 | 7.42 | 1.42 | " |
| 60 | 1.240 | 1.0554 | 0.0000 | 526.4 | 32.37 | 3.51 | 0.00 | 0.00 | " |
| 80 | 1.214 | 0.0000 | 0.6836 | 812.6 | 0.00 | 0.00 | 33.76 | 6.83 | A |
| 80 | ----- | 0.0888 | 0.6731 | 729.1 | 2.61 | 0.29 | 32.54 | 6.73 | " |
| 80 | ----- | 0.1970 | 0.6553 | 652.6 | 5.66 | 0.65 | 30.96 | 6.55 | " |
| 80 | 1.230 | 0.2870 | 0.6370 | 601.2 | 8.11 | 0.95 | 29.58 | 6.37 | A + B |
| 80 | ----- | 0.4256 | 0.4604 | 627.0 | 12.56 | 1.41 | 22.34 | 4.60 | B |
| 80 | ----- | 0.6005 | 0.3327 | 595.3 | 17.91 | 2.00 | 16.31 | 3.32 | " |
| 80 | ----- | 0.9132 | 0.1871 | 504.9 | 26.66 | 3.04 | 8.97 | 1.87 | " |
| 80 | ----- | 1.2355 | 0.0832 | 421.3 | 34.54 | 4.11 | 3.82 | 0.83 | " |
| 80 | 1.309 | 1.5162 | 0.0000 | 366.4 | 40.75 | 5.05 | 0.00 | 0.00 | " |

[a] The concentration unit is: equiv/100 g water.

[b] The concentration unit is: mol/100 equiv of salts.

[c] These values were calculated by the compiler.

[d] The solid phases are: A = KCl; B = $KH_2PO_4$.

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Ammonium dihydrogenphosphate; $NH_4H_2PO_4$; [7722-76-1]<br>(3) Water; $H_2O$; [7732-18-5] | Bergman, A.G.; Gladkovskaya, A.A.; Galushkina, R.A.<br>*Zh. Neorg. Khim.* 1972, *17*, 2055-6. |
| **VARIABLES:**<br>Temperature and composition. | **PREPARED BY:**<br>J. Eysseltová |

**EXPERIMENTAL VALUES:**

| Original mixture | Component added | conc.[a] | $t$/°C. | solid phases[b] |
|---|---|---|---|---|
| 12.5% $KH_2PO_4$ + 87.5% $H_2O$ | $NH_4H_2PO_4$ | 11.5 | +6.0 | A + B |
| 15.0% $KH_2PO_4$ + 85.0% $H_2O$ | " | 11.6 | +14.2 | " |
| " " " | " | 17.3 | +17.6 | " |
| 71.72% $NH_4H_2PO_4$ + 28.28% $KH_2PO_4$ | $H_2O$ | 20.5 | -4.5 | B + C |
| " " " | " | 32.6 | +25.0 | A + B |
| 45.81% $NH_4H_2PO_4$ + 54.19% $KH_2PO_4$ | " | 18.2 | -4.0 | A + C |
| " " | " | 24.5 | +13.6 | A + B |
| " " | " | 25.0 | +14.0 | " |
| 25.0% $NH_4H_2PO_4$ + 75.0% $KH_2PO_4$ | " | 14.3 | -3.6 | A + C |
| 10.0% $NH_4H_2PO_4$ + 90.0% $H_2O$ | $KH_2PO_4$ | 10.3 | -4.0 | " |

[a] This is the mass% of the component added.

[b] The solid phases are: A = β-solid soln; B = α-$NH_4H_2PO_4$; C = ice.

Compiler's comment: It is not possible to construct a legitimate phase diagram on the basis of the data that are given. The conc. of component added has the meaning given to it only if the added component is a salt. When water is the added component, the relation $w_{H_2O}$ = 100 - conc. of added component is valid. With this assumption the following compositions of points lying on the eutectic curve were calculated.

(continued next page)

AUXILIARY INFORMATION

| METHOD/APPARATUS/PROCEDURE: | SOURCE AND PURITY OF MATERIALS: |
|---|---|
| The only information given is that a visually polythermic method (1) was used. | Chemically pure $KH_2PO_4$ and $NH_4H_2PO_4$ were recrystallized and dried before being used. Bidistilled water was used. |
| | **ESTIMATED ERROR:**<br>No information is given. |
| | **REFERENCES:**<br>1. Bergman, A.G.; Luzhnaya, N.P. *Fiziko-Khimicheskie Osnovy Izucheniya i Ispol'zovaniya Solyanykh Mestorozhdeniy Khlorid-sul'fatnogo Tipa*, Moscow, IAN SSSR, 1951. |

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0] | Bergman, A.G.; Gladkovskaya, A.A.; Galushkina, R.A. |
| (2) Ammonium dihydrogenphosphate; $NH_4H_2PO_4$; [7722-76-1] | *Zh. Neorg. Khim.* 1972, *17*, 2055-6. |
| (3) Water; $H_2O$; [7732-18-5] | |

EXPERIMENTAL VALUES cont'd:

| $KH_2PO_4$ | | $NH_4H_2PO_4$ | | $H_2O$ | | |
|---|---|---|---|---|---|---|
| mass% | mol/kg | mass% | mol/kg | mass% | $t$/°C. | solid phases[a] |
| 11.21 | 1.06 | 11.50 | 1.29 | 77.28 | +6.0 | A + B |
| 13.44 | 1.32 | 11.60 | 1.34 | 74.95 | +14.2 | " |
| 12.78 | 1.34 | 17.30 | 2.15 | 69.91 | +17.6 | " |
| 5.80 | 0.53 | 14.70 | 1.60 | 79.50 | -4.5 | B + C |
| 9.22 | 1.00 | 23.38 | 3.01 | 67.40 | +25.0 | A + B |
| 9.86 | 0.88 | 8.33 | 0.88 | 81.80 | -4.0 | A + C |
| 13.28 | 1.29 | 11.22 | 1.29 | 75.50 | +13.6 | A + B |
| 13.55 | 1.32 | 11.45 | 1.32 | 75.00 | +14.0 | " |
| 7.72 | 0.63 | 2.58 | 0.24 | 89.70 | -3.6 | A + C |
| 10.30 | 0.94 | 9.06 | 0.98 | 80.63 | -4.0 | " |
| The composition of the eutectic point is: | | | | | | |
| 8.50 | 0.07 | 11.40 | 0.53 | 80.10 | -4.5 | A + B + C |

[a]The solid phases are the same as those given in footnote b above.

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Ammonium dihydrogenphosphate; $NH_4H_2PO_4$; [7722-76-1]<br>(3) Water; $H_2O$; [7732-18-5] | Shenkin, Ya.S.; Ruchnova, S.A.; Rodionova, N.A.<br>*Zh. Neorg. Khim.* 1972, *17*, 3368-9. |
| **VARIABLES:** | **PREPARED BY:** |
| Composition and temperature at atmospheric pressure. | J. Eysseltová |

**EXPERIMENTAL VALUES:**

Composition and boiling points of saturated solutions in the $NH_4H_2PO_4$-$KH_2PO_4$-$H_2O$ system.

| $KH_2PO_4$ | | $NH_4H_2PO_4$ | | $H_2O$ | |
|---|---|---|---|---|---|
| mass% | mol/kg | mass% | mol/kg | mass% | b.p./°C. |
| 52.70 | 8.18 | 0 | 0 | 47.30 | 105.1 |
| 51.78 | 8.46 | 3.28 | 0.63 | 44.94 | 105.3 |
| 49.40 | 8.30 | 6.90 | 1.37 | 43.70 | 106.2 |
| 47.46 | 8.32 | 10.67 | 2.21 | 41.87 | 105.7 |
| 44.58 | 8.20 | 15.52 | 3.38 | 39.90 | 106.9 |
| 43.60 | 8.25 | 17.57 | 3.93 | 38.83 | 107.1 |
| 42.60 | 8.30 | 19.70 | 4.54 | 37.70 | 108.0 |
| 38.78 | 8.07 | 25.94 | 6.39 | 35.28 | 108.9 |
| 38.44 | 8.41 | 28.00 | 7.25 | 33.56 | 108.6 |
| 37.23 | 8.19 | 29.39 | 7.65 | 33.38 | 106.6 |
| 35.31 | 8.12 | 32.76 | 8.91 | 31.93 | 108.8 |
| 35.08 | 7.75 | 31.69 | 8.28 | 33.23 | 108.8 |
| 32.64 | 7.31 | 34.56 | 9.15 | 32.80 | 106.4 |
| 30.57 | 6.89 | 36.86 | 9.83 | 32.57 | 106.9 |
| 28.15 | 6.54 | 40.23 | 11.05 | 31.62 | 109.7 |
| 27.92 | 6.79 | 41.87 | 12.04 | 30.21 | 110.6 |
| 27.09 | 6.62 | 42.86 | 12.39 | 30.05 | 109.8 |
| 25.36 | 6.16 | 44.42 | 12.77 | 30.22 | 110.3 |
| 24.79 | 6.09 | 45.32 | 13.17 | 29.89 | 109.5 |
| 21.91 | 5.50 | 48.85 | 14.52 | 29.24 | 109.4 |
| 20.24 | 4.92 | 49.59 | 14.28 | 30.17 | 111.4 |

(continued next page)

AUXILIARY INFORMATION

| METHOD/APPARATUS/PROCEDURE: | SOURCE AND PURITY OF MATERIALS: |
|---|---|
| The method used to determine the solubility has been described earlier (1). | Chemically pure $KH_2PO_4$ and $NH_4H_2PO_4$ were used. |
| | **ESTIMATED ERROR:**<br>No information is given. |
| | **REFERENCES:**<br>1. Shenkin, Ya.S.; Ruchnova, S.A.; Shenkina, A.P. *Zh. Neorg. Khim.* 1968, *13*, 256. |

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0] | Shenkin, Ya.S.; Ruchnova, S.A.; Rodionova, N.A. |
| (2) Ammonium dihydrogenphosphate; $NH_4H_2PO_4$; [7722-76-1] | *Zh. Neorg. Khim.* 1972, *17*, 3368-9. |
| (3) Water; $H_2O$; [7732-18-5] | |

EXPERIMENTAL VALUES cont'd:

Composition and boiling points of saturated solutions in the $NH_4H_2PO_4$-$KH_2PO_4$-$H_2O$ system.

| $KH_2PO_4$ | | $NH_4H_2PO_4$ | | $H_2O$ | |
|---|---|---|---|---|---|
| mass% | mol/kg | mass% | mol/kg | mass% | b.p./°C. |
| 19.07 | 5.14 | 53.69 | 17.13 | 27.24 | 110.9 |
| 17.01 | 4.35 | 54.27 | 16.42 | 28.72 | 112.0 |
| 14.82 | 3.72 | 55.91 | 16.60 | 29.27 | 109.6 |
| 14.71 | 3.76 | 56.57 | 17.12 | 28.72 | 110.8 |
| 8.26 | 2.05 | 62.15 | 18.25 | 29.59 | 110.4 |
| 6.83 | 1.80 | 65.35 | 20.41 | 27.82 | 109.9 |
| 0 | 0 | 68.30 | 18.72 | 31.70 | 110.5 |

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Potassium hydrogenselenate; $KHSeO_4$; [25105-33-3]<br>(3) Water; $H_2O$; [7732-18-5] | Zbořilová, L.; Krejčí, J.<br>*Scripta Fac. Sci. Nat. UJEP Brunensis, Chemie 1* 1972, 77-80. |
| **VARIABLES:**<br>Composition at 20°C. | **PREPARED BY:**<br>J. Eysseltová |

**EXPERIMENTAL VALUES:**

Composition of the phases in the $KH_2PO_4$-$KHSeO_4$-$H_2O$ system at 20°C.

| saturated solution | | | | | solid phase | | | |
|---|---|---|---|---|---|---|---|---|
| $KH_2PO_4$ | | $KHSeO_4$ | | $H_2O$ | Se | P | $KHSeO_4$ | $KH_2PO_4$ |
| mass% | mol/kg[a] | mass% | mol/kg[a] | mass% | mass% | mass% | mass% | mass% |
| 0 | 0 | 43.31 | 4.16 | 56.69 | | | | |
| 1.51 | 0.18 | 38.88 | 3.56 | 59.50 | 35.40 | 4.20 | 80.93 | 19.10 |
| 3.21 | 0.38 | 35.96 | 3.22 | 60.86 | 34.70 | 4.46 | 80.00 | 19.60 |
| 4.29 | 0.51 | 34.64 | 3.09 | 61.03 | 24.75 | 8.90 | 56.98 | 40.85 |
| 5.06 | 0.55 | 28.28 | 2.31 | 66.66 | 25.30 | 9.40 | 58.20 | 41.80 |
| 5.37 | 0.55 | 23.49 | 1.80 | 71.18 | 24.40 | 9.47 | 56.85 | 41.90 |
| 8.18 | 0.84 | 20.87 | 1.60 | 70.94 | 24.80 | 10.08 | 57.80 | 41.60 |
| 7.64 | 0.75 | 17.77 | 1.30 | 74.57 | 8.06 | 18.46 | 18.50 | 81.50 |
| 8.15 | 0.75 | 12.94 | 0.89 | 78.89 | 1.18 | 21.80 | 2.72 | 96.80 |
| 8.91 | 0.75 | 4.46 | 0.28 | 86.53 | 0.33 | 22.40 | 0.76 | 98.40 |
| 18.50 | 1.66 | 0 | 0 | 81.50 | | | | |
| calculated for $KH_2PO_4 \cdot KHSeO_4$ | | | | | | | 57.36 | 42.67 |
| calculated for $3KH_2PO_4 \cdot KHSeO_4$ | | | | | | | 80.15 | 19.85 |

[a] The mol/kg $H_2O$ values were calculated by the compiler.

AUXILIARY INFORMATION

| METHOD/APPARATUS/PROCEDURE: | SOURCE AND PURITY OF MATERIALS: |
|---|---|
| Saturated solutions containing $KHSeO_4$ and $KH_2PO_4$ in molar ratios of 9:1 to 1:9 were prepared at higher temperatures and equilibrated in a thermostat for several hours. Solid and liquid phases were analyzed. Selenium was determined iodometrically (2) and phosphorus was determined colorimetrically (3, 4). | $KHSeO_4$ was synthesized by the reaction of $K_2SeO_4$ with $H_2SeO_4$ (1). No other details are given. |
| | **ESTIMATED ERROR:**<br>No information is given. |

**REFERENCES:**

1. Dostál, K.; Krejčí, J. *Z. Anorg. Allg. Chem.* 1958, *296*, 29.
2. Blanka, B; et al. *Coll. Czech. Chem. Soc.* 1963, *28*, 3424.
3. Bernhart. D.N.; Wreath, A.R. *Anal. Chem.* 1955, *27*, 440.
4. Netherton, L.E.; Wreath, A.R. *Anal. Chem.* 1955, *27*, 860.

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Dipotassium sulfate; $K_2SO_4$; [7778-80-5]<br>(3) Water; $H_2O$; [7732-18-5] | Gladkovskaya, A.A.; Bergman, A.G.<br>*Tr. Kuban. S.-Kh. In-ta* 1975, *102*, 130, 31-4. |
| **VARIABLES:**<br>Composition and temperature. | **PREPARED BY:**<br>J. Eysseltová |

**EXPERIMENTAL VALUES:**

| original mixture | added | A[a] | $t$/°C. | solid phases |
|---|---|---|---|---|
| 10% $KH_2PO_4$ + 90% $K_2SO_4$ | $H_2O$ | 8.6 | +7.2 | $K_2SO_4 \cdot H_2O$ + $K_2SO_4$ |
| " " " | " | 7.0 | -1.2 | $K_2SO_4 \cdot H_2O$ + ice |
| 20% $KH_2PO_4$ + 80% $K_2SO_4$ | " | 8.6 | +3.0 | $K_2SO_4$ + $K_2SO_4 \cdot H_2O$ |
| " " " | " | 7.5 | -1.2 | ice + $K_2SO_4 \cdot H_2O$ |
| 43.85% $KH_2PO_4$ + 56.15% $K_2SO_4$ | " | 8.6 | -2.0 | ice + $K_2SO_4$ |
| 16% $KH_2PO_4$ + 84% $H_2O$ | $K_2SO_4$ | 7.0 | +15.6 | $KH_2PO_4$ + $K_2SO_4$ |

[a] This is the mass% of the component added.

COMMENT: It is impossible to construct a valid phase diagram on the basis of the above data. The compiler's opinion is that the value A had its given meaning only if the component added is a salt. In the case of water, the relation $w_{H_2O}$ = 100 - A is valid. On the basis of this assumption the compiler has calculated the following values.

| $KH_2PO_4$ | | $K_2SO_4$ | | $H_2O$ | | |
|---|---|---|---|---|---|---|
| mass% | mol/kg | mass% | mol/kg | mass% | $t$/°C. | solid phases[a] |
| 0.86 | 0.06 | 7.74 | 0.48 | 91.4 | +7.2 | A + B |
| 0.70 | 0.05 | 6.30 | 0.38 | 93.0 | -1.2 | A + C |
| 1.72 | 0.13 | 6.88 | 0.43 | 91.4 | +3.0 | A + B |
| 1.50 | 0.11 | 6.00 | 0.37 | 92.5 | -1.2 | A + C |
| 3.77 | 0.30 | 4.83 | 0.30 | 91.4 | -2.0 | B + C |
| 14.95 | 1.40 | 7.00 | 0.51 | 78.05 | +15.6 | B + D |

The solid phases are: A = $K_2SO_4 \cdot H_2O$; B = $K_2SO_4$; C = ice; D = $KH_2PO_4$.

(continued next page)

AUXILIARY INFORMATION

| METHOD/APPARATUS/PROCEDURE: | SOURCE AND PURITY OF MATERIALS: |
|---|---|
| A visual polythermic method was used (1). Solid carbon dioxide was used as the cooling agent. | No information is given. |
| | **ESTIMATED ERROR:**<br>No details are given. |
| | **REFERENCES:**<br>1. Bergman, A.G.; Luzhnaya, N.P. *Fiziko-khimicheskie Osnovy Izuchenija i Ispol'zovanija Soljanykh Mestorozhdenii Khlorid-sul'fatnogo Tipa*, Moscow, IAN SSSR, 1951. |

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Dipotassium sulfate; $K_2SO_4$; [7778-80-5]<br>(3) Water; $H_2O$; [7732-18-5] | Gladkovskaya, A.A.; Bergman, A.G.<br>*Tr. Kuban. S.-Kh. In-ta* 1975, *102*, 130, 31-4. |

EXPERIMENTAL VALUES cont'd:

The authors give the following triple points:

| $KH_2PO_4$ | | $K_2SO_4$ | | $H_2O$ | | |
|---|---|---|---|---|---|---|
| mass% | mol/kg[a] | mass% | mol/kg[a] | mass% | t/°C. | solid phases |
| 10.3 | 0.07 | 4.2 | 0.01 | 88.5 | +3.1 | ice + $KH_2PO_4$ + $K_2SO_4$ |
| 2.5 | 0.01 | 6.2 | 0.02 | 91.3 | +1.2 | ice + $K_2SO_4$ + $K_2SO_4 \cdot H_2O$ |

[a] These values were calculated by the compiler.

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Potassium chloride; KCl; [7747-40-7]<br>(3) Water; $H_2O$; [7732-18-5] | Mráz, R.; Srb, V.; Tichý, S.; Vosolsobě, J. *Chem. Prům.* 1976, *26*, 511-4. |
| **VARIABLES:**<br>Composition and temperature. | **PREPARED BY:**<br>J. Eysseltová |

**EXPERIMENTAL VALUES:**

Solubility isotherms in the $KH_2PO_4$-KCl-$H_2O$ system.

| $KH_2PO_4$ | | KCl | | $H_2O$ | |
|---|---|---|---|---|---|
| mass% | mol/kg[a] | mass% | mol/kg[a] | mass%[a] | solid phases |
| | | temp. = 25°C. | | | |
| 20.3 | 1.87 | 0 | 0 | 79.7 | $KH_2PO_4$ |
| 20.8 | 1.93 | 0 | 0 | 79.2 | " |
| 17.6 | 1.61 | 2.2 | 0.37 | 80.2 | " |
| 16.6 | 1.55 | 4.8 | 0.82 | 78.6 | " |
| 13.5 | 1.21 | 6.0 | 1.00 | 80.7 | " |
| 13.3 | 1.25 | 8.3 | 1.42 | 78.4 | " |
| 11.0 | 1.05 | 12.0 | 2.09 | 77.0 | " |
| 8.7 | 0.83 | 14.0 | 2.43 | 77.3 | " |
| 7.5 | 0.71 | 15.4 | 2.68 | 77.1 | " |
| 7.0 | 0.69 | 18.6 | 3.36 | 74.4 | " |
| 7.1 | 0.72 | 20.2 | 3.73 | 72.7 | " |
| 5.7 | 0.57 | 20.4 | 3.70 | 73.9 | " |
| 5.5 | 0.57 | 23.4 | 4.41 | 71.1 | " |
| 5.0 | 0.52 | 23.8 | 4.48 | 71.2 | $KH_2PO_4$ + KCl |
| 5.6 | 0.59 | 24.9 | 4.80 | 69.5 | KCl |
| 3.0 | 0.31 | 25.3 | 4.73 | 71.7 | " |
| 1.5 | 0.15 | 25.5 | 4.69 | 73.0 | " |
| 0 | 0 | 26.6 | 4.86 | 73.4 | " |
| 0 | 0 | 26.4 | 4.81 | 73.6 | " |

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AUXILIARY INFORMATION

**METHOD/APPARATUS/PROCEDURE:**

Solutions were saturated at a temperature 5 K higher than that of the respective isotherm. The samples were equilibrated by stirring for 4 hours. The mixtures were then allowed to stand for 1 hour before samples were taken for analyses. Chlorides were precipitated by adding excess $AgNO_3$ and then back-titrating the excess $AgNO_3$ with rhodanine. The dihydrogenphosphate ions were precipitated by adding excess bismuth nitrate and the excess bismuth was back-titrated with Komplexon III.

**SOURCE AND PURITY OF MATERIALS:**

No information is given.

**ESTIMATED ERROR:**

The temperature was controlled to within ± 0.2 K. The accuracy of the phosphorus analysis was at least ± 3%.

**REFERENCES:**

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Potassium chloride; KCl; [7747-40-7]<br>(3) Water; $H_2O$; [7732-18-5] | Mráz, R.; Srb, V.; Tichý, S.; Vosolsobě, J.<br>*Chem. Prům.* 1976, *26*, 511-4. |

EXPERIMENTAL VALUES cont'd:

Solubility isotherms in the $KH_2PO_4$-KCl-$H_2O$ system.

| $KH_2PO_4$ | | KCl | | $H_2O$ | |
|---|---|---|---|---|---|
| mass% | mol/kg[a] | mass% | mol/kg[a] | mass%[a] | solid phases |
| | | temp. = 50°C. | | | |
| 29.0 | 3.00 | 0 | 0 | 71.00 | $KH_2PO_4$ |
| 22.0 | 2.17 | 3.5 | 0.63 | 74.5 | " |
| 14.9 | 1.42 | 8.0 | 1.40 | 77.1 | " |
| 12.4 | 1.20 | 11.7 | 2.07 | 75.9 | " |
| 12.5 | 1.24 | 13.6 | 2.47 | 73.9 | " |
| 9.7 | 0.95 | 15.6 | 2.80 | 74.7 | " |
| 6.5 | 0.66 | 21.4 | 3.98 | 72.1 | " |
| 5.0 | 0.53 | 25.5 | 4.92 | 69.5 | " |
| 5.3 | 0.58 | 27.0 | 5.34 | 67.7 | $KH_2PO_4$ + KCl |
| 0 | 0 | 29.6 | 5.64 | 70.4 | KCl |
| | | temp. = 75°C. | | | |
| 39.2 | 4.73 | 0 | 0 | 60.8 | $KH_2PO_4$ |
| 34.7 | 4.00 | 1.7 | 0.40 | 63.6 | " |
| 31.5 | 3.51 | 2.6 | 0.53 | 65.9 | " |
| 27.3 | 3.04 | 6.7 | 1.36 | 66.0 | " |
| 25.0 | 2.83 | 10.1 | 2.09 | 64.9 | " |
| 20.1 | 2.22 | 13.5 | 2.72 | 66.4 | " |
| 16.1 | 1.78 | 17.4 | 3.51 | 66.5 | " |
| 16.4 | 1.89 | 20.0 | 4.22 | 63.6 | " |
| 12.2 | 1.43 | 25.0 | 5.33 | 62.8 | " |
| 9.1 | 1.11 | 30.6 | 6.81 | 60.3 | $KH_2PO_4$ + KCl |
| 5.0 | 0.59 | 32.5 | 6.97 | 62.5 | KCl |
| 2.9 | 0.33 | 31.8 | 6.53 | 65.3 | " |
| 0 | 0 | 32.2 | 6.66 | 66.8 | " |

[a] These values were calculated by the compiler.

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Potassium nitrate; $KNO_3$; [7757-79-1]<br>(3) Water; $H_2O$; [7732-18-5] | Shenkin, Ya.S.; Gorozhankin, E.V.<br>*Zh. Neorg. Khim.* 1976, *21*, 2293-5. |
| **VARIABLES:**<br>Composition and temperature at atmospheric pressure. | **PREPARED BY:**<br>J. Eysseltová |

**EXPERIMENTAL VALUES:**

Composition and boiling points in the $KH_2PO_4$-$KNO_3$-$H_2O$ system.

| $KH_2PO_4$ | | $KNO_3$ | | $H_2O$ | | | |
|---|---|---|---|---|---|---|---|
| mass% | mol/kg[a] | mass% | mol/kg[a] | mass%[a] | b.p./°C | -lg N[b] | solid phase[c] |
| 52.7 | 8.18 | 0 | 0 | 47.3 | 105.1 | | A |
| 47.3 | 6.96 | 2.8 | 0.555 | 49.9 | 105.1 | 0.0564 | " |
| 46.2 | 6.78 | 3.7 | 0.730 | 50.1 | 105.1 | 0.0495 | " |
| 42.6 | 6.20 | 6.9 | 1.35 | 50.5 | 105.5 | 0.0560 | " |
| 41.4 | 6.08 | 8.6 | 1.70 | 50.0 | 105.5 | 0.0570 | " |
| 37.8 | 5.63 | 12.9 | 2.59 | 49.3 | 106.0 | 0.0603 | " |
| 35.5 | 5.32 | 15.5 | 3.13 | 49.0 | 106.4 | 0.0610 | " |
| 32.1 | 4.79 | 18.7 | 3.76 | 49.2 | 106.9 | 0.0623 | " |
| 32.5 | 4.91 | 18.9 | 3.85 | 48.6 | 106.5 | 0.0618 | " |
| 30.6 | 4.72 | 21.8 | 4.53 | 47.6 | 106.9 | 0.0623 | " |
| 29.8 | 5.10 | 27.3 | 6.29 | 42.9 | 107.2 | 0.0717 | A + B |
| 26.4 | 4.47 | 30.2 | 6.88 | 43.4 | 107.7 | 0.0826 | B |
| 24.5 | 4.10 | 31.6 | 7.12 | 43.9 | 107.9 | 0.0736 | " |
| 23.7 | 3.93 | 32.0 | 7.14 | 44.3 | 106.7 | 0.0801 | " |
| 22.2 | 3.61 | 32.7 | 7.18 | 45.1 | 107.2 | 0.0781 | " |
| 21.2 | 3.57 | 35.2 | 7.99 | 43.6 | 107.2 | | " |
| 15.7 | 2.86 | 43.9 | 10.75 | 40.4 | 108.7 | 0.0880 | " |
| 15.0 | 2.83 | 46.0 | 11.67 | 39.0 | 109.2 | 0.1016 | " |
| 14.8 | 2.86 | 47.0 | 12.17 | 38.2 | 109.2 | 0.1016 | " |
| 12.3 | 2.45 | 51.1 | 13.81 | 36.6 | 109.9 | 0.1077 | " |
| 11.7 | 2.36 | 51.8 | 14.04 | 36.5 | 110.0 | 0.1125 | " |
| 10.5 | 2.20 | 54.5 | 15.40 | 35.0 | 110.2 | 0.1134 | " |
| 8.1 | 1.94 | 61.2 | 19.71 | 30.7 | 112.8 | 0.1258 | " |
| 7.7 | 2.00 | 64.0 | 22.37 | 28.3 | 115.1 | 0.1438 | " |

(continued next page)

AUXILIARY INFORMATION

| METHOD/APPARATUS/PROCEDURE: | SOURCE AND PURITY OF MATERIALS: |
|---|---|
| The method is the same as that described earlier (1). Phosphorus was determined gravimetrically as $Mg_2P_2O_7$. Nitrate ion was reduced with Deward alloy and the $NH_3$ was distilled, but no further information is given. | Chemically pure salts were recrystallized before being used. |
| | **ESTIMATED ERROR:**<br>No information is given. |
| | **REFERENCES:**<br>1. Shenkin, Ya.S.; Rushnova, S.A.; Shenkina, A.P. *Zh. Neorg. Khim.* 1968, *13*, 256. |

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Potassium nitrate; $KNO_3$; [7757-79-1]<br>(3) Water; $H_2O$; [7732-18-5] | Shenkin, Ya.S; Gorozhankin, E.V.<br>*Zh. Neorg. Khim.* 1976, *21*, 2293-5. |

EXPERIMENTAL VALUES cont'd:

Composition and boiling points in the $KH_2PO_4$-$KNO_3$-$H_2O$ system.

| $KH_2PO_4$ | | $KNO_3$ | | $H_2O$ | | | |
|---|---|---|---|---|---|---|---|
| mass% | mol/kg[a] | mass% | mol/kg[a] | mass%[a] | b.p./°C | -lg N[b] | solid phase[c] |
| 5.9 | 1.64 | 67.6 | 25.23 | 26.5 | 115.6 | 0.1592 | B |
| 4.1 | 1.10 | 68.4 | 24.60 | 27.5 | 116.2 | 0.1772 | " |
| 4.0 | 1.21 | 71.7 | 29.19 | 24.3 | 118.0 | 0.1774 | " |
| 3.3 | 1.02 | 73.0 | 30.47 | 23.7 | 118.0 | 0.1910 | " |
| 0 | 0 | 74.6 | 29.05 | 25.4 | 114.5 | 0.1960 | " |

[a] These values were calculated by the compiler.

[b] N is the mol fraction of water in the system.

[c] The solid phases are: A = $KH_2PO_4$; B = $KNO_3$.

According to the authors, the "temperature depression" (not defined) is a nearly linear function of -lg N.

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Potassium chloride; KCl; [7747-40-7]<br>(3) Water; $H_2O$; [7732-18-5] | Solov'ev, A.P.; Balashova, E.F.; Verendyakina, N.A.; Zyuzina, L.F.<br>*Vzaymodeystvie Khloridov Kaliya, Magniya, Amoniyas ich Nitratami i Fosfatami* 1977, 3-11. |
| **VARIABLES:**<br>Composition at 25°C. | **PREPARED BY:**<br>J. Eysseltová |

**EXPERIMENTAL VALUES:**

Solubility in the $KH_2PO_4$-KCl-$H_2O$ system at 25°C.

| $KH_2PO_4$ | | KCl | | $H_2O$ | | |
|---|---|---|---|---|---|---|
| mass% | mol/kg[a] | mass% | mol/kg[a] | mass%[a] | refr. index | solid phase |
| ---- | 0.000 | 26.30 | 4.786 | 73.70 | 1.3714 | KCl |
| 2.25 | 0.226 | 24.75 | 4.547 | 73.00 | 1.3711 | " |
| 4.47 | 0.458 | 23.90 | 4.475 | 71.63 | 1.3710 | KCl + $KH_2PO_4$ |
| 4.90 | 0.485 | 20.98 | 3.796 | 74.12 | 1.3669 | $KH_2PO_4$ |
| 6.50 | 0.636 | 18.42 | 3.290 | 75.08 | 1.3643 | " |
| 7.60 | 0.726 | 15.52 | 2.707 | 76.88 | 1.3611 | " |
| 10.92 | 1.047 | 12.51 | 2.191 | 76.57 | 1.3591 | " |
| 12.59 | 1.187 | 9.48 | 1.631 | 77.93 | 1.3571 | " |
| 14.65 | 1.354 | 5.90 | 0.995 | 79.45 | 1.3566 | " |
| 20.30 | 1.871 | ----- | 0.000 | 79.70 | 1.3550 | " |

[a] These values were calculated by the compiler.

AUXILIARY INFORMATION

| METHOD/APPARATUS/PROCEDURE: | SOURCE AND PURITY OF MATERIALS: |
|---|---|
| Equilibrium was reached isothermally during the course of 1 to 3 days. The chloride content was determined by the Volhard method, the dihydrogenphosphate was precipitated as $NH_4MgPO_4$, the excess of Mg was titrated complexometrically. The index of refraction was measured with an IRF-22 refractometer. | The salts were either reagent grade or chemically pure. They were recrystallized twice before being used. |
| | **ESTIMATED ERROR:**<br>The temperature was controlled to within ± 0.1°C. No other information is given. |
| | **REFERENCES:** |

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Ammonium dihydrogenphosphate; $NH_4H_2PO_4$; [7722-76-1]<br>(3) Water; $H_2O$; [7732-18-5] | Solov'ev, A.P.; Balashova, E.F.; Verendyakina, N.A.; Zyuzina, L.F.<br>*Vzaymodeystvie Khloridov Kaliya, Magniya, Amoniya s ich Nitratami i Fosfatami* 1977, 3-11. |
| **VARIABLES:** | **PREPARED BY:** |
| Composition at 25°C. | J. Eysseltová |

**EXPERIMENTAL VALUES:**

Composition of saturated solutions in the $KH_2PO_4$-$NH_4H_2PO_4$-$H_2O$ system at 25°C.

| $KH_2PO_4$ | | $NH_4H_2PO_4$ | | $H_2O$ | | |
|---|---|---|---|---|---|---|
| mass% | mol/kg[a] | mass% | mol/kg[a] | mass%[a] | refr. index | solid phases |
| 21.60 | 2.024 | ---- | 0.00 | 78.40 | 1.3550 | $KH_2PO_4$ |
| 20.80 | 2.034 | 4.08 | 0.472 | 75.12 | 1.3630 | solid[2]soln |
| 19.24 | 1.890 | 5.98 | 0.695 | 74.78 | 1.3665 | " " |
| 16.10 | 1.698 | 14.25 | 1.778 | 69.65 | 1.3720 | " " |
| 13.60 | 1.478 | 18.80 | 2.417 | 67.60 | 1.3742 | " " |
| 11.37 | 1.264 | 22.57 | 2.969 | 66.06 | 1.3750 | " " |
| 9.24 | 0.995 | 24.20 | 2.877 | 66.56 | 1.3760 | " " |
| 7.00 | 0.771 | 26.30 | 3.427 | 66.70 | 1.3770 | " " |
| 0.30 | 0.030 | 28.05 | 3.403 | 71.65 | 1.3780 | " " |
| ----- | 0.000 | 29.30 | 3.613 | 70.70 | 1.3780 | $NH_4H_2PO_4$ |

[a] These values were calculated by the compiler.

AUXILIARY INFORMATION

**METHOD/APPARATUS/PROCEDURE:**

The mixtures were equilibrated for 1-3 days in a thermostat. The ammonium ion content was determined by the Kjeldahl method. The $H_2PO_4^-$ was precipitated as $NH_4MgPO_4$, and the excess magnesium was titrated complexometrically. The refractive index was measured with a IRF-22 refractometer.

**SOURCE AND PURITY OF MATERIALS:**

The salts were reagent grade or chemically pure and were recrystallized before being used.

**ESTIMATED ERROR:**

The temperature was controlled to within ± 0.1 K. No other information is given.

**REFERENCES:**

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Potassium borate, $KBO_2$; [13709-94-9]<br>(3) Water; $H_2O$; [7732-18-5] | Beremzhanov, B.A.; Voronina, L.V.; Savich, R.F.<br>*Khim. Khim. Tekhnol. (Alma Ata)* 1978, 173-8. |
| **VARIABLES:**<br>Composition at 25 and 50°C. | **PREPARED BY:**<br>J. Eysseltová |

**EXPERIMENTAL VALUES:**

Composition of saturated solutions in the $KH_2PO_4$-$KBO_2$-$H_2O$ system.

| $KH_2PO_4$ | | | $KBO_2$ | | | refr. | | solid[b] |
|---|---|---|---|---|---|---|---|---|
| mass% | mol% | mol/kg[a] | mass% | mol% | mol/kg[a] | index | pH | phase |
| | | | temp. = 25°C. | | | | | |
| ---- [a] | ---- | ---- | 0.367[a] | 0.081 | 0.450 | 1.441 | 13.95 | A |
| 89.5 | 53.12 | 62.9 | ----- | ----- | ----- | 1.360 | 7 | B |
| 66.05 | 20.34 | 14.30 | 0.023 | 0.012 | 0.0083 | 1.410 | 7.23 | " |
| 41.47 | 8.74 | 5.21 | 0.054 | 0.017 | 0.0113 | 1.399 | 6.98 | " |
| 39.17 | 7.67 | 4.74 | 0.055 | 0.018 | 0.0110 | 1.396 | 6.53 | " |
| 38.40 | 7.56 | 4.58 | 0.056 | 0.018 | 0.0111 | 1.394 | 6.32 | " |
| 35.52 | 6.73 | 4.05 | 0.057 | 0.018 | 0.0108 | 1.390 | 6.24 | " |
| 29.18 | 5.07 | 3.03 | 0.094 | 0.026 | 0.0162 | 1.385 | 5.97 | " |
| 27.65 | 4.75 | 2.81 | 0.129 | 0.035 | 0.0218 | 1.374 | 5.81 | " |
| 27.26 | 4.72 | 2.76 | 0.145 | 0.040 | 0.0244 | 1.371 | 5.74 | " |
| 26.50 | 4.47 | 2.66 | 0.164 | 0.047 | 0.0273 | 1.366 | 5.59 | " |
| 25.73 | 4.19 | 2.55 | 0.176 | 0.048 | 0.0290 | 1.361 | 5.31 | " |
| 24.96 | 4.13 | 2.45 | 0.201 | 0.055 | 0.0328 | 1.360 | 5.06 | " |
| 20.16 | 3.28 | 1.86 | 0.293 | 0.076 | 0.0450 | 1.368 | 4.32 | " |
| 17.28 | 2.56 | 1.54 | 0.374 | 0.096 | 0.0554 | 1.356 | 4.64 | A + B |
| 13.44 | 1.84 | 1.15 | 0.328 | 0.076 | 0.0464 | 1.367 | 4.91 | A |
| 11.52 | 1.61 | 0.96 | 0.304 | 0.071 | 0.0421 | 1.386 | 6.82 | " |
| 10.37 | 1.39 | 0.85 | 0.300 | 0.071 | 0.0410 | 1.416 | 8.05 | " |
| 9.60 | 1.37 | 0.78 | 0.323 | 0.076 | 0.0438 | 1.425 | 11.24 | " |
| 9.22 | 1.31 | 0.75 | 0.304 | 0.072 | 0.0410 | 1.430 | 12.07 | " |
| 6.91 | 0.96 | 0.55 | 0.339 | 0.078 | 0.0446 | 1.435 | 13.05 | " |
| 4.61 | 0.56 | 0.36 | 0.351 | 0.079 | 0.0451 | 1.440 | 13.60 | " |
| 0.77 | 0.09 | 0.06 | 0.363 | 0.080 | 0.0449 | 1.441 | 13.85 | " |

(continued next page)

AUXILIARY INFORMATION

| METHOD/APPARATUS/PROCEDURE: | SOURCE AND PURITY OF MATERIALS: |
|---|---|
| No details are given other than that a solubility method was used. | No information is given. |
| | **ESTIMATED ERROR:**<br>No information is given. |
| | **REFERENCES:** |

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0] | Beremzhanov, B.A.; Voronina, L.V.; Savich, R.F. |
| (2) Potassium borate; $KBO_2$; [13709-94-9] | *Khim. Khim. Tekhnol. (Alma Ata)* 1978, 173-8. |
| (3) Water; $H_2O$; [7732-18-5] | |

EXPERIMENTAL VALUES cont'd:

Composition of saturated solutions in the $KH_2PO_4$-$KBO_2$-$H_2O$ system.

| $KH_2PO_4$ | | | $KBO_2$ | | | refr. | | solid[b] |
|---|---|---|---|---|---|---|---|---|
| mass% | mol% | mol/kg[a] | mass% | mol% | mol/kg[a] | index | pH | phase |
| | | | temp. = 50°C. | | | | | |
| ---- | ---- | ----- | 0.409[a] | 0.090 | 0.0502 | 1.445 | 14.0 | A |
| 95.3[a] | 72.91 | 149.8 | ----- | ----- | ----- | 1.365 | 7.20 | B |
| 55.30 | 13.94 | 9.10 | 0.051 | 0.020 | 0.0139 | 1.360 | 6.21 | " |
| 47.62 | 10.73 | 6.69 | 0.059 | 0.021 | 0.0138 | 1.364 | 6.03 | " |
| 43.78 | 9.30 | 5.73 | 0.059 | 0.017 | 0.0128 | 1.366 | 6.00 | " |
| 40.32 | 8.06 | 4.97 | 0.059 | 0.016 | 0.0121 | 1.368 | 5.98 | " |
| 36.48 | 7.12 | 4.22 | 0.063 | 0.021 | 0.0121 | 1.371 | 5.95 | " |
| 30.34 | 5.39 | 3.20 | 0.070 | 0.018 | 0.0123 | 1.374 | 5.90 | " |
| 29.95 | 5.36 | 3.14 | 0.073 | 0.022 | 0.0127 | 1.376 | 5.89 | " |
| 28.18 | 5.07 | 2.89 | 0.075 | 0.022 | 0.0128 | 1.379 | 5.87 | " |
| 27.65 | 4.73 | 2.81 | 0.103 | 0.031 | 0.0174 | 1.381 | 5.85 | " |
| 20.54 | 3.29 | 1.90 | 0.090 | 0.024 | 0.0139 | 1.384 | 5.82 | A + B |
| 13.06 | 1.83 | 1.10 | 0.059 | 0.014 | 0.0083 | 1.386 | 8.96 | A |
| 10.37 | 1.38 | 0.85 | 0.054 | 0.012 | 0.0074 | 1.388 | 9.88 | " |
| 8.45 | 1.17 | 0.68 | 0.070 | 0.015 | 0.0093 | 1.390 | 10.61 | " |
| 8.06 | 0.97 | 0.64 | 0.082 | 0.019 | 0.0109 | 1.394 | 11.15 | " |
| 5.38 | 0.74 | 0.42 | 0.117 | 0.026 | 0.0151 | 1.398 | 12.08 | " |
| 3.46 | 0.37 | 0.26 | 0.178 | 0.039 | 0.0225 | 1.405 | 12.46 | " |
| 2.69 | 0.36 | 0.20 | 0.199 | 0.044 | 0.0250 | 1.423 | 12.95 | " |
| 1.54 | 0.18 | 0.12 | 0.288 | 0.064 | 0.0358 | 1.432 | 13.20 | " |

[a] These values were calculated by the compiler.

[b] The solid phases are: A = $KBO_2$; B = $KH_2PO_4$.

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Potassium chloride; KCl; [7747-40-7]<br>(3) Water; $H_2O$; [7732-18-5] | Khallieva, Sh.D.<br>*Izv. AN Turkm. SSR. ser. khim.* 1978, 3, 125-6. |
| **VARIABLES:** | **PREPARED BY:** |
| Composition at 40°C. | J. Eysseltová |

**EXPERIMENTAL VALUES:**

Solubility isotherm for the $KH_2PO_4$-KCl-$H_2O$ system at 40°C.

| $KH_2PO_4$ | | KCl | | $H_2O$ | |
|---|---|---|---|---|---|
| mass% | mol/kg[a] | mass% | mol/kg[a] | mass% | solid phase |
| 27.15 | 2.738 | ---- | ---- | 72.85 | $KH_2PO_4$ |
| 17.12 | 1.658 | 7.04 | 1.244 | 75.84 | " |
| 12.82 | 1.243 | 11.46 | 2.029 | 75.72 | " |
| 9.73 | 0.929 | 13.39 | 2.335 | 76.88 | " |
| 7.29 | 0.741 | 20.47 | 3.800 | 72.24 | " |
| 4.21 | 0.443 | 25.97 | 4.988 | 69.82 | $KH_2PO_4$ + KCl |
| 3.945 | 0.416 | 26.48 | 5.104 | 68.575 | " |
| ---- | ---- | 28.01 | 5.218 | 71.99 | KCl |

[a]The mol/kg $H_2O$ values were calculated by the compiler.

AUXILIARY INFORMATION

| METHOD/APPARATUS/PROCEDURE: | SOURCE AND PURITY OF MATERIALS: |
|---|---|
| The isothermal method was used. Equilibrium was checked by repeated analysis. Standard analytical methods were used to determine the amount of chloride, potassium and dihydrogenphosphate ions. | Reagent grade salts were used. |
| | **ESTIMATED ERROR:**<br>The deviation from 40°C was no greater than ± 0.5 K. No other information is given. |
| | **REFERENCES:** |

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0]<br>(2) Potassium nitrate; $KNO_3$; [7757-79-1]<br>(3) Water; $H_2O$; [7732-18-5] | Girich, T.E.; Gulyamov, Yu.M.; Ganz, S.N. *Zh. Neorg. Khim.* 1979, *24*, 1084-6. |
| **VARIABLES:**<br>Composition at 25 and 50°C. | **PREPARED BY:**<br>J. Eysseltová |

**EXPERIMENTAL VALUES:**

Composition of the isotherms in the $KH_2PO_4$-$KNO_3$-$H_2O$ system.

| | mass percent | | | concn.[a] | | indices[b] | | mol/kg[c] | | solid[d] |
|---|---|---|---|---|---|---|---|---|---|---|
| no | $KH_2PO_4$ | $KNO_3$ | $H_2O$ | $KH_2PO_4$ | $KNO_3$ | $KH_2PO_4$ | $H_2O$ | $KH_2PO_4$ | $KNO_3$ | phase |
| | | | | | temp. = 25°C. | | | | | |
| 1 | 20.49 | 0 | 79.51 | 33.94 | 0 | 100.0 | 2945.9 | 1.89 | 0 | A |
| 2 | 16.93 | 4.13 | 78.94 | 28.38 | 9.32 | 75.27 | 2651.5 | 1.57 | 0.52 | " |
| 3 | 14.96 | 7.45 | 77.59 | 25.52 | 17.12 | 59.85 | 2345.2 | 1.42 | 0.95 | " |
| 4 | 13.50 | 10.75 | 75.75 | 23.57 | 25.28 | 48.25 | 2046.7 | 1.31 | 1.40 | " |
| 5 | 12.23 | 13.95 | 73.82 | 21.92 | 33.67 | 39.43 | 1798.7 | 1.22 | 1.87 | " |
| 6 | 11.35 | 16.78 | 71.87 | 20.89 | 41.60 | 33.43 | 1600.4 | 1.16 | 2.31 | " |
| 7 | 11.00 | 18.46 | 70.54 | 20.62 | 46.64 | 30.65 | 1486.7 | 1.15 | 2.59 | " |
| 8 | 10.17 | 20.79 | 69.04 | 19.50 | 53.66 | 26.66 | 1366.7 | 1.15 | 3.00 | " |
| 9 | 10.15 | 22.11 | 67.74 | 19.82 | 58.17 | 25.42 | 1282.2 | 1.10 | 3.23 | A + B |
| 10 | 10.03 | 22.45 | 67.52 | 19.64 | 59.23 | 24.91 | 1267.7 | 1.09 | 3.29 | " |
| 11 | 7.07 | 23.79 | 69.14 | 13.51 | 61.31 | 18.06 | 1336.5 | 0.75 | 3.40 | B |
| 12 | 5.11 | 24.98 | 69.91 | 9.65 | 63.67 | 13.17 | 1363.7 | 0.54 | 3.53 | " |
| 13 | 0 | 27.49 | 72.51 | 0 | 67.57 | 0 | 1479.9 | 0 | 3.75 | " |
| | | | | | temp. = 50°C. | | | | | |
| 14 | 29.15 | 0 | 70.85 | 54.45 | 0 | 100.0 | 1836.7 | 3.02 | 0 | A |
| 15 | 25.63 | 4.21 | 70.16 | 49.75 | 10.98 | 81.91 | 1646.5 | 2.68 | 0.593 | " |
| 16 | 20.82 | 11.68 | 67.50 | 40.80 | 30.82 | 56.96 | 1396.1 | 2.27 | 1.71 | " |
| 17 | 19.95 | 13.11 | 66.94 | 39.44 | 34.89 | 53.06 | 1395.0 | 2.19 | 1.94 | " |
| 18 | 18.08 | 15.42 | 66.50 | 35.97 | 41.31 | 46.55 | 1294.0 | 2.00 | 2.29 | " |
| 19 | 14.73 | 22.01 | 63.26 | 30.76 | 61.90 | 33.20 | 1077.4 | 1.71 | 3.44 | " |
| 20 | 14.01 | 23.35 | 62.24 | 29.59 | 66.41 | 30.83 | 1041.6 | 1.65 | 3.77 | " |
| 21 | 12.32 | 26.37 | 61.31 | 26.53 | 76.56 | 25.74 | 939.3 | 1.48 | 4.25 | " |

(continued next page)

AUXILIARY INFORMATION

**METHOD/APPARATUS/PROCEDURE:**

The mixtures were heated to a temperature 5-10 K above that desired and then placed in a thermostat at 25°C for 8 hours or at 50°C for 6 hours. The phosphate and nitrate ion contents were determined photocolorimetrically (2,3). The measurement of the physical properties has been described elsewhere (1).

**SOURCE AND PURITY OF MATERIALS:**

A special purity grade of salts was used and the salts were recrystallized before being used.

**ESTIMATED ERROR:**

The temperature was controlled to within ± 0.1 K. No other details are given.

**REFERENCES:**

1. Protsenko, P.I.; Andreeva, T.A. *Zh. Neorg. Khim.* 1964, 9, 1441.
2. Moizhes, I.B. *Rukovodstvo po Analizu v Proizvodstve Fosfora, Fosfornoy Kisloty i Udobreniy*, Khimiya, Leningrad 1973.

(continued next page)

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| (1) Potassium dihydrogenphosphate; $KH_2PO_4$; [7778-77-0] | Girich, T.E.; Gulyamov, Yu.M.; Ganz, S.N. |
| (2) Potassium nitrate; $KNO_3$; [7757-79-1] | *Zh. Neorg. Khim.* 1979, *24*, 1084-6. |
| (3) Water; $H_2O$; [7732-18-5] | |

EXPERIMENTAL VALUES cont'd:

Composition of the isotherms in the $KH_2PO_4$-$KNO_3$-$H_2O$ system.

| | mass percent | | | concn.[a] | | indices[b] | | mol/kg[c] | | solid[d] |
|---|---|---|---|---|---|---|---|---|---|---|
| no | $KH_2PO_4$ | $KNO_3$ | $H_2O$ | $KH_2PO_4$ | $KNO_3$ | $KH_2PO_4$ | $H_2O$ | $KH_2PO_4$ | $KNO_3$ | phase |
| | | | | temp. = 50°C. | | | | | | |
| 22 | 10.70 | 28.90 | 60.40 | 23.39 | 85.14 | 21.55 | 920.1 | 1.30 | 4.73 | A |
| 23 | 7.84 | 36.80 | 55.36 | 18.72 | 115.86 | 13.92 | 742.8 | 1.04 | 6.58 | " |
| 24 | 7.54 | 38.90 | 53.56 | 18.61 | 129.42 | 12.58 | 675.5 | 1.03 | 7.18 | " |
| 25 | 7.44 | 39.41 | 53.15 | 18.52 | 132.11 | 12.30 | 663.7 | 0.96 | 7.34 | A + B |
| 26 | 6.98 | 39.63 | 53.39 | 17.30 | 132.29 | 11.56 | 668.5 | 1.03 | 7.33 | " |
| 27 | 5.60 | 41.06 | 53.34 | 13.86 | 137.18 | 9.18 | 662.0 | 0.77 | 7.61 | B |
| 28 | 5.16 | 41.48 | 53.36 | 12.79 | 138.51 | 8.45 | 661.0 | 0.71 | 7.69 | " |
| 29 | 4.50 | 42.28 | 53.22 | 11.16 | 141.82 | 7.31 | 654.7 | 0.62 | 7.86 | " |
| 30 | 0 | 46.25 | 53.75 | 0 | 153.35 | 0 | 652.1 | 0 | 8.51 | " |

[a] The concentration unit is: mol/1000 mol water.

[b] The concentration unit is: mol/100 mol of solute.

[c] These mol/kg $H_2O$ values were calculated by the compiler.

[d] The solid phases are: A = $KH_2PO_4$; B = $KNO_3$.

The physical properties of the above solutions are given below.

| no | viscosity/cP | density/g $cm^{-3}$ | $\kappa$/S $cm^{-1}$ |
|---|---|---|---|
| 1 | 1.722 | 1.156 | 0.100 |
| 2 | 1.325 | 1.160 | 0.110 |
| 3 | 1.281 | 1.169 | 0.115 |
| 4 | 1.285 | 1.184 | 0.120 |
| 5 | 1.277 | 1.189 | 0.130 |
| 6 | 1.276 | 1.203 | 0.135 |
| 7 | 1.278 | 1.212 | 0.140 |
| 8 | 1.280 | 1.222 | 0.143 |
| 9 | 1.299 | 1.230 | 0.145 |
| 10 | 1.299 | 1.231 | 0.145 |
| 11 | 1.237 | 1.220 | 0.147 |
| 12 | 1.189 | 1.212 | 0.150 |
| 13 | 1.051 | 1.197 | 0.155 |
| 14 | 1.487 | 1.225 | 1.05 |
| 15 | 1.301 | 1.234 | 1.10 |
| 16 | 1.119 | 1.236 | 1.15 |
| 17 | 1.117 | 1.243 | 1.15 |
| 18 | 1.116 | 1.247 | 1.25 |
| 19 | 1.115 | 1.264 | 1.40 |
| 20 | 1.115 | 1.271 | 1.45 |
| 21 | 1.115 | 1.287 | 1.50 |
| 22 | 1.116 | 1.302 | 1.60 |
| 23 | 1.117 | 1.329 | 1.90 |
| 24 | 1.118 | 1.335 | 2.05 |
| 25 | 1.119 | 1.340 | 2.15 |
| 26 | 1.119 | 1.339 | 2.15 |
| 27 | 1.117 | 1.332 | 2.10 |
| 28 | 1.112 | 1.331 | 2.05 |
| 29 | 1.112 | 1.330 | 1.99 |
| 30 | 1.050 | 1.325 | 1.95 |

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