COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Dipotassium hydrogenphosphate; K_2HPO_4; [7758-11-4] (2) Potassium carbonate; K_2CO_3; [584-08-7] (3) Urea; CH_4N_2O; [57-13-6] (4) Water; H_2O; [7732-18-5]	Velikanova, L.V.; Bergman, A.G. *Izv. Vysch. Ucheb. Zaved., Khim. Khim. Tekhnol.* **1974**, *17*, 7-10 and 1513-6.
VARIABLES: Temperature and composition.	**PREPARED BY:** J. Eysseltová

EXPERIMENTAL VALUES:

Monovariant points in the K_2HPO_4-K_2CO_3-$CO(NH_2)_2$-H_2O system.

	K_2CO_3		K_2HPO_4		$CO(NH_2)_2$		H_2O	
t/°C.	mass%	mol/kg[a]	mass%	mol/kg[a]	mass%	mol/kg[a]	mass%	solid phase[b]
Section I: (25% K_2CO_3 + 75% K_2HPO_4)-$CO(NH_2)_2$-H_2O								
-22	7.25	0.89	21.75	2.13	12.4	3.52	58.6	ice + A + G
-10.5	8.75	1.17	26.25	2.80	11.3	3.50	53.7	A + G + H
3.7	12.05	1.95	36.15	4.65	7.2	2.68	44.6	A + B + H
34	13.65	2.19	30.95	3.94	10.4	3.84	35	B + H + I
50.6	15	3.93	45	9.36	12.4	7.48	27.6	B + C + I
54	14.7	3.92	43.9	9.29	14.3	8.78	27.1	C + I + J
-16.9	9.25	1.06	27.75	2.52	0	0	63	ice + A
5	13.58	2.14	40.72	5.11	0	0	45.7	A + B
57.5	16.82	3.72	50.48	8.86	0	0	32.7	B + C
Section II: (50% K_2CO_3 + 50% K_2HPO_4)-$CO(NH_2)_2$-H_2O								
-35	21	2.86	21	2.27	5	1.57	53	ice + B + G
-6[c]	22.2	3.29	22.2	2.61	7.2	2.46	48.5	B + G + H
37[c]	50		50		13.7		33.8	B + D + H
39.6	26.3	5.74	26.3	4.56	14.3	7.19	33.1	D + H + I
61	25.4	7.23	25.4	5.74	23.8	15.60	25.4	D + I + J
-31.5	21.75	2.78	21.75	2.20	0	0	56.5	ice + B
51.5	31.5	6.15	31.5	4.88	0	0	37	B + D
Section III: (75% K_2CO_3 + 25% K_2HPO_4)-$CO(NH_2)_2$-H_2O								
-37.5	30.75	4.09	10.25	1.08	4.7	1.44	55	ice + B + G
-12.5	31.05	4.38	10.35	1.16	7.4	2.40	51.2	B + G + H
25.2	38.1	7.33	12.7	1.93	11.6	5.13	37.6	B + E + H

(continued next page)

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
A visual polythermic method was used. The nature of the solid phases was checked by microphotographical techniques.	No information is given.
	ESTIMATED ERROR: No information is given.
	REFERENCES:

COMPONENTS:
(1) Dipotassium hydrogenphosphate; K_2HPO_4; [7758-11-4]
(2) Potassium carbonate; K_2CO_3; [584-08-7]
(3) Urea; CH_4N_2O; [57-13-6]
(4) Water; H_2O; [7732-18-5]

ORIGINAL MEASUREMENTS:
Velikanova, L.V.; Bergman, A.G.
Izv. Vysch. Ucheb. Zaved., Khim. Khim. Tekhnol. Russ. 1974, 17, 7-10 and 1513-6.

EXPERIMENTAL VALUES cont'd:

Monovariant points in the K_2HPO_4-K_2CO_3-$CO(NH_2)_2$-H_2O system.

	K_2CO_3		K_2HPO_4		$CO(NH_2)_2$		H_2O	
t/°C.	mass%	mol/kg[a]	mass%	mol/kg[a]	mass%	mol/kg[a]	mass%	solid phase[b]
37.5	37.5	8.00	12.5	2.11	16.1	7.90	33.9	E + H + I
56.5	35.4	9.59	11.8	2.53	26.1	16.27	26.7	E + I + J
69.7	31.27	10.77	10.43	2.85	37.3	29.57	21	D + E + J
-35.5	32.55	4.16	10.85	1.10	0	0	56.6	ice + B
-29.2	42.6	7.13	14.2	1.88	0	0	43.2	B + E
86.5	48.75	10.07	16.25	2.66	0	0	35	D + E
Section IV: (45% K_2CO_3 + 55% K_2HPO_4)-$CO(NH_2)_2$-H_2O								
-27	15.03	1.88	18.37	1.83	9	2.60	57.6	ice + A + G
-8.6	18.54	2.67	22.66	2.59	8.6	2.86	50.2	A + G + H
-7.5	19.17	2.76	23.43	2.68	7.3	2.42	50.2	A + B + H
41.8	24.3	5.46	29.7	5.29	13.8	7.13	32.2	B + D + H
45.6	24.07	5.56	29.43	5.39	15.2	8.08	31.3	D + H + I
63.7	22.59	6.68	27.61	6.49	25.4	17.33	24.4	D + I + J
-21.6	17.73	2.11	21.67	2.05	0	0	60.6	ice + A
-6.6	21.78	3.05	26.62	2.96	0	0	51.6	A + B
55.8	29.30	6.07	35.80	5.88	0	0	34.9	B + D
Section V: (85% K_2CO_3 + 15% K_2HPO_4)-$CO(NH_2)_2$-H_2O								
-40	33.68	4.30	6.12	0.62	3.6	1.05	55.6	ice + B + G
-12.5	37.65	5.50	6.65	0.77	6.2	2.08	49.5	B + G + H
14.3	41.48	7.26	7.32	1.01	9.9	3.99	41.3	B + E + H
30	40.3	7.75	7.1	1.08	15	6.64	37.6	E + H + I
51.4	36.8	8.87	6.5	1.24	26.7	14.81	30	E + I + J
68.7	28.73	9.66	5.07	1.35	44.7	34.61	21.5	D + E + J
-36.5	36.98	4.73	6.52	0.66	0	0	56.5	ice + B
16.6	46.16	7.30	8.14	1.02	0	0	45.7	B + E
106.5	56.25	12.20	9.98	1.70	0	0	33.5	D + E
Section VI: (90% K_2CO_3 + 10% K_2HPO_4)-$CO(NH_2)_2$-H_2O								
-40.7	36.54	4.77	4.06	0.42	4	1.20	55.4	ice + F + G
-22	40.77	5.89	4.53	0.52	4.7	1.56	50	B + F + G
7	45	7.75	5	0.68	8	3.17	42	B + E + G
15.5	44.37	7.98	4.93	0.70	10.5	4.34	40.2	E + G + H
40.2	41.13	8.65	4.57	0.76	19.9	9.63	34.4	E + H + I
58.7	34.83	9.36	3.87	0.82	34.4	21.29	26.9	E + I + J
-37	38.7	4.91	4.3	0.43	0	0	57	ice + B
-13.5	44.3	6.30	4.92	0.55	0	0	50.8	B + F
10.5	47.8	7.37	5.3	0.64	0	0	46.9	E + F
116.5	60.0	13.04	6.7	1.14	0	0	33.3	D + E
the quaternary eutectic point								
-41.5	34.32	4.14	3.22	0.31	2.52	0.62	59.92	ice + A + F + G

The relative areas of crystallization of the individual phases are:

Section	ice	A	B	C	D	E	F	G	H	I	J
I	13.64	3.46	2.81	29.32	0	0	0	3.88	12.22	10.82	23.85
II	14.47	0	4	0	31.3	0	0	5.82	12.33	9.82	22.86
III	13.99	0	2.61	0	33.9	2.73	0	4.36	13	10.63	18.74
IV	13.81	1.83	3.79	0	32.35	0	0	5.01	11.69	12.33	19.19
V	14.13	0	1.43	0	36.21	0	0	5.89	10.56	10.43	16.8
VI	14.79	0	0.66	0	32.78	6.36	0.69	8.4	10.3	10.13	15.89

[a] The mol/kg H_2O values have been calculated by the compiler.

[b] The solid phases are: A = $K_2HPO_4 \cdot 6H_2O$; B = $K_2HPO_4 \cdot 3H_2O$; C = K_2HPO_4; D = K_2CO_3; E = $2K_2CO_3 \cdot 3H_2O$; F = $K_2CO_3 \cdot 6H_2O$; G = α-urea; H = β-urea; I = γ-urea; J = δ-urea.

[c] An obvious error - compiler.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Dipotassium hydrogenphosphate; K_2HPO_4; [7758-11-4] (2) Ammonium dihydrogenphosphate; $NH_4H_2PO_4$; [7722-76-1] (3) Diammonium hydrogenphosphate; $(NH_4)_2HPO_4$; [7783-28-0] (4) Water; H_2O; [7732-18-5]	Torochestnikov, N.S.; Rodionova, T.M.; Kirsanova, L.D. *VINITI* 1979, 2909, 17 p.
VARIABLES: Temperature and amount of K_2HPO_4 in solutions with a ratio of $NH_4H_2PO_4/(NH_4)_2HPO_4$ = 2.34.	**PREPARED BY:** J. Eysseltová

EXPERIMENTAL VALUES:

Part 1. Solubility polytherm along the sections of the $NH_4H_2PO_4$-$(NH_4)_2HPO_4$-K_2HPO_4-H_2O system.

	composition (g of each component)					
t/°C.[a]	$NH_4H_2PO_4$	$(NH_4)_2HPO_4$	$K_2HPO_4 \cdot 2H_2O$[b]	H_2O	A_i[c]	mass% ammonium phosphates
-7	----	----	12.18	25	25	-----
-6.9	1.4289	0.6100	12.18	25	25	5.2
-7.2	1.8607	0.7950	12.18	25	25	6.67
-7.7	2.3420	1.0013	12.18	25	25	8.25
-9	3.3088	1.4530	12.18	25	25	14.53
-10	(no data given)		12.18	25	25	18.1
-9	6.1565	2.6310	12.4626	25	25	19.0
-6.5	6.6565	2.8446	12.4626	25	25	20.23
-2.5	7.2679	3.1059	12.4626	25	25	21.68
-2	6.1219	2.6074	9.9422	20	25	22.57
4.5	7.1316	3.1039	9.9422	20	25	25.36
10.5	7.8846	3.3694	9.9422	20	25	27.32
9	8.0187	3.4293	9.9422	20	25	27.66
17	9.0374	3.8625	9.9422	20	25	30.11
2	----	----	22.4178	15	45	-----
-2	1	0.4274	22.4178	15	45	3.67
-5	2	0.8548	22.4178	15	45	7.09
-8	3	1.2822	22.4178	15	45	10.27
-11	4	1.7096	22.4178	15	45	13.24
-13	4.5	1.9233	22.4178	15	45	14.65
6	5	2.1370	22.4178	15	45	16.02
10	5.5	2.3507	22.4178	15	45	17.34

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AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

A visual polythermic method was used in the temperature range of -20 to +20°C. The disappearance of the last crystal was observed. The mixtures were prepared by weight and heated, while being stirred, at a rate of 0.5 deg/min. The analyses have been described elsewhere (1).

SOURCE AND PURITY OF MATERIALS:

Chemically pure salts were recrystallized, washed with ethanol, and dried below 60°C.

ESTIMATED ERROR:

The precision of the weighing was 0.005 g. No other information is given.

REFERENCES:

1. Vinnik, M.M.; Erbanova, L.N., et al. *Metody Analiza Fosfatnogo Syrja*, Moscow, 1975, p. 215.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Dipotassium hydrogenphosphate; K_2HPO_4; [7758-11-4] (2) Ammonium dihydrogenphosphate; $NH_4H_2PO_4$; [7722-76-1] (3) Diammonium dydrogenphosphate; $(NH_4)_2HPO_4$; [7783-28-0] (4) Water; H_2O; [7732-18-5]	Torochestnikov, N.S.; Rodionova, T.M.; Korsanova, L.D. *VINITI* 1979, 2909, 17 p.

EXPERIMENTAL VALUES cont'd:

Part 1. Solubility polytherm along the sections of the $NH_4H_2PO_4$-$(NH_4)_2HPO_4$-K_2HPO_4-H_2O system.

composition (g of each component)						mass% ammonium phosphates
t/°C.[a]	$NH_4H_2PO_4$	$(NH_4)_2HPO_4$	$K_2HPO_4 \cdot 2H_2O$[b]	H_2O	A_i[c]	
8	----	----	29.8211	15	50	-----
4	1	0.4274	19.8807	10	50	4.56
2	2	0.8548	29.8211	15	50	6.00
-0.5	3	1.2822	29.8211	15	50	8.72
-3	4	1.7096	29.8211	15	50	11.27
-3.5	4.5	1.9233	29.8211	15	50	12.50
-5	5	2.1370	29.8211	15	50	13.73
7	5.5	2.3507	29.8211	15	50	14.90
13.5	6	2.5644	29.8211	15	50	16.04
13	----	----	27.2952	10	55	-----
10.5	1	0.4274	27.2952	10	55	3.70
9	2	0.8548	27.2952	10	55	7.10
4.5	3	1.2822	27.2952	10	55	10.3
8	3.5	1.4970	27.2952	10	55	11.8
12	4	1.7096	27.2952	10	55	13.3
3	----	----	24.5162	15	46.4	-----
-8.5	4.0533	1.7322	24.5162	15	46.4	12.77
-10	4.6573	1.9903	24.5162	15	46.4	14.4
11.5	5.6232	2.4031	24.5162	15	46.4	16.85
12	----	----	24.3237	10	53	-----
1.7	2.8571	1.2210	24.3237	10	53	10.62
0	3.3453	1.4296	24.3237	10	53	12.21
10	2.4576	1.0503	34.5454	10	58	7.3

[a] The temperature at which the last crystal disappeared.

[b] This is probably a typographical error. The dihydrate is not mentioned anywhere in the text and on the basis of the compiler's recalculation the starting material appears to be the trihydrate.

[c] This is a constant, near to but not identical with the mass% of the binary solution of K_2HPO_4 lying on the section studied.

Part 2. The compiler has recalculated the data in Part 1 assuming that the starting dipotassium hydrogenphosphate is $K_2HPO_4 \cdot 3H_2O$. The recalculated values are given below.

K_2HPO_4		$NH_4H_2PO_4$		$(NH_4)_2HPO_4$		H_2O	
mass%	mol/kg	mass%	mol/kg	mass%	mol/kg	mass%	t/°C.
25.0	1.9	----	----	----	----	75.0	-7
23.7	1.9	3.64	0.4	1.55	0.2	71.1	-6.9
23.3	1.9	4.67	0.6	2.00	0.2	70.0	-7.2
22.9	1.9	5.77	0.7	2.47	0.3	68.8	-7.7
22.2	1.9	7.88	1.0	3.46	0.4	66.5	-9
20.6	2.0	13.3	1.9	5.68	0.7	60.4	-9
20.2	2.0	14.2	2.1	6.05	0.8	59.5	-6.5
19.9	2.0	15.2	2.3	6.49	0.8	58.4	-2.5
19.6	1.9	15.8	2.4	6.74	0.9	57.8	-2
18.9	1.9	17.8	2.8	7.72	1.1	55.6	4.5
18.4	1.9	18.1	3.1	8.17	1.1	54.3	10.5
18.3	1.9	19.4	3.1	8.28	1.2	54.0	9
17.7	1.9	21.1	3.5	9.01	1.3	52.2	17

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COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Dipotassium hydrogenphosphate; K_2HPO_4; [7758-11-4] (2) Ammonium dihydrogenphosphate; $NH_4H_2PO_4$; [7722-76-1] (3) Diammonium hydrogenphosphate; $(NH_4)_2HPO_4$; [7783-28-0] (4) Water; H_2O; [7732-18-5]	Torochestnikov, N.S.; Rodionova, T.M.; Kirsanova, L.D. *VINITI* 1979, 2909, 17 p.

EXPERIMENTAL VALUES cont'd:

Part 2. The compiler has recalculated the data in Part 1 assuming that the starting dipotassium hydrogenphosphate is $K_2HPO_4 \cdot 3H_2O$. The recalculated values are given below.

K_2HPO_4		$NH_4H_2PO_4$		$(NH_4)_2HPO_4$		H_2O	
mass%	mol/kg	mass%	mol/kg	mass%	mol/kg	mass%	t/°C.
45.7	4.8	----	----	----	----	54.3	2
44.0	4.8	2.57	0.4	1.10	0.2	52.3	-2
42.5	4.8	4.96	0.8	2.12	0.3	50.4	-5
41.0	4.8	7.19	1.3	3.07	0.5	48.7	-8
39.7	4.8	9.27	1.7	3.96	0.6	47.1	-11
39.0	4.8	10.3	1.9	4.38	0.7	46.3	-13
38.4	4.8	11.2	2.1	4.79	0.8	45.6	6
37.8	4.8	12.1	2.4	5.19	0.9	44.9	10
50.8	5.9	----	----	----	----	49.2	8
48.5	5.9	3.19	0.6	1.36	0.2	47.0	4
47.7	5.9	4.19	0.8	1.79	0.3	46.3	2
46.3	5.9	6.10	1.2	2.61	0.4	44.9	-0.5
45.0	5.9	7.91	1.6	3.38	0.6	43.7	-3
44.4	5.9	8.78	1.8	3.75	0.7	43.1	-3.5
43.8	5.9	9.62	2.0	4.11	0.7	42.5	-5
43.2	5.9	10.4	2.2	4.46	0.8	41.9	7
42.6	5.9	11.2	2.4	4.80	0.9	41.3	13.5
55.8	7.3	----	----	----	----	44.2	13
53.8	7.3	2.58	0.5	1.10	0.2	42.5	10.5
51.9	7.3	4.98	1.1	2.12	0.4	41.0	9
50.1	7.3	7.21	1.6	3.08	0.6	39.6	4.5
49.2	7.3	8.27	1.8	3.53	0.7	38.9	8
48.4	7.3	9.30	2.1	3.97	0.8	38.3	12
47.3	5.2	----	----	----	----	52.7	3
41.3	5.2	8.94	1.7	3.82	0.6	45.9	-8.5
40.5	5.2	10.1	1.9	4.31	0.7	45.1	-10
39.3	5.2	11.8	2.3	5.05	0.9	43.8	11.5
54.1	6.8	----	----	----	----	45.9	12
48.3	6.8	7.44	1.6	3.17	0.6	41.0	1.7
47.5	6.8	8.55	1.8	3.65	0.7	40.3	0
54.9	8.3	5.11	1.2	2.18	0.4	37.8	10

Part 3. Graphically derived solubility isotherms in the $NH_4H_2PO_4$-$(NH_4)_2HPO_4$-K_2HPO_4-H_2O system.

authors' data[a]		compiler's recalculations						
K_2HPO_4	ammonium phosphates	K_2HPO_4		$NH_4H_2PO_4$		$(NH_4)_2HPO_4$		H_2O
mass%	mass%	mass%	mol/kg	mass%	mol/kg	mass%	mol/kg	mass%
		temp. = -10°C.						
0	21	0	0	14.7	1.6	6.28	0.6	79.0
45	12.25	39.5	4.7	8.58	1.5	3.66	0.6	48.3
46.4	14.4	39.7	5.0	10.1	1.9	4.31	0.7	45.9
45	14.85	38.3	4.7	10.4	1.9	4.44	0.7	46.9
25	18.3	20.4	1.9	12.8	1.8	5.47	0.7	62.3
36.5	0	36.5	3.3	0	0	0	0	63.5

(continued next page)

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Dipotassium hydrogenphosphate: K_2HPO_4; [7758-11-4] (2) Ammonium dihydrogenphosphate; $NH_4H_2PO_4$; [7722-76-1] (3) Diammonium hydrogenphosphate; $(NH_4)_2HPO_4$; [7783-28-0] (4) Water; H_2O; [7732-18-5]	Torochestnikov, N.S.; Rodionova, T.M.; Kirsanova, L.D. *VINITI* 1979, 2909, 17 p.

EXPERIMENTAL VALUES cont'd:

Part 3. Graphically derived solubility isotherms in the $NH_4H_2PO_4$-$(NH_4)_2HPO_4$-K_2HPO_4-H_2O system.

authors' data[a]		compiler's recalculations						
K_2HPO_4	ammonium phosphates	K_2HPO_4		$NH_4H_2PO_4$		$(NH_4)_2HPO_4$		H_2O
mass%	mass%	mass%	mol/kg	mass%	mol/kg	mass%	mol/kg	mass%
			temp. = -5°C.					
0	24.4	0	0	17.1	2.0	7.30	0.7	75.6
45	7.1	41.8	4.7	4.97	0.8	2.12	0.3	51.1
46.4	8.85	42.3	5.0	6.20	1.1	2.64	0.4	48.9
50.0	13.7	43.1	5.7	9.59	1.9	4.10	0.7	43.2
45.0	15.2	38.2	4.7	10.6	2.0	4.55	0.7	46.6
25.0	20.9	19.8	1.9	14.6	2.1	6.25	0.8	59.4
39.75	0	39.75	3.8	0	0	0	0	60.25
			temp. = 0°C.					
0	26.9	0	0	18.8	2.2	8.05	0.8	73.1
45.0	1.85	44.2	4.7	1.29	0.2	0.55	0.07	54.0
46.4	3.3	44.9	5.0	2.31	0.4	0.98	0.1	51.8
50.0	8.55	45.7	5.7	5.99	1.1	2.55	0.4	45.8
53.0	12.25	46.5	6.5	8.58	1.8	3.66	0.7	40.2
50.0	14.2	42.9	5.7	9.94	2.0	4.25	0.8	43.0
45.0	15.5	38.0	4.7	10.9	2.0	4.64	0.8	45.5
25.0	23.3	19.2	1.9	16.3	2.5	6.97	0.9	57.5
43.2	0	43.2	4.4	0	0	0	0	56.8
			temp. = 10°C.					
0	31.65	0	0	22.2	2.8	9.47	1.0	68.35
53.0	2.05	51.9	6.5	1.43	0.3	0.61	0.1	38.1
55.0	4.4	52.6	7.0	3.08	0.6	1.31	0.2	43.0
58.0	7.3	53.8	7.9	5.11	1.1	2.18	0.4	38.9
55.0	12.5	48.1	7.0	8.75	1.9	3.74	0.7	39.4
50.0	15.4	42.3	5.7	10.8	2.2	4.61	0.8	42.3
45.0	17.35	37.2	4.7	12.2	2.3	5.2	0.9	45.4
25.0	27.4	18.2	1.9	19.2	3.1	8.2	1.1	58.4
52.0	0	52.0	6.2	0	0	0	0	48.0

The authors state that the equilibrium solid phases are $NH_4H_2PO_4$, KH_2PO_4 and an unspecified double salt. There is no mention of the degree of hydration.

[a] Concerning the mass% of K_2HPO_4, see footnote *b* under Part 1.

Part 4. Solubility in the $NH_4H_2PO_4$-$(NH_4)_2HPO_4$-K_2HPO_4-H_2O system at 0°C.

	$NH_4H_2PO_4$		$(NH_4)_2HPO_4$		K_2HPO_4		H_2O
Nr	mass%	mol/kg[a]	mass%	mol/kg[a]	mass%	mol/kg[a]	mass%
1	20.0	3.57	31.4	4.89	----	----	48.6
2	23.2	4.18	25.0	3.92	3.6	0.42	48.2
3	10.7	2.13	10.4	1.81	35.4	4.67	43.6
4	7.5	1.68	7.2	1.40	46.5	6.88	32.9
5	6.8	1.53	7.6	1.49	47.0	6.99	38.6
6	15.6	2.82	23.6	3.72	12.8	1.53	48.0
7	2.8	0.64	2.15	0.43	57.3	8.71	37.7

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