

COMPONENTS: (1) Lithium phosphate; $\text{Li}_3\text{PO}_4$ ; [10377-52-3] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]		ORIGINAL MEASUREMENTS: Rosenheim, A.; Reglin, W. <i>Z. Anorg. Chem.</i> <u>1921</u> , 120, 103-19.																				
VARIABLES: One temperature: 25°C		PREPARED BY: J. Eysseltová and M. Salomon																				
EXPERIMENTAL VALUES:																						
<p>The electrolytic conductances of satd <math>\text{Li}_3\text{PO}_4</math> slns at 25°C were reported</p> <table> <thead> <tr> <th>experiment No.</th> <th><math>10^4 \kappa_{\text{sln}} / \text{S cm}^{-1}</math></th> <th>experiment No.</th> <th><math>10^4 \kappa_{\text{sln}} / \text{S cm}^{-1}</math></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>20.1</td> <td>5</td> <td>9.43</td> </tr> <tr> <td>2</td> <td>11.5</td> <td>6</td> <td>9.24</td> </tr> <tr> <td>3</td> <td>10.8</td> <td>7</td> <td>9.24</td> </tr> <tr> <td>4</td> <td>9.51</td> <td>8</td> <td>9.25</td> </tr> </tbody> </table>			experiment No.	$10^4 \kappa_{\text{sln}} / \text{S cm}^{-1}$	experiment No.	$10^4 \kappa_{\text{sln}} / \text{S cm}^{-1}$	1	20.1	5	9.43	2	11.5	6	9.24	3	10.8	7	9.24	4	9.51	8	9.25
experiment No.	$10^4 \kappa_{\text{sln}} / \text{S cm}^{-1}$	experiment No.	$10^4 \kappa_{\text{sln}} / \text{S cm}^{-1}$																			
1	20.1	5	9.43																			
2	11.5	6	9.24																			
3	10.8	7	9.24																			
4	9.51	8	9.25																			
<p>The high <math>\kappa_{\text{sln}}</math> values for expts 1-3 were attributed to impurities and neglected. Based on the data from expts 4-8, the authors reported an ave <math>\kappa_{\text{sln}} = 9.40 \times 10^{-4} \text{ S cm}^{-1}</math> and <math>\kappa_{\text{salt}} = \kappa_{\text{sln}} - \kappa_{\text{H}_2\text{O}} = 9.37 \times 10^{-4} \text{ S cm}^{-1}</math>. The soly of <math>\text{Li}_3\text{PO}_4</math> was calcd from</p> $\text{soly} = \frac{1000 \kappa_{\text{salt}}}{3(\lambda_{\text{Li}}^\infty + \lambda_{\text{PO}_4^\infty})} = (7.688/3) \times 10^{-3} \text{ mol dm}^{-3} = 2.563 \times 10^{-3} \text{ mol dm}^{-3}$ <p><math>\lambda^\infty(\text{Li}^+) = 39.7 \text{ S cm}^2 \text{ mol}^{-1}</math> and was taken from Kohlraush and Holborn (1). <math>\lambda^\infty(\text{PO}_4^{3-}) = 82.3 \text{ S cm}^2 \text{ mol}^{-1}</math> was estimated by Böttger (2): both values correspond to 25°C. In the original calculation, the authors neglected to multiply <math>\kappa_{\text{salt}}</math> by 1000, and hence report a solubility too low by this factor. The author's calcns are also subject to rounding off errors amounting to an error of around +1% in the final value for the soly. Additional errors involve the uncertainties in the <math>\lambda^\infty</math> values. Although these errors are significant, they are relatively minor to the error involved in neglecting the hydrolysis of the <math>\text{PO}_4^{3-}</math> ion. The effect of hydrolysis on the calcn of the soly from conductivity data is discussed in detail in the critical evaluation.</p>																						
AUXILIARY INFORMATION																						
METHOD/APPARATUS/PROCEDURE:	<p><math>\text{Li}_3\text{PO}_4 \cdot 2\text{H}_2\text{O}</math> was pptd from aq <math>\text{H}_3\text{PO}_4</math> with excess <math>\text{LiOH}</math>. The dihydrate was washed, air dried at about 16°C and analysed with the following results: Li 13.50, 13.66 mass% found (16.67% calcd); <math>\text{PO}_4</math> 62.53, 62.46 mass% found (62.58% calcd); <math>\text{H}_2\text{O}</math> 23.90, 23.78% found (23.72% calcd). Drying at 60°C for several days gave the hemihydrate which analysed as <math>\text{Li}_3\text{PO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}</math>. Presumably conductivity water was used for prep of slns and washing of ppts. The compilers assume that <math>\text{Li}_3\text{PO}_4 \cdot 2\text{H}_2\text{O}</math> was used as the starting material for all experiments.</p> <p>ESTIMATED ERROR: Nothing specified. The compilers assume the experimental precision to be around <math>\pm 1 \times 10^{-6} \text{ S cm}^{-1}</math>. The std dev in <math>\kappa_{\text{salt}}</math> is <math>4.2 \times 10^{-6} \text{ S cm}^{-1}</math>.</p> <p>REFERENCES:</p> <ol style="list-style-type: none"> <li>Kohlrausch, F.; Holborn, O. <i>Das Leitvermögen der Elektrolyte</i>. II Auflage, <u>1916</u>, Tab. 8a.</li> <li>Böttger, W. <i>Z. Phys. Chem.</i> <u>1903</u>, 46, 596.</li> </ol>																					

$$\kappa_{\text{salt}} = \kappa_{\text{sln}} - \kappa_{\text{H}_2\text{O}} = 9.30 \times 10^{-4} \text{ S cm}^{-1}$$

<b>COMPONENTS:</b> (1) Sodium dihydrogenphosphate; $\text{NaH}_2\text{PO}_4$ ; [7558-80-7] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Apfel, O. Dissertation, Technical University, Darmstadt, 1911.
<b>VARIABLES:</b> Composition and temperature.	<b>PREPARED BY:</b> J. Eyseltová

**EXPERIMENTAL VALUES:**Composition of saturated solutions in the  $\text{NaH}_2\text{PO}_4\text{-H}_2\text{O}$  system.

$t/\text{°C}$	$\text{PO}_4^{3-}$	$\text{Na}^+$	$\text{NaH}_2\text{PO}_4$	<sup>b</sup>	solid phase
	c <sup>a</sup>	c <sup>a</sup>	mass%		
0	3.01		36.13	4.71	
0		2.84	34.08	4.31	
25	4.08		48.97	8.00	$\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$
35.5	4.47		53.65	9.64	"
40	4.70		56.41	10.78	"
44 <sup>c</sup>	4.83		57.97	11.49	"
44	5.06		60.73	12.89	$\text{NaH}_2\text{PO}_4 \cdot \text{H}_2\text{O}$
50	5.15		61.81	13.48	$\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$
50		5.26	63.13	14.27	
55	5.32		63.85	14.72	$\text{NaH}_2\text{PO}_4 \cdot \text{H}_2\text{O}$
58	5.46		65.53	15.84	
61	5.48		65.77	16.01	$\text{NaH}_2\text{PO}_4$
65	5.49		65.89	16.10	"
70	5.52		66.25	16.36	"
75	5.60		67.21	17.08	"
83	5.76		69.13	18.66	"

<sup>a</sup> These concentrations are expressed as mol/1000 g soln.<sup>b</sup>

These values were calculated by the compiler.

<sup>c</sup>

This was a metastable equilibrium.

**AUXILIARY INFORMATION**

<b>METHOD/APPARATUS/PROCEDURE:</b> All the experiments were performed in a water thermostat. Equilibrium was ascertained by repeated analysis of the liquid phase, which was separated from the solid phase by filtration through a mat of platinum wires. Phosphate was determined gravimetrically as $\text{Mg}_2\text{P}_2\text{O}_7$ . Sodium was determined as $\text{Na}_2\text{SO}_4$ after phosphoric acid had been removed as lead phosphate.	<b>SOURCE AND PURITY OF MATERIALS:</b> No information is given.
	<b>ESTIMATED ERROR:</b> No information is given.
	<b>REFERENCES:</b>

<b>COMPONENTS:</b> (1) Disodium hydrogenphosphate; $\text{Na}_2\text{HPO}_4$ ; [7558-79-4] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Shiomii, Ts. Mem. Col. Sci. Emp. (Kyoto) 1908, 1, 406-13.
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<b>VARIABLES:</b> Composition and temperature.	<b>PREPARED BY:</b> J. Eysseltová
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EXPERIMENTAL VALUES: Solubility of $\text{Na}_2\text{HPO}_4$ in water.									
$t/^\circ\text{C}$	concn <sup>a</sup>	mean	mass% <sup>b</sup>	mol/kg <sup>b</sup>	$t/^\circ\text{C}$	concn <sup>a</sup>	mean	mass% <sup>b</sup>	mol/kg <sup>b</sup>
0.65	1.74		1.71	0.12	30.21	20.80		17.22	1.46
0.65	1.74	1.74	1.71	0.12	30.21	20.76	20.81	17.19	1.46
0.65	1.74		1.71	0.12	30.21	20.88		17.27	1.47
10.26	3.55		3.43	0.25	30.26	21.60		17.76	1.52
10.26	3.54	3.55	3.42	0.25	30.26	21.62		17.78	1.52
10.36	3.58		3.46	0.25	30.26	21.56		17.74	1.52
10.36	3.59		3.46	0.25	30.26	21.55		17.73	1.52
10.36	3.58	3.58	3.46	0.25	30.26	21.56	21.59	17.74	1.52
10.36	3.58		3.46	0.25	30.26	21.61		17.77	1.52
15.11	5.23		4.97	0.37	30.26	21.60		17.76	1.52
15.11	5.22	5.23	4.96	0.37	30.26	21.59		17.76	1.52
20.24	7.88		7.30	0.55	30.26	21.59		17.76	1.52
20.24	7.90	7.89	7.32	0.56	30.76	23.42		18.98	1.65
20.24	7.89		7.31	0.56	30.76	23.40	23.41	18.96	1.65
20.24	7.89		7.31	0.56	30.76	23.41		18.97	1.65
25.15	12.03		10.74	0.85	33.04	30.88		23.59	2.17
25.15	12.01	12.02	10.72	0.84	33.04	30.88	30.88	23.59	2.17
25.15	12.01		10.72	0.84	33.14	31.39		23.89	2.21
25.40	12.32		10.97	0.87	33.14	31.37	31.38	23.88	2.21
25.40	12.34	12.32	10.98	0.87	36.27	45.36		31.20	3.19
25.40	12.31		10.96	0.86	36.27	45.35		31.20	3.19
25.50	12.42		11.05	0.87	36.27	45.34		31.20	3.19
25.50	12.41	12.43	11.04	0.87	36.27	45.38		31.21	3.19
25.50	12.47		11.09	0.88	36.27	45.39	45.37	31.22	3.19

(continued next page)

AUXILIARY INFORMATION									
METHOD/APPARATUS/PROCEDURE:					SOURCE AND PURITY OF MATERIALS:				
The isothermal method was used. Equilibrium was approached from both supersaturation and undersaturation. Samples of saturated solution were weighed, evaporated to dryness and heated strongly to form the pyrophosphate. The solubility was calculated from the weight of the pyrophosphate formed.					The $\text{Na}_2\text{HPO}_4$ was recrystallized twice.				
ESTIMATED ERROR:									
					The temperature was kept constant within 0.1 K (0.6 K above 90°).				
REFERENCES:									

## Disodium Hydrogenphosphate

## COMPONENTS:

(1) Disodium hydrogenphosphate;  $\text{Na}_2\text{HPO}_4$ ; [7558-79-4]  
 (2) Water;  $\text{H}_2\text{O}$ ; [7732-18-5]

## ORIGINAL MEASUREMENTS:

Shiomii, Ts.

Mem. Col. Sci. Emp. (Kyoto) 1908, 1, 406-13.

## EXPERIMENTAL VALUES cont'd:

Solubility of  $\text{Na}_2\text{HPO}_4$  in water.

$t/^\circ\text{C}$	concn <sup>a</sup>	mean	mass% <sup>b</sup>	mol/kg <sup>b</sup>	$t/^\circ\text{C}$	concn <sup>a</sup>	mean	mass% <sup>b</sup>	mol/kg <sup>b</sup>
36.27	45.36		31.20	3.19	55.17	81.37		44.86	5.72
36.27	45.41		31.23	3.19	55.17	81.43	81.40	44.88	5.73
36.27	45.36		31.20	3.19	55.27	81.61		44.94	5.74
36.27	45.35		31.20	3.19	55.27	81.66	81.64	44.95	5.74
37.27	47.56		32.23	3.34	60.23	83.01		45.36	5.84
37.27	47.48		32.19	3.34	60.23	83.02	83.00	45.36	5.84
37.27	47.46		32.18	3.34	60.23	82.98		45.35	5.84
37.27	47.53	47.52	32.22	3.34	70.26	88.10		46.84	6.20
37.27	47.56		32.23	3.34	70.26	88.17	88.11	46.86	6.20
37.27	47.48		32.19	3.34	70.26	88.07		46.83	6.20
37.27	47.49		32.20	3.34	80.39	94.74		48.65	6.66
37.27	47.56		32.23	3.34	80.39	94.83	94.78	48.67	6.67
40.29	54.95		35.46	3.86	80.39	94.76		48.65	6.67
40.29	54.86		35.42	3.86	89.74	102.85		50.70	7.23
40.29	54.95		35.46	3.86	89.74	102.89	102.87	50.71	7.24
40.29	54.83	54.88	35.41	3.86	94.75	107.31		51.76	7.55
40.29	54.85		35.42	3.86	94.75	107.37	107.34	51.78	7.55
40.29	54.88		35.43	3.86	94.75	107.34		51.77	7.55
45.14	68.67		40.71	4.83	95.86	107.08		51.71	7.53
45.14	68.68	68.64	40.72	4.83	95.86	107.09	107.09	51.71	7.53
45.14	68.61		40.69	4.83	96.86	104.94		51.20	7.38
45.14	68.58		40.68	4.82	96.86	105.01	104.98	51.22	7.39
47.23	76.60		43.37	5.39	99.57	101.25		50.31	7.12
47.23	76.55	76.58	43.36	5.38	99.57	101.22	101.21	50.30	7.12
48.23	80.03	80.03	44.45	5.63	99.57	101.16		50.29	7.12
48.33	80.12		44.48	5.64	99.77	102.12		50.52	7.18
48.33	80.17	80.15	44.50	5.64	99.77	102.16	102.15	50.53	7.18
50.22	80.40		44.57	5.66	99.77	102.16		50.53	7.18
50.22	80.34	80.35	44.55	5.65					
50.22	80.32		44.54	5.65					
50.22	80.36		44.56	5.65					

<sup>a</sup>The concentration units are: g/100 g  $\text{H}_2\text{O}$ .<sup>b</sup>These values were calculated by the compiler.

<b>COMPONENTS:</b> (1) Disodium hydrogenphosphate; $\text{Na}_2\text{HPO}_4$ ; [7558-79-4] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]		<b>ORIGINAL MEASUREMENTS:</b> Hammick, D.L.; Goadby, H.K.; Booth, H. <i>J. Chem. Soc.</i> 1920, 67, 1589-92.		
<b>VARIABLES:</b> Composition and temperature.		<b>PREPARED BY:</b> J. Eyseltová		
<b>EXPERIMENTAL VALUES:</b>				
Solubility of $\text{Na}_2\text{HPO}_4$ in water.				
<i>t</i> /°C	concn $\text{Na}_2\text{HPO}_4$ g/100 g $\text{H}_2\text{O}$	mass% <sup>a</sup>	mol/kg <sup>a</sup>	$\text{H}_2\text{O}$ mass% <sup>a</sup>
-0.47	1.45	1.43	0.10	98.57
6.00	2.73	2.66	0.19	97.34
19.95	7.26	6.77	0.51	93.23
22.77	8.93	8.20	0.63	91.80
24.15	9.53	8.70	0.67	91.30
25.75	10.90	9.83	0.77	90.17
27.80	14.16	12.40	1.00	87.60
28.65	15.87	13.70	1.12	86.30
29.05	16.04	13.82	1.13	86.18
29.50	17.18	14.66	1.21	85.34
30.10	19.45	16.28	1.37	83.72
30.90	20.08	16.72	1.41	83.28
32.50	22.57	18.41	1.59	81.57
33.70	24.63	19.76	1.73	80.24
34.70	29.75	22.93	2.09	77.07
36.50	31.15	23.75	2.19	76.25
40.02	35.56	26.23	2.50	73.76
<sup>a</sup> These values were calculated by the compiler.				
AUXILIARY INFORMATION				
<b>METHOD/APPARATUS/PROCEDURE:</b> Saturated solutions were prepared by stirring the solid phase with distilled water in an electrically heated thermostat. The saturated solution was siphoned through a glass-wool filter into a weighed bottle. The composition was determined by converting the dissolved phosphate to $\text{Mg}_2\text{P}_2\text{O}_7$ .	<b>SOURCE AND PURITY OF MATERIALS:</b> Arsenic-free $\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$ was recrystallized and used to prepare the other hydrates. The dihydrate was prepared by boiling finely divided dodecahydrate with ethyl alcohol. The heptahydrate was prepared by fusing together an appropriate mixture of the dihydrate and dodecahydrate and cooling.			
<b>ESTIMATED ERROR:</b>				
No information is given.				
<b>REFERENCES:</b>				

## Disodium Hydrogenphosphate

<b>COMPONENTS:</b> (1) Disodium hydrogenphosphate; $\text{Na}_2\text{HPO}_4$ ; [7558-79-4] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]		<b>ORIGINAL MEASUREMENTS:</b> Menzel, G.; Gabler, C. <i>Z. Anorg. Chem.</i> <u>1928</u> , 177, 187-214.				
<b>VARIABLES:</b> Temperature and composition.		<b>PREPARED BY:</b> J. Eysseltová				
<b>EXPERIMENTAL VALUES:</b>						
Solubility of $\text{Na}_2\text{HPO}_4$ in water. concentration of $\text{Na}_2\text{HPO}_4$						
<i>t</i> /°C	in 1000 ml soln mol	in 1000 g soln gram	in 1000 g of $\text{H}_2\text{O}$ mol	in 1000 g of $\text{H}_2\text{O}$ gram		
0	0.1152	16.37	0.1130	16.05	0.1148	16.31
18	0.4444	63.12	0.4212	59.85	0.4482	63.67
25	0.8399	119.28	0.7625	108.29	0.8551	121.44
	-0.48 <sup>a</sup>			0.109	15.5	
The solid phase was $\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$ [10039-32-4].						
<sup>a</sup> This is the cryohydric point.						
<b>AUXILIARY INFORMATION</b>						
<b>METHOD/APPARATUS/PROCEDURE:</b>  The apparatus is described elsewhere (1). At 0°C, the equilibrium vessel and sampling pipet were thermostated in an ice-water mixture. Equilibrium was checked by repeated analysis. The $\text{Na}_2\text{HPO}_4$ content was determined by titration with 0.1 M HCl using methylorange as indicator (2).			<b>SOURCE AND PURITY OF MATERIALS:</b>  Purest Kahlbaum $\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$ was used.			
			<b>ESTIMATED ERROR:</b>  The temperature was controlled to $\pm 0.1$ K. The accuracy of the cryohydric temperature is $\pm 0.01$ K.			
		<b>REFERENCES:</b>		1. Menzel, H. <i>Z. Anorg. Allg. Chem.</i> <u>1927</u> , 164, 6. 2. Kolthoff, I. <i>Massanalyse, II</i> , p. 139, Berlin, <u>1928</u> .		

<b>COMPONENTS:</b> (1) Trisodium phosphate; $\text{Na}_3\text{PO}_4$ ; [7601-54-9] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Apfel, O.  Dissertation, Technical University, Darmstadt, <u>1911</u> .
<b>VARIABLES:</b> Temperature and Composition	<b>PREPARED BY:</b> J. Eyseltová

**EXPERIMENTAL VALUES:**Composition of saturated solutions of  $\text{Na}_3\text{PO}_4$  in water.

$t/\text{°C}$	$\text{PO}_4^{3-}$	$\text{Na}_3\text{PO}_4$ <sup>a</sup>	solid phase <sup>b</sup>
	mol/kg sln	mass%	
0	0.26	4.27	A
25	0.75	12.31	"
37	0.98	16.08	B
40	1.02	16.74	"
44	1.09	17.89	"
50	1.38	22.65	B + C <sup>c</sup>
55	1.595	26.18	C
65	1.84	30.20	"
70	1.99	32.66	"
75	2.14	35.12	"

<sup>a</sup> These values were calculated by the compiler.<sup>b</sup> The solid phases are: A =  $\text{Na}_3\text{PO}_4 \cdot 12\text{H}_2\text{O}$ ; B =  $\text{Na}_3\text{PO}_4 \cdot 10\text{H}_2\text{O}$ ; C =  $\text{Na}_3\text{PO}_4 \cdot 8\text{H}_2\text{O}$ .<sup>c</sup> The octahydrate is said to exist in the region 50 to 75°C "with great probability".**AUXILIARY INFORMATION**

<b>METHOD/APPARATUS/PROCEDURE:</b>  All the experiments were performed in a water thermostat. The attainment of equilibrium was checked by repeated analysis of the liquid phase. The liquid phase was separated from the solid phase by filtration through a mat of platinum wires. Phosphate was precipitated as $\text{NH}_4\text{MgPO}_4 \cdot 6\text{H}_2\text{O}$ and weighed as $\text{Mg}_2\text{P}_2\text{O}_7$ . Sodium was determined as $\text{Na}_2\text{SO}_4$ after phosphoric acid had been removed as lead phosphate.	<b>SOURCE AND PURITY OF MATERIALS:</b>  Nothing given.
	<b>ESTIMATED ERROR:</b>  Nothing given.
	<b>REFERENCES:</b>

## Trisodium Phosphate

<b>COMPONENTS:</b> (1) Trisodium phosphate; $\text{Na}_3\text{PO}_4$ ; [7601-54-9] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]		<b>ORIGINAL MEASUREMENTS:</b> Schroeder, W.C.; Berk, A.A.; Gabriel, A. <i>J. Am. Chem. Soc.</i> 1937, 59, 1783-90.			
<b>VARIABLES:</b> Temperature and Composition		<b>PREPARED BY:</b> J. Eysseltová			
<b>EXPERIMENTAL VALUES:</b>					
Solubility of $\text{Na}_3\text{PO}_4$ in water at 83 to 350°C.					
<i>t</i> /°C	concen of $\text{Na}_3\text{PO}_4$	g(1)/100 g(2)	mass% <sup>a</sup>	mol/kg <sup>a</sup>	time/h <sup>b</sup>
83	61.1	37.93	3.72	39	
83	62.2	38.35	3.79	39	
101	78.4	43.95	4.78	43	
101	76.8	43.44	4.68	43	
115	88.6	46.98	5.40	48	
115	90.3	47.45	5.50	48	
115	89.8	47.31	5.47	48	
121	93.2	48.24	5.68	86	
129	91.1	47.67	5.55	45	
129	89.3	47.17	5.44	45	
139	88.2	46.85	5.37	39	
139	88.7	47.00	5.40	39	
139	88.8	47.03	5.41	39	
150	83.9	45.62	5.11	16	
150	79.8	44.38	4.86	16	
150	83.1	45.38	5.06	44	
150	78.9	44.10	4.81	44	
150	82.2	45.12	5.01	44	
150	84.1	45.68	5.12	18	
150	78.6	44.01	4.79	18	
159	76.0	43.18	4.63	66	
(continued next page)					
<b>AUXILIARY INFORMATION</b>					
<b>METHOD/APPARATUS/PROCEDURE:</b> Self-constructed high temperature solubility bomb with sampler ensuring the sampling at the operating temperature. The time of equilibration varied from case to case, because of the difficulty in attaining true equilibrium. Phosphate determinations were made by a colorimetric method using aminonaphtholsulfonic acid (1).	<b>SOURCE AND PURITY OF MATERIALS:</b> Merck CP $\text{Na}_3\text{PO}_4 \cdot 12\text{H}_2\text{O}$ was used. The actual phosphate content of this material was determined by analysis but the results are not given. In some cases the dodecahydrate was dried at 120°C to give approximately the monohydrate or it was recrystallized at 250°C to give the anhydrous salt.				
	<b>ESTIMATED ERROR:</b> Phosphate determination: the error not greater than 1%.				
	<b>REFERENCES:</b> 1. Fiske, C.H.; Subbarow, J.T. <i>J. Biol. Chem.</i> 1925, 66, 375.				

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Trisodium phosphate, $\text{Na}_3\text{PO}_4$ ; [7601-54-9]	Schroeder, W.C.; Berk, A.A.; Gabriel, A.
(2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	J. Am. Chem. Soc. <u>1937</u> , 59, 1783-90.

## EXPERIMENTAL VALUES cont'd:

Solubility of  $\text{Na}_3\text{PO}_4$  in water at 83 to 350°C.

$t/^\circ\text{C}$	concn of $\text{Na}_3\text{PO}_4$			time/h <sup>b</sup>
	g(1)/100 g(2)	mass% <sup>a</sup>	mol/kg <sup>a</sup>	
169	71.9	41.83	4.38	47
169	70.2	41.24	4.28	47
185	66.2	39.83	4.03	48
185	65.0	39.39	3.96	48
187	63.1	38.69	3.84	67
187	62.0	38.27	3.78	67
204	62.0	38.27	3.78	71
204	60.8	37.81	3.70	71
214	50.0	33.33	3.05	90
214	50.8	33.69	3.09	90
216	48.8	32.80	2.97	65
216	47.6	32.25	2.90	65
225	25.2	20.13	1.54	15
225	33.7	25.20	2.05	15
225	27.3	21.44	1.66	18
225	27.8	21.75	1.69	18
235	17.9	15.18	1.09	17
250	8.6	7.92	0.52	17
250	8.6	7.92	0.52	17
250	8.5	7.83	0.52	17
300	2.4	2.34	0.15	18
350	0.15	0.15	0.01	19

<sup>a</sup> These values were calculated by the compiler.<sup>b</sup> This is the time allowed for equilibration.

<b>COMPONENTS:</b> (1) Dipotassium hydrogenphosphate; K <sub>2</sub> HPO <sub>4</sub> ; [7758-11-4] (2) Water; H <sub>2</sub> O; [7732-18-5]		<b>ORIGINAL MEASUREMENTS:</b> Marshall, W.L.; Hall, C.E.; Mesmer, R.E. <i>J. Inorg. Nucl. Chem.</i> <u>1981</u> , <b>43</b> , 449-55.
<b>VARIABLES:</b> Temperature and composition.		<b>PREPARED BY:</b> J. Eyseltová
<b>EXPERIMENTAL VALUES:</b>		
Part 1. Smoothed values for the solubility of K <sub>2</sub> HPO <sub>4</sub> in H <sub>2</sub> O.		
<i>t</i> /°C	mass%	<i>mol/kg</i> <sup>a</sup>
100	74.0	16.34
150	75.5	17.69
200	76.5	18.69
250	77.0	19.22
300	77.5 <sup>b</sup>	19.77
350	78.0 <sup>b</sup>	20.35
400	78.5	20.96
<p><sup>a</sup>The mol/kg H<sub>2</sub>O values were calculated by the compiler.</p> <p><sup>b</sup>Based on experiments at temperature and extrapolation from lower temperatures. The accuracy is ± 1.5%.</p>		
(continued next page)		
<b>AUXILIARY INFORMATION</b>		
<b>METHOD/APPARATUS/PROCEDURE:</b> Gold-plated stainless steel high pressure vessels were used. The samples and a small amount of water (to counterbalance the vapor pressure) were rocked at constant high temperature between 100° and 400°C for period of time of 2 to 5 hr. The vanado-molybdate method for quantitative spectrophotometric determination was used. The reagent used was that of Bridger, et al. (1). The procedure was modified slightly.	<b>SOURCE AND PURITY OF MATERIALS:</b> No information is given.	
		<b>ESTIMATED ERROR:</b> The accuracy of the temperature was ± 0.5 to 1 K. The accuracy of the smoothed values was ± 0.5%.
	<b>REFERENCES:</b> 1. Bridger, G.L.; Boylan, D.R.; Markey, J.W. <i>Anal. Chem.</i> <u>1953</u> , <b>25</b> , 336.	

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Dipotassium hydrogenphosphate; K <sub>2</sub> HPO <sub>4</sub> ; [7758-11-4]	Marshall, W.L.; Hall, C.E.; Mesmer, R.E. J. Inorg. Nucl. Chem. 1981, 43, 449-55.
(2) Water; H <sub>2</sub> O; [7732-18-5]	

## EXPERIMENTAL VALUES cont'd:

Part 2. Two liquid phase regions and critical phenomena in the K<sub>2</sub>HPO<sub>4</sub>-H<sub>2</sub>O system at 360-400°C.

K <sub>2</sub> HPO <sub>4</sub> mass%	mol/kg <sup>a</sup>	t <sup>b</sup> /°C	the phase <sup>c</sup> appearing	t <sup>c</sup> /°C	upper temperature reached/°C <sup>d</sup>
4.58	0.28	368.0	L <sub>2</sub>	378.5 <sup>e</sup>	390
10.0	0.64	360.0	L <sub>2</sub>	379.0 <sup>e</sup>	390
20.0	1.43	361.8	L <sub>2</sub>	-----	---
30.0	2.46	360.0	L <sub>2</sub>	377.4 <sup>e</sup>	390
40.0	3.83	361.0	L <sub>2</sub>	377.0 <sup>e</sup>	400
50.0	5.74	366.0	L <sub>1</sub>	g	400
60.0	8.61	>400	- <sub>1</sub>	-	400

<sup>a</sup>The mol/kg H<sub>2</sub>O values were calculated by the compiler.

<sup>b</sup>The temperature of two-liquid phase appearance with rising temperature.

<sup>c</sup>The liquid-vapor critical temperature of very dilute phase.

<sup>d</sup>The concentrated liquid phase was always clear at the highest temperature reached.

<sup>e</sup>L<sub>1</sub> is the more dilute phase; L<sub>2</sub> is the more concentrated phase.

<sup>f</sup>The actual composition of the dilute phase undergoing the critical phenomenon is estimated to be 3 mass%.

<sup>g</sup>Could not detect this.

<b>COMPONENTS:</b> (1) Potassium dihydrogenphosphate; $\text{KH}_2\text{PO}_4$ ; [7778-77-0] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]		<b>ORIGINAL MEASUREMENTS:</b> Apfel, O. Dissertation, Technical University, Darmstadt, 1911.		
<b>VARIABLES:</b> Temperature and composition.		<b>PREPARED BY:</b> J. Eyssel tová		
<b>EXPERIMENTAL VALUES:</b>				
Composition of the saturated liquid phase.				
$t/^\circ\text{C.}$	$\text{PO}_4^{3-}$ concn <sup>b</sup>	$\text{K}^+$ concn <sup>b</sup>	$\text{KH}_2\text{PO}_4$ <sup>a</sup> mass% 20.15 <sup>c</sup> 36.68 36.65 <sup>c</sup>	mol/kg 0.86 1.82 1.85 <sup>c</sup> 3.04 4.26 4.25 <sup>c</sup> 5.19 5.30 <sup>c</sup>
0	0.77	0.77	10.48	0.86
25	1.47	1.48	19.87	1.82
50	2.15	2.15	29.26	3.04
70	2.695	2.693	36.68	4.26
83	3.04	3.08	41.38	5.19
			41.92 <sup>c</sup>	5.30 <sup>c</sup>
<sup>a</sup> These values were calculated by the compiler.				
<sup>b</sup> The concentration unit is: mol/1000 g of solution.				
<sup>c</sup> In these calculations the potassium content was taken as the starting point of the calculation. In the other calculations it was the $\text{PO}_4^{3-}$ content.				
<b>AUXILIARY INFORMATION</b>				
<b>METHOD/APPARATUS/PROCEDURE:</b> All the experiments were carried out in a water thermostat. Equilibrium was checked by repeated analysis. The solid and liquid phases were separated from each other by filtration through a platinum wire mat. The phosphate ion content was determined gravimetrically as $\text{Mg}_2\text{P}_2\text{O}_7$ , and potassium was determined as $\text{KClO}_4$ .	<b>SOURCE AND PURITY OF MATERIALS:</b> No information is given.			
<b>ESTIMATED ERROR:</b>				
No information is given.				
<b>REFERENCES:</b>				

<b>COMPONENTS:</b> (1) Potassium dihydrogenphosphate; $\text{KH}_2\text{PO}_4$ ; [7778-77-0] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]		<b>ORIGINAL MEASUREMENTS:</b> Menzel, H.; Gabler, C. <i>Z. Anorg. Chem.</i> , 1929, 177, 187-214.				
<b>VARIABLES:</b> Temperature and composition.		<b>PREPARED BY:</b> J. Eyssettová				
<b>EXPERIMENTAL VALUES:</b>						
Composition of saturated solutions of $\text{KH}_2\text{PO}_4$ in water.						
<i>t</i> /°C.	in 1000 cm <sup>3</sup> mols	of solution grams	in 1000 g of mols	solution grams	in 1000 g of mols	water grams
0	1.001	136.3	0.917	124.8	1.047	142.6
15	1.359	185.0	1.233	167.8	1.481	201.7
18	1.433	195.2	1.302	177.3	1.583	215.5
25	1.699	231.3	1.474	200.7	1.845	251.2
-2.75 <sup>a</sup>					1.08	147
<sup>a</sup> This is the cryohydric point of the system under consideration. However, the authors are in doubt about the accuracy of their analytical results.						
<b>AUXILIARY INFORMATION</b>						
<b>METHOD/APPARATUS/PROCEDURE:</b>	<b>SOURCE AND PURITY OF MATERIALS:</b>					
The apparatus was that described previously (1). The equilibrium was checked by repeated analysis. The $\text{H}_2\text{PO}_4^-$ ion content was determined gravimetrically as ammonium phosphomolybdate.	Kahlbaum $\text{KH}_2\text{PO}_4$ was used. This material had been prepared for enzyme investigations.					
<b>ESTIMATED ERROR:</b>						
The temperature was controlled to $\pm 0.1$ K. The accuracy of the cryohydric temperature was $\pm 0.01$ K. No other information is given.						
<b>REFERENCES:</b>						
1. Menzel, H. <i>Z. Anorg. Allg. Chem.</i> , 1927, 164, 6.						

<b>COMPONENTS:</b> (1) Potassium dihydrogenphosphate; $\text{KH}_2\text{PO}_4$ ; [7778-77-0] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Krasil'shtschikov, A.I. <i>Izv. In-ta Fiz.-khim. An.</i> <u>1933</u> , 6, 159-68.
<b>VARIABLES:</b> Composition at 0, 25 and 50°C.	<b>PREPARED BY:</b> J. Eysseltová

**EXPERIMENTAL VALUES:**Composition of saturated solutions of  $\text{KH}_2\text{PO}_4$  in water.

<i>t</i> /°C	<i>d</i> g cm <sup>-3</sup>	conc <sup>a</sup>	K <sub>2</sub> O conc <sup>b</sup>	conc <sup>c</sup>	conc <sup>a</sup>	P <sub>2</sub> O <sub>5</sub> conc <sup>b</sup>	conc <sup>c</sup>	H <sub>2</sub> O conc <sup>c</sup>	mass% KH <sub>2</sub> PO <sub>4</sub>	mol/kg <sup>d</sup>
0	1.094	9.44	4.39	39.85	9.44	6.62	60.15	808.2	12.68	1.06
25	1.147	15.9	6.89	39.85	15.9	10.40	60.15	478.5	19.90	1.82
50		25.8	10.09	39.85	25.8	15.22	60.15	295.1	29.15	3.02

<sup>a</sup>The concentration unit is: mol/1000 mol  $\text{H}_2\text{O}$ .<sup>b</sup>The concentration unit is: g/100 g of solution.<sup>c</sup>The concentration unit is: g/100 g of oxides.<sup>d</sup>These values were calculated by the compiler.**AUXILIARY INFORMATION****METHOD/APPARATUS/PROCEDURE:**

The mixtures were allowed to equilibrate for 12-15 hours in a water thermostat. Phosphorus was determined gravimetrically as  $\text{Mg}_2\text{P}_2\text{O}_7$ .

**SOURCE AND PURITY OF MATERIALS:**

Kahlbaum  $\text{KH}_2\text{PO}_4$  was used.

**ESTIMATED ERROR:**

The temperature was controlled to within  $\pm 0.1$  K.

**REFERENCES:**

## Potassium Dihydrogenphosphate

<b>COMPONENTS:</b> (1) Potassium dihydrogenphosphate; $\text{KH}_2\text{PO}_4$ ; [7778-77-0] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]		<b>ORIGINAL MEASUREMENTS:</b> Bergman, A.G.; Bochkarev, N.F. <i>Izv. Akad. Nauk SSSR</i> 1938, 237-65.																																				
<b>VARIABLES:</b> Temperature and composition.		<b>PREPARED BY:</b> J. Eysseltova																																				
<b>EXPERIMENTAL VALUES:</b>																																						
Composition and crystallization temperatures in the aqueous $\text{KH}_2\text{PO}_4$ system.																																						
<table> <thead> <tr> <th><math>\text{KH}_2\text{PO}_4</math> mass%</th> <th><math>\text{mol/kg}^a</math></th> <th><math>t/^\circ\text{C.}</math></th> <th>solid phase</th> </tr> </thead> <tbody> <tr><td>4</td><td>0.30</td><td>-0.7</td><td>ice</td></tr> <tr><td>8</td><td>0.63</td><td>-1.5</td><td>"</td></tr> <tr><td>10</td><td>0.81</td><td>-2.1</td><td>"</td></tr> <tr><td>12</td><td>1.00</td><td>0.8</td><td><math>\text{KH}_2\text{PO}_4</math></td></tr> <tr><td>16</td><td>1.39</td><td>13.6</td><td>"</td></tr> <tr><td>18</td><td>1.61</td><td>19.8</td><td>"</td></tr> <tr><td>20</td><td>1.83</td><td>26.0</td><td>"</td></tr> <tr><td>22</td><td>2.07</td><td>31.8</td><td>"</td></tr> </tbody> </table>			$\text{KH}_2\text{PO}_4$ mass%	$\text{mol/kg}^a$	$t/^\circ\text{C.}$	solid phase	4	0.30	-0.7	ice	8	0.63	-1.5	"	10	0.81	-2.1	"	12	1.00	0.8	$\text{KH}_2\text{PO}_4$	16	1.39	13.6	"	18	1.61	19.8	"	20	1.83	26.0	"	22	2.07	31.8	"
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<b>METHOD/APPARATUS/PROCEDURE:</b>  No details are given except that a visual polythermic method was used.	<b>SOURCE AND PURITY OF MATERIALS:</b>  Chemically pure $\text{KH}_2\text{PO}_4$ was recrystallized twice before being used.																																					
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<b>VARIABLES:</b> Temperature and composition.	<b>PREPARED BY:</b> J. Eysseltova

**EXPERIMENTAL VALUES:**  
 Composition of saturated solutions of  $\text{KH}_2\text{PO}_4$  in water.

$t/\text{^{\circ}C.}$	mass% $\text{KH}_2\text{PO}_4$		
	calcd. <sup>a</sup>	exptl	mol/kg $\text{KH}_2\text{PO}_4$ <sup>b</sup>
0	12.79	12.88	1.086
5	14.05	14.00	1.196
10	15.46	15.50	1.347
15	16.93	16.87	1.491
20	18.46	18.45	1.662
25	20.09	20.04	1.841
30	21.77	21.90	2.060
35	23.51	23.65	2.275
40	25.31	25.10	2.462
45	27.17	26.90	2.703
50	29.07	29.00	3.001
60	33.01	33.40	3.684
70	37.10	37.05	4.324
80	41.29	41.30	5.169
90	45.53	45.5	6.134

<sup>a</sup>These values were calculated from the empirical formula:

$$a = 12.79 + 0.250 t + 0.00182 t^2 - 0.00000616 t^3$$

where a is given as g  $\text{KH}_2\text{PO}_4$ /100 g soln, and t = temperature.

<sup>b</sup>These values were calculated by the compiler from the experimental results reported by the author.

#### AUXILIARY INFORMATION

<b>METHOD/APPARATUS/PROCEDURE:</b> A small amount of solid salt was added to 10-15 ml of a solution saturated at a higher temperature. The mixtures were equilibrated in a thermostat. Equilibration times were 3 hours for temperatures above 30°C, and 6 hours for temperatures lower than 30°C. After equilibration, samples of the solution were analyzed for $\text{KH}_2\text{PO}_4$ by drying at 110°C and weighing.	<b>SOURCE AND PURITY OF MATERIALS:</b> $\text{KH}_2\text{PO}_4$ was synthesized from $\text{K}_2\text{CO}_3$ and $\text{H}_3\text{PO}_4$ and recrystallized. Its purity was said to be equivalent to "chemically pure".
	<b>ESTIMATED ERROR:</b> The temperature had a precision of $\pm 0.05^\circ\text{C}$ . No other details are given.
	<b>REFERENCES:</b>

<b>COMPONENTS:</b> (1) Potassium dihydrogenphosphate; $\text{KH}_2\text{PO}_4$ ; [7778-77-0] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]		<b>ORIGINAL MEASUREMENTS:</b> Bel'tschev, F.V. <i>Trudy Beloruss. S.-Kh. Akad.</i> <u>1953</u> , 19, 145-9.																																																								
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<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;"><math>\text{KH}_2\text{PO}_4</math></th> <th style="text-align: center;">mass%</th> <th style="text-align: center;">mol/kg<sup>a</sup></th> <th style="text-align: center;"><math>t/^\circ\text{C}.</math></th> <th style="text-align: center;">solid phase</th> </tr> </thead> <tbody> <tr> <td></td><td></td><td></td><td></td><td></td></tr> <tr> <td></td><td>4</td><td>0.30</td><td>-0.8</td><td>ice</td></tr> <tr> <td></td><td>8</td><td>0.63</td><td>-1.6</td><td>"</td></tr> <tr> <td></td><td>10</td><td>0.81</td><td>-2.0</td><td>"</td></tr> <tr> <td></td><td>12</td><td>1.00</td><td>-0.2</td><td>"</td></tr> <tr> <td></td><td>14</td><td>1.19</td><td>-7.8</td><td>"</td></tr> <tr> <td></td><td>16</td><td>1.39</td><td>+14.1</td><td><math>\text{KH}_2\text{PO}_4</math></td></tr> <tr> <td></td><td>18</td><td>1.61</td><td>+20.6</td><td>"</td></tr> <tr> <td></td><td>20</td><td>1.83</td><td>+26.7</td><td>"</td></tr> <tr> <td></td><td>22</td><td>2.07</td><td>+32.2</td><td>"</td></tr> </tbody> </table>				$\text{KH}_2\text{PO}_4$	mass%	mol/kg <sup>a</sup>	$t/^\circ\text{C}.$	solid phase							4	0.30	-0.8	ice		8	0.63	-1.6	"		10	0.81	-2.0	"		12	1.00	-0.2	"		14	1.19	-7.8	"		16	1.39	+14.1	$\text{KH}_2\text{PO}_4$		18	1.61	+20.6	"		20	1.83	+26.7	"		22	2.07	+32.2	"
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<b>METHOD/APPARATUS/PROCEDURE:</b> A visual polythermic method (1) was used.. No other details are given.		<b>SOURCE AND PURITY OF MATERIALS:</b> Chemically pure $\text{KH}_2\text{PO}_4$ was recrystallized twice before use.																																																								
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<b>COMPONENTS:</b> (1) Potassium dihydrogenphosphate; $\text{KH}_2\text{PO}_4$ ; [7778-77-0] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Punin, Yu.O.; Mirenkova, T.F.; Artamanova, O.I.; Ul'yanova, T.P. <i>Zh. Neorg. Khim.</i> <u>1975</u> , 20, 2813-5.
<b>VARIABLES:</b> Temperature and composition.	<b>PREPARED BY:</b> J. Eyseltová
<b>EXPERIMENTAL VALUES:</b>	
<p>Parameters <math>a_1</math> of the equation</p> $c_t = a_0 + a_1 t + a_2 t^2 + \dots + a_5 t^5$ $a_0 = 14.958$ $a_1 = 2.881 \times 10^{-1}$ $a_2 = 4.914 \times 10^{-3}$ $a_3 = 1.826 \times 10^{-5}$ $a_4 = 2.311 \times 10^{-7}$ $a_5 = 0$	
$c_t$ = concentration of the saturated solution as g/100 g $\text{H}_2\text{O}$ at the temperature, $t^\circ\text{C}$ .	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD/APPARATUS/PROCEDURE:</b> Mixtures of $\text{KH}_2\text{PO}_4$ and water were prepared by precise weighing. The saturation temperatures were measured by an apparatus constructed for the purpose of measuring the rate of crystal growth (1).	<b>SOURCE AND PURITY OF MATERIALS:</b> A special purity grade of $\text{KH}_2\text{PO}_4$ was used.
	<b>ESTIMATED ERROR:</b> No information is given.
	<b>REFERENCES:</b> <ol style="list-style-type: none"> <li>Petrov, T.G.; Trejbis, E.B.; Kosatkin, A.P. "Vyrashchivanie kristallov iz rasvorov", Nedra, Leningrad, <u>1967</u>.</li> </ol>

<b>COMPONENTS:</b>				<b>ORIGINAL MEASUREMENTS:</b>			
(1) Dipotassium hydrogenphosphate; $K_2HPO_4$ ; [7758-11-4]				Ravich, M.I. Izv. AN SSSR, Ser. Khim. 1938, 141-6.			
(2) Water; $H_2O$ ; [7732-18-5]							
<b>VARIABLES:</b> Temperature and composition.				<b>PREPARED BY:</b> J. Eyssettova			

**EXPERIMENTAL VALUES:**

Composition and crystallization temperatures of saturated solutions  
in the  $K_2HPO_4 - H_2O$  system.

$t/^\circ C.$	$K_2HPO_4$			solid phase	$t/^\circ C.$	$K_2HPO_4$			solid phase
	mass%	mol%	mol/kg <sup>a</sup>			mass%	mol%	mol/kg <sup>a</sup>	
-4.2	16.78	2.04	1.16	ice	8.2	69.09	18.75	12.83	A <sup>c</sup>
-6.4	23.60	3.09	1.77	"	0	57.05	12.01	7.62	B
-9	29.61	4.17	2.41	"	10.0	59.08	12.96	8.28	"
-11.7	34.10	5.07	2.97	"	15.0	60.16	13.49	8.66	B
-13.5	36.78	5.67	3.33	ice + A	20.0	61.52	14.16	9.17	"
0	46.11	8.12	4.91	A	25.0	62.74	14.83	9.66	"
4.95	50.12	9.40	5.76	"	30.0	64.13	15.60	10.26	"
9.7	54.43	10.99	6.85	"	35	65.68	16.51	10.98	"
13.15	57.89	12.44	7.89	"	39.5	67.54	17.68	11.94	"
14.3	-----	-----	-----	A + B	44	69.83	19.29	13.28	"
14.6	60.82	13.82	8.91	A <sup>c</sup>	46	71.26	20.42	14.23	"
14.85	71.73	14.29	9.26	"	51	72.64	21.55	15.24	C
14.7	62.96	14.94	9.75	"	56	72.50	21.38	15.13	"
12.8	65.95	16.68	11.11	"	63	72.79	21.66	15.35	"

<sup>a</sup>The mol/kg  $H_2O$  values were calculated by the compiler.

<sup>b</sup>The solid phases are: A =  $K_2HPO_4 \cdot 6H_2O$ ; B =  $K_2HPO_4 \cdot 3H_2O$ ; C =  $KH_2PO_4$ .

<sup>c</sup>This is a metastable solution.

**AUXILIARY INFORMATION**

<b>METHOD/APPARATUS/PROCEDURE:</b>	<b>SOURCE AND PURITY OF MATERIALS:</b>	
For the systems in which the trihydrate or the anhydrous salt was the solid phase, the solubility was determined by evaporating the solution to dryness. Where the hexahydrate was the solid phase, a visual polythermic method was used. Analyses were carried out gravimetrically: $K_2O$ was determined as $KClO_4$ ; $P_2O_5$ was determined as $Mg_2P_2O_7$ ; and water was determined by weight loss during calcination.	The $K_2HPO_4$ was prepared from twice recrystallized $KH_2PO_4$ and KOH.	
	<b>Analysis:</b>	
	found	calcd for $K_2HPO_4 \cdot 6H_2O$
	$K_2O$	33.37
	$P_2O_5$	25.20
	$H_2O$	41.52
		33.38
		25.26
		41.46
	<b>ESTIMATED ERROR:</b>	
	No information is given.	
	<b>REFERENCES:</b>	

<b>COMPONENTS:</b> (1) Tripotassium phosphate; $K_3PO_4$ ; [7778-53-2] (2) Water; $H_2O$ ; [7732-18-5]		<b>ORIGINAL MEASUREMENTS:</b> Jänecke, E. <i>Z. Phys. Chem.</i> 1927, 127, 71-92.					
<b>VARIABLES:</b> Temperature and composition.		<b>PREPARED BY:</b> J. Eysseltová					
<b>EXPERIMENTAL VALUES:</b>							
Crystallization temperatures and composition of saturated solutions existing in equilibrium with crystalline $K_3PO_4 \cdot 8H_2O$ .							
$t/^\circ C.$	$H_2O$ conc <sup>b</sup>	$K_3PO_4^a$ mass%	mass%	mol/kg			
45.1	68	40.3	59.7	6.98			
43.2	75	43.0	57.0	6.24			
23.3	104	51.0	49.0	4.52			
7.5	125	55.8	44.2	3.73			
<sup>a</sup> These values were calculated by the compiler.							
<sup>b</sup> The concentration unit is: g/100 g $K_3PO_4$ .							
<b>AUXILIARY INFORMATION</b>							
<b>METHOD/APPARATUS/PROCEDURE:</b>  The salt was added to the water and the mixture was heated until total liquefaction occurred. A cooling curve of the mixture was then measured. The methods of analysis are not described.	<b>SOURCE AND PURITY OF MATERIALS:</b>  Merck pure $K_3PO_4$ was used and was further purified by dissolving the salt in water and passing $NH_3$ through the solution for 2-3 hours. The octahydrate precipitated from the solution.						
	Analysis:                  found                  calculated $H_2O$ 40.00%                  40.58% $P_2O_5$ 19.10%                  19.95% $K_2O$ 40.14%                  39.47%						
	<b>ESTIMATED ERROR:</b>  No information is given.						
	<b>REFERENCES:</b>						

<b>COMPONENTS:</b> (1) Tripotassium phosphate; $K_3PO_4$ ; [7778-53-2] (2) Water; $H_2O$ ; [7732-18-5]					<b>ORIGINAL MEASUREMENTS:</b> Ravich, M.I. <i>Izv. AN SSSR. ser. Khim.</i> <u>1938</u> , 141-6.									
<b>VARIABLES:</b> Temperature and composition.					<b>PREPARED BY:</b> J. Eyseltová									
<b>EXPERIMENTAL VALUES:</b> Compositions and crystallization temperatures in the $K_3PO_4-H_2O$ system.														
$t/^\circ C.$	$K_3PO_4$ mass%	$K_3PO_4$ mol%	$H_2O$ mol/kg <sup>a</sup>	solid <sub>b</sub> phase	$t/^\circ C.$	$K_3PO_4$ mass%	$K_3PO_4$ mol%	$H_2O$ mol/kg <sup>a</sup>	solid <sub>b</sub> phase					
-1.18	4.54	0.40	0.22	ice	42.6	59.46	11.06	6.90	B					
-2.60	9.75	0.91	0.50	"	44.5	60.84	11.64	7.31	"					
-4.6	15.43	1.52	0.85	"	45.4	61.94	12.13	7.66	"					
-7.7	21.74	2.30	1.30	"	45.6	62.51	12.39	7.85	"					
-12.0	27.34	3.09	1.77	"	45.6	63.12	12.68	8.06	"					
-15.8	31.53	3.76	2.16	"	45.4									
-20.0	35.12	4.39	2.54	"	25	63.17	12.70	8.07	B + C					
-24.0	38.33	5.00	2.92	A + ice	30	63.19	12.71	8.08	"					
-28.2	40.25	5.40	3.17	B + ice	35	63.33	12.77	8.13	"					
-8.8	42.92	6.00	3.54	B	40	63.41	12.81	8.16	"					
0	44.26	6.31	3.74	"	45	63.56	12.89	8.21	"					
10	46.83	6.95	4.14	"	50	63.80	13.00	8.30	C					
20	49.62	7.71	4.63	"	60	64.08	13.14	8.40	"					
25	51.42	8.23	4.98	"	-7.7	43.85	6.21	3.67	A					
30	53.08	8.75	5.32	"	0	47.62	7.16	4.28	"					
35	55.43	9.54	5.85	"	5.0	49.80	7.76	4.67	"					
40	57.51	10.30	6.37	"	8.8	52.23	8.43	5.15	"					
					12.3	57.72	10.00	6.43						

<sup>a</sup> The mol/kg  $H_2O$  values were calculated by the compiler.

<sup>b</sup> The solid phases are: A =  $K_3PO_4 \cdot 9H_2O$ ; B =  $K_3PO_4 \cdot 7H_2O$ ; C =  $K_3PO_4 \cdot 3H_2O$ .

<sup>c</sup> Metastable equilibrium.

#### AUXILIARY INFORMATION

<b>METHOD/APPARATUS/PROCEDURE:</b> The isothermal method was used. The solubility was determined by evaporating the saturated solutions and drying to constant weight. Cooling curves were determined for some of the mixtures.	<b>SOURCE AND PURITY OF MATERIALS:</b> The material used is reported as having been submitted by Berg. The compiler assumes the material is the same as that used in (1).
	<b>ESTIMATED ERROR:</b> No information is given.
	<b>REFERENCES:</b> 1. Berg, L.G. <i>Izv. AN SSSR. ser. Khim.</i> <u>1938</u> , 150.

## Rubidium Dihydrogenphosphate

COMPONENTS: (1) Rubidium dihydrogenphosphate; $\text{RbH}_2\text{PO}_4$ ; [13774-16-8] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	ORIGINAL MEASUREMENTS: Bykova, I.N.; Kuznetsova, G.P.; Kolotilova, V.Ya.; Stepin, B.D. <i>Zh. Neorg. Khim.</i> <u>1968</u> , 13, 540-4.		
VARIABLES: Temperature.	PREPARED BY: J. Eysseltova		
<b>EXPERIMENTAL VALUES:</b>			
Solubility of $\text{RbH}_2\text{PO}_4$ in water.			
<i>t</i> /°C	g/100 g $\text{H}_2\text{O}$	mass% <sup>a</sup>	mol/kg <sup>a</sup>
0	43.2	30.16	2.37
25	78.7	44.04	4.31
40	103.7	50.91	5.68
50	123.6	55.27	6.77
60	137.1	57.82	7.51
80	162.9	61.96	8.93
<sup>a</sup> These values were calculated by the compiler.			
COMMENTS and ADDITIONAL DATA: The temperature coefficient of the solubility is reported to be constant in the temperature ranges 0 to 40°C and 50 to 80°C. The values are:			
range/°C.	$dm_1/dT/\text{mol kg}^{-1} \text{K}^{-1}$		
0 - 40	0.0803		
50 - 80	0.070		
AUXILIARY INFORMATION			
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS: $\text{RbH}_2\text{PO}_4$ was synthesized from reagent grade $\text{H}_3\text{PO}_4$ and $\text{Rb}_2\text{CO}_3$ . The $\text{Rb}_2\text{CO}_3$ was obtained by calcining $\text{Rb}_2(\text{COO})_2$ . The maximum amount of impurity in the $\text{RbH}_2\text{PO}_4$ was 0.05 mass%.		
The mixtures were equilibrated isothermally for 15 days. The apparatus has been described elsewhere (1). The rubidium content was determined gravimetrically as the tetraphenylborate. The temperature coefficient of the solubility was determined graphically.	ESTIMATED ERROR: The temperature was controlled to within $\pm 0.1$ K. No other information is given.		
	REFERENCES: 1. Kuznetsova, G.P.; Stepin, B.D. <i>Zh. Neorg. Khim.</i> <u>1965</u> , 10, 472.		

<b>COMPONENTS:</b> (1) Cesium dihydrogenphosphate; $\text{CsH}_2\text{PO}_4$ ; [18649-05-3] (2) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Bykova, I.N.; Kuznetsova, G.P.; Kolotilova, V.Ya.; Stepin, B.D. <i>Zh. Neorg. Khim.</i> <u>1968</u> , 13, 540-4.
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<b>VARIABLES:</b> Temperature.	<b>PREPARED BY:</b> J. Eysseltová
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<b>EXPERIMENTAL VALUES:</b> Solubility of $\text{CsH}_2\text{PO}_4$ in water.			
$t/^\circ\text{C}.$	g/100 g $\text{H}_2\text{O}$	mass% <sup>a</sup>	mol/kg <sup>a</sup>
0	106.0	51.43	4.61
25	146.97	59.5	6.39
40	169.4	62.88	7.37
50	185.3	64.96	8.06
60	199.7	66.63	8.69
80	258.0	72.07	11.2

<sup>a</sup>These values were calculated by the compiler.

The temperature coefficient of solubility is reported to be constant in the temperature range that was studied. The value is

$$\frac{dm}{dT} = 0.0683 \text{ mol kg}^{-1} \text{ K}^{-1}.$$

#### AUXILIARY INFORMATION

<b>METHOD/APPARATUS/PROCEDURE:</b> The mixtures were equilibrated isothermally for 15 days. The apparatus and procedure are described elsewhere (1). The solubility was determined by a gravimetric analysis for phosphorus. The phosphorus was weighed as $\text{Mg}_2\text{P}_2\text{O}_7$ . The temperature coefficient of the solubility was determined graphically.	<b>SOURCE AND PURITY OF MATERIALS:</b> $\text{CsH}_2\text{PO}_4$ was synthesized by reacting $\text{H}_3\text{PO}_4$ with $\text{Cs}_2\text{CO}_3$ . The latter was obtained by calcining $\text{Cs}_2(\text{COO})_2$ . The amount of impurities was no more than 0.05 mass%.
	<b>ESTIMATED ERROR:</b> The temperature was controlled to within $\pm 0.1 \text{ K}$ . No other information is given.
	<b>REFERENCES:</b> 1. Kuznetsova, G.P.; Stepin, B.D. <i>Zh. Neorg. Khim.</i> <u>1965</u> , 10, 472.