

<b>COMPONENTS:</b> (1) Rubidium oxide; $\text{Rb}_2\text{O}$ ; [18008-11-4] (2) Phosphorus pentoxide; $\text{P}_2\text{O}_5$ ; [1314-56-3] (3) Water- $\text{d}_2$ ; $\text{D}_2\text{O}$ ; [7789-20-0] (4) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Rashkovich, L.N.; Momtaz, R.Sh. <i>Zh. Neorg. Khim.</i> <u>1978</u> , <i>23</i> , 1349-55.																																																																																																																								
<b>VARIABLES:</b> Temperature and composition.	<b>PREPARED BY:</b> J. Eysseltová																																																																																																																								
<b>EXPERIMENTAL VALUES:</b> Composition of saturated solutions in the $\text{Rb}_2\text{O}-\text{P}_2\text{O}_5-\text{H}_2\text{O}$ system. <table border="1"> <thead> <tr> <th><math>t/^\circ\text{C}</math></th> <th><math>\text{Rb}_2\text{O}</math> mass%</th> <th><math>\text{P}_2\text{O}_5</math> mass%</th> <th>solid phase</th> <th><math>t/^\circ\text{C}</math></th> <th><math>\text{Rb}_2\text{O}</math> mass%</th> <th><math>\text{P}_2\text{O}_5</math> mass%</th> <th>solid phase</th> </tr> </thead> <tbody> <tr> <td>25</td> <td>43.2</td> <td>22.2</td> <td><math>\text{Rb}(\text{H},\text{D})_2\text{PO}_4</math></td> <td>50</td> <td>42.9</td> <td>23.2</td> <td><math>\text{Rb}(\text{H},\text{D})_2\text{PO}_4</math></td> </tr> <tr> <td>25</td> <td>35.5</td> <td>21.2</td> <td>"</td> <td>50</td> <td>36.5</td> <td>22.2</td> <td>"</td> </tr> <tr> <td>25</td> <td>32.3</td> <td>20.3</td> <td>"</td> <td>50</td> <td>34.5</td> <td>22.4</td> <td>"</td> </tr> <tr> <td>25</td> <td>31.0</td> <td>20.1</td> <td>"</td> <td>50</td> <td>33.5</td> <td>22.3</td> <td>"</td> </tr> <tr> <td>25</td> <td>28.8</td> <td>19.9</td> <td>"</td> <td>50</td> <td>32.0</td> <td>22.3</td> <td>"</td> </tr> <tr> <td>25</td> <td>26.4</td> <td>20.8</td> <td>"</td> <td>50</td> <td>31.6</td> <td>22.2</td> <td>"</td> </tr> <tr> <td>25</td> <td>28.2</td> <td>29.2</td> <td>"</td> <td>50</td> <td>29.9</td> <td>22.5</td> <td>"</td> </tr> <tr> <td>25</td> <td>28.9</td> <td>32.6</td> <td>"</td> <td>50</td> <td>29.6</td> <td>23.2</td> <td>"</td> </tr> <tr> <td>25</td> <td>28.8</td> <td>32.9</td> <td>"</td> <td>50</td> <td>30.5</td> <td>30.2</td> <td>"</td> </tr> <tr> <td>25</td> <td>29.4</td> <td>35.9</td> <td>"</td> <td>50</td> <td>30.8</td> <td>33.1</td> <td>"</td> </tr> <tr> <td>25</td> <td>26.1</td> <td>38.2</td> <td><math>\text{Rb}(\text{H},\text{D})_5(\text{PO}_4)_2</math></td> <td>50</td> <td>31.1</td> <td>33.4</td> <td>"</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>50</td> <td>31.5</td> <td>36.5</td> <td>"</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>50</td> <td>31.3</td> <td>36.5</td> <td>"</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>50</td> <td>31.1</td> <td>37.8</td> <td><math>\text{Rb}(\text{H},\text{D})_5(\text{PO}_4)_2</math></td> </tr> </tbody> </table>		$t/^\circ\text{C}$	$\text{Rb}_2\text{O}$ mass%	$\text{P}_2\text{O}_5$ mass%	solid phase	$t/^\circ\text{C}$	$\text{Rb}_2\text{O}$ mass%	$\text{P}_2\text{O}_5$ mass%	solid phase	25	43.2	22.2	$\text{Rb}(\text{H},\text{D})_2\text{PO}_4$	50	42.9	23.2	$\text{Rb}(\text{H},\text{D})_2\text{PO}_4$	25	35.5	21.2	"	50	36.5	22.2	"	25	32.3	20.3	"	50	34.5	22.4	"	25	31.0	20.1	"	50	33.5	22.3	"	25	28.8	19.9	"	50	32.0	22.3	"	25	26.4	20.8	"	50	31.6	22.2	"	25	28.2	29.2	"	50	29.9	22.5	"	25	28.9	32.6	"	50	29.6	23.2	"	25	28.8	32.9	"	50	30.5	30.2	"	25	29.4	35.9	"	50	30.8	33.1	"	25	26.1	38.2	$\text{Rb}(\text{H},\text{D})_5(\text{PO}_4)_2$	50	31.1	33.4	"					50	31.5	36.5	"					50	31.3	36.5	"					50	31.1	37.8	$\text{Rb}(\text{H},\text{D})_5(\text{PO}_4)_2$
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<b>METHOD/APPARATUS/PROCEDURE:</b> The mixtures were heated until nearly all the solid phase had disappeared. Then the temperature required was established and the mixtures were thermostated for at least 2 weeks. The composition of the liquid phase was determined by potentiometric titration with KOH after the samples had first been acidified with a known amount of $\text{H}_3\text{PO}_4$ . The deuterium content was determined by a method described elsewhere (1).	<b>SOURCE AND PURITY OF MATERIALS:</b> $\text{Rb}_2\text{CO}_3$ and $\text{D}_3\text{PO}_4$ were used as received. The impurities in these substances was less than 0.05 mass%. The electrolytic conductivity of the heavy water was $6 \times 10^{-6} \text{ S cm}^{-1}$ . The extent of deuteration was 96% for $\text{D}_3\text{PO}_4$ , 99% for $\text{D}_2\text{O}$ , and 90-91% for the saturated solutions.  <b>ESTIMATED ERROR:</b> The temperature was controlled to within $\pm 0.01 \text{ K}$ . The analyses had a precision of $\pm 0.1 \text{ mass\%}$ .  <b>REFERENCES:</b> 1. Volkova, E.N.; Podshivalov, J.S.; Rashkovich, L.N.; Strukov, B.A. <i>Izv. AN SSSR, Ser. fiz.</i> <u>1975</u> , <i>39</i> , 288.																																																																																																																								



COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Rubidium dihydrogenphosphate; $\text{RbH}_2\text{PO}_4$ ; [13774-16-8]	Rashkovich, L.N.; Momtaz, R.Sh.
(2) Rubidium oxide; $\text{Rb}_2\text{O}$ ; [18088-11-4]	Zh. Neorg. Khim. <u>1978</u> , 23, 1349-55.
(3) Phosphoric acid; $\text{H}_3\text{PO}_4$ ; [7664-38-2]	
(4) Water; $\text{H}_2\text{O}$ ; [7732-18-5]	

## EXPERIMENTAL VALUES cont'd:

authors' data		compiler's recalculated values						solid phase
$\text{Rb}_2\text{O}$ mass%	$\text{P}_2\text{O}_5$ mass%	$\text{Rb}_2\text{O}$		$\text{H}_3\text{PO}_4$		$\text{RbH}_2\text{PO}_4$		
		mass%	mol%	mass%	mol%	mass%	mol%	
		temp. = 50°C.						
36.2	21.8	7.49	1.10	----	----	56.0	8.42	$\text{RbH}_2\text{PO}_4$
33.5	21.5	5.18	0.70	----	----	55.3	7.66	" <sup>2</sup> $\text{PO}_4$
31.8	21.1	4.01	0.51	----	----	54.2	7.12	"
31.3	21.3	3.25	0.41	----	----	54.7	7.14	"
30.1	21.2	2.18	0.27	----	----	54.5	6.89	"
28.6	20.8	1.21	0.14	----	----	53.5	6.46	"
28.3	21.2	0.38	0.05	----	----	54.5	6.61	"
28.5	23.2	----	----	2.17	0.52	55.3	7.14	"
29.5	28.4	----	----	8.29	2.46	57.3	9.12	"
30.3	33.6	----	----	14.6	5.63	58.8	12.2	"
30.7	36.0	----	----	17.5	7.82	59.6	14.3	"
31.3	39.6	----	----	21.9	12.8	60.8	19.2	"
31.4	39.5	----	----	21.6	12.7	61.0	19.2	"
30.9	41.7	----	----	25.2	17.3	60.0	22.2	$\text{RbH}_5(\text{PO}_4)_2$

The authors linearized their data in the form:

$$w_{\text{Rb}_2\text{O}} = a + b w_{\text{P}_2\text{O}_5}$$

In the region where  $P/\text{Rb} > 1$  the constants have the following values:

for  $t = 25^\circ\text{C}$ :  $a = 17.5 \pm 0.4$  mass% and  $b = 0.30 \pm 0.01 \pm \sigma = 0.1$

for  $t = 50^\circ\text{C}$ :  $a = 24.6 \pm 0.1$  mass% and  $b = 0.172 \pm 0.004 \pm \sigma = 0.06$

In the region where  $\text{Rb}_2\text{O}$  is in excess

for  $t = 25^\circ\text{C}$ :  $a = -40 \pm 5$  mass% and  $b = 3.8 \pm 0.3 \pm \sigma = 0.6$

for  $t = 50^\circ\text{C}$ :  $a = -124 \pm 23$  mass% and  $b = 7.3 \pm 1.1 \pm \sigma = 0.8$