COMPONENTS:

(1) Dipotassium hydrogenphosphate; K_2HPO_4; [7758-11-4]

(2) Water; H_2O; [7732-18-5]

EVALUATOR:

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CRITICAL EVALUATION:

THE BINARY SYSTEM

The only study of this system has been made by Ravich (1). A few other solubility values have been reported as part of a study of a multicomponent system (6,7). In both these studies the values reported are about 1% lower than those reported by Ravich (1). Ravich reports the eutectic of this system to be 36.78 mass% (3.33 mol/kg) K_2HPO_4 at 259.8 K; the transition of the hexahydrate to the trihydrate occurs at 287.5 K (solution composition is not given); and the transition of the trihydrate to the anhydrous salt takes place at 319 to 324 K and 71.26 to 72.64 mass% K_2HPO_4. He also observed metastable solutions saturated with the hexahydrate and the trihydrate. The regions in which the various phases exist are rather narrow. Because of the lack of solubility data from other sources, the treatment of data described in chapter 3 could not be used. The system has a pronounced tendency to form supersaturated solutions (2-5).

MULTICOMPONENT SYSTEMS

Solubility measurements have been reportedfor several multicomponent systems.

1. The K_2HPO_4-KBO_2-H_2O system. Data have been reported for 298 and 323 K (8). The data cannot be evaluated but it should be noted that the values reported for the K_2HPO_4-H_2O system differ from the values of Ravich (1) by about +30%.
2. The K_2HPO_4-$CO(NH_2)_2$-H_2O system. Two unspecified ternary compounds have been reported for this system (9). A later study of this system (10) gave a more detailed description and mentioned K_2HPO_4 and the α-, β-, γ-, and δ- modifications of urea as solid phases.
3. The K_2HPO_4-K_2CO_3-H_2O system. Solubility measurements have been made over the temperature interval of 253 to 353 K (11). Later these same investigators published the solubility polytherm of the quaternary system K_2HPO_4-K_2CO_3-$CO(NH_2)_2$-H_2O (12).
4. The K_2HPO_4-KNO_3-H_2O system. Only the components and their hydrates were found as solid phases in this system (13).
5. The K_2HPO_4-KCl-H_2O system. Solubility values have been determined at 298, 323 and 348 K (6). The authors reported $2KCl{\cdot}K_2HPO_4{\cdot}5H_2O$ as a solid phase at 298 K. They also emphasized the tendency of all solutions existing in contact with a phosphate-containing solid to form supersaturated solutions.
6. The K_2HPO_4-$(NH_4)_2HPO_4$-H_2O system. No ternary compounds were observed in this system (7,9,14). In contrast to this, the compound $NaNH_4HPO_4$ is present in the Na_2HPO_4-$(NH_4)_2HPO_4$-H_2O system (15). An analogous compound exists in the Na_2HPO_4-K_2HPO_4-H_2O system (16). This system is discussed in chapter 5.

Data have also been published for the K_2HPO_4-$NH_4H_2PO_4$-$(NH_4)_2HPO_4$-H_2O system (17), but the paper contains many uncertainties which make it impossible to discuss and evaluate the data.

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CRITICAL EVALUATION: (cont'd)

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