

<p>COMPONENTS:</p> <p>1. Potassium pyrosulfite; <math>K_2S_2O_5</math>; [16731-55-8]</p> <p>2. Water; <math>H_2O</math>: [7732-18-5]</p>	<p>EVALUATOR:</p> <p>Mary R. Masson, Dept. of Chemistry, University of Aberdeen, Meston Walk, Old Aberdeen, AB9 2UE, Scotland, UK. March 1984.</p>
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## CRITICAL EVALUATION:

There are two sets of data for this system (1,2), although one set is reported in terms of  $KHSO_3$ , and had to be converted for purposes of comparison (2). However, the two sets of data are not in agreement. The first set (1) gives the regression equation

$$y = 22.12 + 0.472(T - 273.2) - 0.00124(T - 273.2)^2 \quad s = 0.14 \text{ (25 pts)}$$

and the second set (2) gives the equation

$$y = 25.1 + 0.255(T - 273.2) \quad s = 0.72 \text{ (11 pts)}$$

where  $y = 100w$  is the solubility expressed as mass % of  $K_2S_2O_5$ ,  $T$  is the temperature in K and  $s$  is the standard deviation of the dependent variable about the regression line.

There is no obvious reason for the differences; the data of Foerster *et al.* are more self-consistent, and therefore probably to be preferred.

## TENTATIVE SOLUBILITIES

The following tentative solubility values were calculated from the regression equation.

T/K	Solubility	
	mass%	molality mol/kg
273.2	22.12	1.278
298.2	33.15	2.230
323.2	42.62	3.341
348.2	50.55	4.598
363.2	54.6	5.409

Foerster (1) also reports data for equilibrium with ice and with  $K_2S_2O_5 \cdot 2/3H_2O$  [91498-98-5]. The regression equations are as follows:

Ice -

$$(T - 273.15) = -0.00051 - 0.294y + 0.00223y^2 - 0.0000972y^3 \quad s = 0.023 \text{ (13 pts)}$$

or

$$y = -0.00230 - 3.40(T - 273.2) + 0.0923(T - 273.2)^2 + 0.0141(T - 273.2)^3 \quad s = 0.077 \text{ (13 pts)}$$

$K_2S_2O_5 \cdot 2/3H_2O$  -

$$y = 21.8 + 0.600(T - 273.2) - 0.00806(T - 273.2)^2 + 0.0003252(T - 273.2)^3 \quad s = 0.089 \text{ (13 pts)}$$

where the symbols have the same meanings as above.

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<p>CRITICAL EVALUATION: (continued)</p> <p>REFERENCES</p> <ol style="list-style-type: none"><li>1. Foerster, F.; Brosche, A.; Norberg-Schutz, Chr. <i>Z. Phys. Chem.</i> <u>1924</u>, <i>10</i>, 435.</li><li>2. Platt, J.H.; Hudson, D. <i>J. Soc. Dyers Colourists</i> <u>1926</u>, <i>42</i>, 348.</li></ol>	