COPPER(I) SULFITE

COMPONENTS:

1. Copper(I) sulfite; Cu₂SO₃; [35788-00-2]
2. Water; H₂O; [7732-18-5]

EVALUATOR:

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CRITICAL EVALUATION:

Copper(I) sulfite crystallizes from aqueous solution in the form of the hemihydrate Cu₂SO₃.1/2H₂O [35788-00-2] (Etard's salt) (1,2). The monohydrate, Cu₂SO₃.H₂O [10294-49-2] (Rogojski's salt) (3) has not been confirmed (2). Cu₂SO₃.1/2H₂O is claimed to be insoluble in water, alcohol and ether (1). Numerical data on the solubility of copper(I)sulfite were given by Margulis et al. (4), who reported the existence of the hydrate Cu₂SO₃.9/2H₂O [35788-00-2]. The solubility of this hydrate increases from 2.2 mg Cu/dm³ (c(Cu₂SO₃) = 1.73 x 10⁻⁵ mol dm⁻³) at 293 K to 26 mg Cu/dm³ (2.04 x 10⁻⁴ mol dm⁻³) at 363 K.

REFERENCES

COMPONENTS:
1. Copper(I) sulfite; Cu₂SO₃ [35788-00-2]
2. Water; H₂O; [7732-18-5]

ORIGINAL MEASUREMENTS:
Margulis, E.V.; Rodin, I.V.

VARIABLES:
Six temperatures: 293 - 363 K

PREPARED BY:
H.D. Lutz

EXPERIMENTAL VALUES:
The authors report the solubility of Cu₂SO₃.9/2H₂O [35788-00-2] in water at various
temperatures, and the solubility product of this compound defined as $K_{sp}(Cu₂SO₃.9/2H₂O) = [Cu^+]²[SO₃²⁻]$.

<table>
<thead>
<tr>
<th>t/°C</th>
<th>mg Cu/dm³</th>
<th>10⁵c(Cu)</th>
<th>$K_{sp}(Cu₂SO₃)$</th>
<th>10⁵c(Cu₂SO₃)²</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>2.2</td>
<td>3.47</td>
<td>4.18 x 10⁻¹⁴</td>
<td>1.73</td>
</tr>
<tr>
<td>30</td>
<td>3.2</td>
<td>5.04</td>
<td>1.28 x 10⁻¹³</td>
<td>2.52</td>
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<tr>
<td>40</td>
<td>9.0</td>
<td>14.2</td>
<td>2.86 x 10⁻¹²</td>
<td>7.08</td>
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<tr>
<td>50</td>
<td>12.4</td>
<td>19.5</td>
<td>7.42 x 10⁻¹²</td>
<td>9.76</td>
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<tr>
<td>70</td>
<td>18.5</td>
<td>29.1</td>
<td>2.46 x 10⁻¹¹</td>
<td>14.6</td>
</tr>
<tr>
<td>90</td>
<td>25.9</td>
<td>40.8</td>
<td>6.79 x 10⁻¹¹</td>
<td>20.4</td>
</tr>
</tbody>
</table>

a Calculated by the compiler from mg Cu/dm³.

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:
The solubility of copper(I)sulfite was studied by the isothermal method. The
experiments were carried out in a water thermostat with mechanical stirring in
closed flasks. The time required for saturation was 2.5 hr. The solutions were
analysed for sulfite (method not given).

SOURCE AND PURITY OF MATERIALS:
Copper(I)sulfite was precipitated from CuSO₄ solutions with Na₂SO₃ (molar ratio
Na₂SO₃/CuSO₄ = 1:1) at 20°C. After stirring for 2 hr, the precipitate was
filtered off, washed with water and acetone, and dried in air at room
temperature.

ESTIMATED ERROR:
Temperature: ±0.5 K (authors).

REFERENCES: