

<p>COMPONENTS:</p> <ol style="list-style-type: none"> 1. Silver sulfite; Ag_2SO_3; [13465-98-0] 2. Water; H_2O; [7732-18-5] 	<p>EVALUATOR:</p> <p>H.D. Lutz, Dept. of Chemistry, University of Siegen, FR Germany.</p> <p>July 1984.</p>
<p>CRITICAL EVALUATION:</p> <p>Silver sulfite crystallizes from aqueous solutions as the anhydrous salt Ag_2SO_3 (1). Numerical data on solubility of Ag_2SO_3 in water are scarce (2-4). In 1910, Baubigny (2) reported that the upper limit of the solubility is $1.60 \times 10^{-4} \text{ mol dm}^{-3}$, molarity, at 290 K. Rodin <i>et al.</i> (4) give a value of $8.1 \times 10^{-6} \text{ mol dm}^{-3}$ at 293 K. They also found a positive temperature coefficient of solubility. Data on the solubility product of Ag_2SO_3, defined as $K_{s0}(\text{Ag}_2\text{SO}_3) = [\text{Ag}^+]^2[\text{SO}_3^{2-}]$, are given by Chateau <i>et al.</i> (3) and Rodin <i>et al.</i> (4), <i>viz.</i> $1.5 \times 10^{-14} \text{ mol}^3 \text{ dm}^{-6}$ at 298.2 K and $4.17 \times 10^{-15} \text{ mol}^3 \text{ dm}^{-9}$, both molarity scale, at 293 K, respectively.</p> <p>TENTATIVE VALUES</p> <p>The solubility of Ag_2SO_3 in water at room temperature is approximately $1 \times 10^{-5} \text{ mol dm}^{-3}$ (molarity scale) ($3 \times 10^{-3} \text{ g/dm}^3$). The temperature coefficient of solubility is probably positive.</p> <p>Silver sulfite is described to be soluble in excess of sulfurous acid or alkaline metal sulfites, forming complex ions, and readily soluble in acids, with decomposition (1).</p> <p>REFERENCES</p> <ol style="list-style-type: none"> 1. <i>Gmelins Handbuch der Anorganischen Chemie</i>, 8. Aufl., Band 61 Silber, Teil B, Lieferung 3, Springer-Verlag, Berlin 1973, p.62. 2. Baubigny, H. <i>Ann. Chim.</i> 1910, Ser. 8, 20, 5. 3. Chateau, H.; Duranté, M.; Hervier, B. <i>Sci. Ind. Photogr.</i> 1956, 27, 257. 4. Rodin, I.V.; Margulis, E.V.; Zhigur'yanova, S.A. <i>Zh. Neorg. Khim.</i> 1983, 28, 1619; <i>Russ. J. Inorg. Chem. (Eng. Transl.)</i> 1983, 28, 916. 	

<p>COMPONENTS:</p> <ol style="list-style-type: none"> 1. Silver sulfite; Ag_2SO_3; [13465-98-0] 2. Water; H_2O; [7732-18-5] 	<p>ORIGINAL MEASUREMENTS:</p> <p>Baubigny, H. <i>Ann. Chim.</i> <u>1910</u>, Ser. 8, 20, 5-57.</p>
<p>VARIABLES:</p> <p>One temperature: 291 K</p>	<p>PREPARED BY:</p> <p>B. Engelen</p>
<p>EXPERIMENTAL VALUES:</p> <p>The author reports the solubility of silver sulfite in water at 16-19°C to be 4.74×10^{-3} g in 100 cm^3 of soln ($c(\text{Ag}_2\text{SO}_3) = 1.60 \times 10^{-4}$ mol dm^{-3}, compiler).</p> <p>This value is said by the author to be a maximum value for the solubility of silver sulfite because of a small impurity of Ag_2SO_4.</p>	
<p>AUXILIARY INFORMATION</p>	
<p>METHOD APPARATUS/PROCEDURE:</p> <p>Saturation method. Equilibrium was established after 24 hr. An aliquot of the supernatant solution was analysed gravimetrically for silver (as the chloride).</p>	<p>SOURCE AND PURITY OF MATERIALS:</p> <p>Silver sulfite was precipitated by bubbling sulfur dioxide through an oxygen-free solution of silver nitrate. The precipitate is said by the author to be nearly free from silver sulfate.</p> <p>ESTIMATED ERROR:</p> <p>Temperature: ± 1.5 K.</p> <p>REFERENCES:</p>

COMPONENTS: 1. Silver sulfite; Ag_2SO_3 ; [13465-98-0] 2. Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Chateau, H.; Duranté, M.; Hervier, B. <i>Sci. Ind. Photogr.</i> <u>1956</u> , 27, 257-62.
VARIABLES: One temperature: 298 K	PREPARED BY: B. Engelen
EXPERIMENTAL VALUES: The solubility product of Ag_2SO_3 , defined as $K_{\text{SO}}(\text{Ag}_2\text{SO}_3) = [\text{Ag}^+]^2[\text{SO}_3^{2-}]$, is reported to be $K_{\text{SO}} = 1.5 \times 10^{-14} \text{ mol}^3 \text{ dm}^{-9}$ at 25°C.	
AUXILIARY INFORMATION	
METHOD APPARATUS/PROCEDURE: The solubility product was determined by potentiometric measurements in the system $\text{Hg}/\text{Hg}_2\text{Cl}_2/\text{KCl}_{\text{sat}}/\text{KNO}_3_{\text{sat}}/\text{NaHSO}_3+\text{AgNO}_3/\text{Ag}$ from the point of first precipitation of Ag_2SO_3 for various pH values. The pH was adjusted with HNO_3 and HCl , respectively, and measured with a glass electrode.	SOURCE AND PURITY OF MATERIALS: Commercial Na_2SO_3 , HNO_3 , HCl , and AgNO_3 were used. ESTIMATED ERROR: REFERENCES:

COMPONENTS: 1. Silver sulfite; Ag_2SO_3 ; [13465-98-0] 2. Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Rodin, I.V.; Margulis, E.V.; Zhigur'yanova, S.A. Zh. Neorg. Khim. 1983, 28, 1619-20; *Russ. J. Inorg. Chem. (Eng. Transl.) 1983, 28, 916-7.																														
VARIABLES: Four temperatures: 293 - 363 K	PREPARED BY: B. Engelen																														
EXPERIMENTAL VALUES: The authors report the solubility of $\text{Ag}_2\text{SO}_3 \cdot 1\text{H}_2\text{O}$ in water at various temperatures, and its solubility product, defined as $K_{\text{SO}}(\text{Ag}_2\text{SO}_3 \cdot 1\text{H}_2\text{O}) = [\text{Ag}^+]^2[\text{SO}_3^{2-}] = [\text{Ag}^+]^3$. <div style="text-align: center;">Composition of the saturated solutions</div> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">$t/^\circ\text{C}$</th> <th style="text-align: left;">mg Ag/dm^3</th> <th style="text-align: left;">$10^5(\text{Ag})$ mol dm^{-3}</th> <th style="text-align: left;">Ag_2SO_3 $10^6 \text{ mass } \%$</th> <th style="text-align: left;">$K_{\text{SO}}(\text{Ag}_2\text{SO}_3)$ $\text{mol}^3 \text{ dm}^{-9}$</th> <th style="text-align: left;">$10^5 c(\text{Ag}_2\text{SO}_3)^a$ mol dm^{-3}</th> </tr> </thead> <tbody> <tr> <td>20</td> <td>1.74</td> <td>1.61</td> <td>2.38</td> <td>4.17×10^{-15}</td> <td>0.81</td> </tr> <tr> <td>50</td> <td>2.94</td> <td>2.72</td> <td>4.03</td> <td>2.01×10^{-14}</td> <td>1.36</td> </tr> <tr> <td>70</td> <td>4.18</td> <td>3.87</td> <td>5.73</td> <td>5.80×10^{-14}</td> <td>1.94</td> </tr> <tr> <td>80</td> <td>5.32</td> <td>4.93</td> <td>7.29</td> <td>1.19×10^{-13}</td> <td>2.47</td> </tr> </tbody> </table> <p>^a Calculated by the compiler from mg Ag/dm^3.</p>		$t/^\circ\text{C}$	mg Ag/dm^3	$10^5(\text{Ag})$ mol dm^{-3}	Ag_2SO_3 $10^6 \text{ mass } \%$	$K_{\text{SO}}(\text{Ag}_2\text{SO}_3)$ $\text{mol}^3 \text{ dm}^{-9}$	$10^5 c(\text{Ag}_2\text{SO}_3)^a$ mol dm^{-3}	20	1.74	1.61	2.38	4.17×10^{-15}	0.81	50	2.94	2.72	4.03	2.01×10^{-14}	1.36	70	4.18	3.87	5.73	5.80×10^{-14}	1.94	80	5.32	4.93	7.29	1.19×10^{-13}	2.47
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METHOD APPARATUS/PROCEDURE: The solubility of silver sulfite was studied by the isothermal saturation method. The experiments were done in closed flasks kept in a water thermostat, with mechanical stirring. The time required for saturation was 3 hr. Silver was determined colorimetrically.	SOURCE AND PURITY OF MATERIALS: Silver sulfite was precipitated from Ag_2SO_4 solutions with Na_2SO_3 . The mixture was stirred for 2 hr, then the precipitate was filtered off, washed with water and acetone, and dried in air at room temperature. ESTIMATED ERROR: Temperature: $\pm 0.5 \text{ K}$. REFERENCES:																														