

COMPONENTS: (1) Silver(II) oxide; AgO; [1301-96-8] (2) Potassium hydroxide; KOH; [1310-58-3] (3) Water; H ₂ O; [7732-18-5]	ORIGINAL MEASUREMENTS: Dirkse, T. P.; Wiers, B. J. <i>Electrochem. Soc.</i> <u>1959</u> , <i>106</i> , 284-7.																												
VARIABLES: Concentration of KOH at 25°C.	PREPARED BY: T. P. Dirkse																												
EXPERIMENTAL VALUES: <p style="text-align: center;">Solubility of AgO in aqueous KOH at 25°C.^a</p> <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;"><u>C_{KOH}/mol dm⁻³</u></th> <th style="text-align: center;"><u>10⁵C_{Ag}/mol dm⁻³</u></th> </tr> </thead> <tbody> <tr><td style="text-align: center;">0.0372</td><td style="text-align: center;">1.11</td></tr> <tr><td style="text-align: center;">0.0743</td><td style="text-align: center;">1.25</td></tr> <tr><td style="text-align: center;">0.149</td><td style="text-align: center;">2.4</td></tr> <tr><td style="text-align: center;">0.186</td><td style="text-align: center;">3.5</td></tr> <tr><td style="text-align: center;">0.297</td><td style="text-align: center;">5.3</td></tr> <tr><td style="text-align: center;">0.309</td><td style="text-align: center;">7.4</td></tr> <tr><td style="text-align: center;">0.372</td><td style="text-align: center;">7.7</td></tr> <tr><td style="text-align: center;">0.557</td><td style="text-align: center;">9.5</td></tr> <tr><td style="text-align: center;">0.591</td><td style="text-align: center;">13.1</td></tr> <tr><td style="text-align: center;">0.743</td><td style="text-align: center;">12.9</td></tr> <tr><td style="text-align: center;">1.49</td><td style="text-align: center;">31</td></tr> <tr><td style="text-align: center;">2.93</td><td style="text-align: center;">49</td></tr> <tr><td style="text-align: center;">4.78</td><td style="text-align: center;">61</td></tr> </tbody> </table> <p>^a The article presents the solubility data only in the form of a graph. That graph was based on the above numerical data.</p>		<u>C_{KOH}/mol dm⁻³</u>	<u>10⁵C_{Ag}/mol dm⁻³</u>	0.0372	1.11	0.0743	1.25	0.149	2.4	0.186	3.5	0.297	5.3	0.309	7.4	0.372	7.7	0.557	9.5	0.591	13.1	0.743	12.9	1.49	31	2.93	49	4.78	61
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METHOD/APPARATUS/PROCEDURE: Equilibrium was reached isothermally at 25°C with constant stirring for at least 2 days. The mixtures were filtered through a Pyrex glass frit. The silver content was determined by a potentiometric titration with dilute aqueous KI (1) after the solutions had first been treated with HNO ₃ to reduce any Ag ²⁺ to Ag ⁺ (2). The KOH solutions were prepared by quantitative dilution of a stock solution to which some Ba(OH) ₂ had been added to remove carbonate ions.	SOURCE AND PURITY OF MATERIALS: The AgO was a commercially available product which was analyzed and found to be about 99% AgO. The KOH was a reagent grade material. The water was first deionized and then distilled.																												
	ESTIMATED ERROR: Less than 5%.																												
	REFERENCES: 1. Johnston, H. L.; Cuta, F.; Garrett, A. B. <i>J. Am. Chem. Soc.</i> <u>1933</u> , <i>55</i> , 2311. 2. Jursa, F.; Jelinek, J. Z. <i>Anorg. Allg. Chem.</i> <u>1925</u> , <i>148</i> , 130.																												

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VARIABLES: Temperature.	PREPARED BY: T. P. Dirkse									
EXPERIMENTAL VALUES: Solubility of AgO in 1 mol KOH dm ⁻³ $10^4 C_{Ag} / \text{mol dm}^{-3}$ <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">$t/^\circ\text{C}$</th> <th style="text-align: center;">after 1 hour</th> <th style="text-align: center;">after 1 week</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">5</td> <td style="text-align: center;">1.3</td> <td style="text-align: center;">0.88</td> </tr> <tr> <td style="text-align: center;">27</td> <td style="text-align: center;">2.48</td> <td style="text-align: center;">1.72</td> </tr> </tbody> </table> <p>The decrease of solubility with time is explained in terms of the following reactions:</p> $\text{AgO} + \text{OH}^- + \text{H}_2\text{O} = \text{Ag}(\text{OH})_3^-$ $2\text{Ag}(\text{OH})_3^- = 2\text{Ag}(\text{OH})_2^- + \text{H}_2\text{O} + 1/2 \text{O}_2$ $2\text{Ag}(\text{OH})_2^- = \text{Ag}_2\text{O}(\text{s}) + \text{H}_2\text{O} + 2\text{OH}^-$ <p>In another series of tests the solubility of AgO in 1 mol KOH dm⁻³ at 22°C was measured over a period of 10 weeks. The data are presented only in graphical form and show that the solubility of AgO is constant if excess solid AgO is present in contact with the solution, but that it gradually decreases when no excess solid AgO is present. This is explained as due to the following reaction:</p> $2\text{Ag}(\text{OH})_2^- = 2\text{Ag} + 1/2 \text{O}_2 + \text{H}_2\text{O} + 2\text{OH}^-.$		$t/^\circ\text{C}$	after 1 hour	after 1 week	5	1.3	0.88	27	2.48	1.72
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METHOD/APPARATUS/PROCEDURE: The mixtures were allowed to equilibrate isothermally with constant stirring. After filtration, the silver content of the filtrate was determined by a potentiometric titration with KI (1).	SOURCE AND PURITY OF MATERIALS: The AgO was a commercially available product. The KOH was carbonate-free. Distilled water was the solvent.									
ESTIMATED ERROR: No details are given.										
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