

COMPONENTS: (1) Cadmium oxide; CdO; [1306-19-0] (2) Water; H ₂ O; [7732-18-5]	ORIGINAL MEASUREMENTS: Remy, H; Kuhlman, A. <i>Z. anal. Chem.</i> <u>1924</u> , <i>66</i> , 161-81.									
VARIABLES: Method of measuring the solubility of CdO in water at 20°C.	PREPARED BY: T. P. Dirkse									
EXPERIMENTAL VALUES: <p style="text-align: center;">Solubility of CdO in water at 20°C.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Method</th> <th style="text-align: center;">mol CdO dm⁻³</th> <th style="text-align: center;">mg CdO dm⁻³</th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">specific conductance</td> <td style="text-align: center;">3.90 x 10⁻⁵</td> <td style="text-align: center;">5.00</td> </tr> <tr> <td style="text-align: left;">conductimetric titration</td> <td style="text-align: center;">3.74 x 10⁻⁵</td> <td style="text-align: center;">4.80</td> </tr> </tbody> </table>		Method	mol CdO dm ⁻³	mg CdO dm ⁻³	specific conductance	3.90 x 10 ⁻⁵	5.00	conductimetric titration	3.74 x 10 ⁻⁵	4.80
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METHOD/APPARATUS/PROCEDURE: Hot CdO is added to water and the mixture shaken. Two methods are used to calculate the solubility; (1) from the measured specific conductance and literature values for ionic conductances; (2) a conductimetric titration with H ₂ SO ₄ . The point of the work is to note the contribution of dissolved CO ₂ to the conductance and how to correct for this.	SOURCE AND PURITY OF MATERIALS: Reagent grade CdO and conductivity water were used. ESTIMATED ERROR: The temperature was not controlled but varied between 19 and 21°C. In the titration results, the uncertainty was 1% of the value reported. REFERENCES:									

COMPONENTS: (1) Cadmium hydroxide; $\text{Cd}(\text{OH})_2$; [21041-95-2] (2) Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Moeller, T.; Rhymmer, P. W.; <i>J. Phys. Chem.</i> <u>1942</u> , <i>46</i> , 477-85.																											
VARIABLES: Composition of solvent at 25°C	PREPARED BY: T. P. Dirkse																											
EXPERIMENTAL VALUES: <p style="text-align: center;">Solubility product^a of cadmium hydroxide at 25°C</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">$C_{\text{OH}^-}/C_{\text{Cd}^{2+}}$</th> <th style="text-align: center;">pH</th> <th style="text-align: center;">$10^{14}K_{\text{so}}$</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">0.2</td><td style="text-align: center;">8.13</td><td style="text-align: center;">3.1</td></tr> <tr><td style="text-align: center;">0.4</td><td style="text-align: center;">8.18</td><td style="text-align: center;">3.4</td></tr> <tr><td style="text-align: center;">0.6</td><td style="text-align: center;">8.21</td><td style="text-align: center;">3.3</td></tr> <tr><td style="text-align: center;">0.8</td><td style="text-align: center;">8.23</td><td style="text-align: center;">3.0</td></tr> <tr><td style="text-align: center;">1.0</td><td style="text-align: center;">8.26</td><td style="text-align: center;">2.8</td></tr> <tr><td style="text-align: center;">1.2</td><td style="text-align: center;">8.32</td><td style="text-align: center;">2.8</td></tr> <tr><td style="text-align: center;">1.4</td><td style="text-align: center;">8.40</td><td style="text-align: center;">3.0</td></tr> <tr><td style="text-align: center;">1.6</td><td style="text-align: center;">8.52</td><td style="text-align: center;">3.3</td></tr> </tbody> </table> <p>^a $K_{\text{so}} = C_{\text{Cd}^{2+}} \cdot (a_{\text{OH}^-})^2$</p> <p>Salts other than $\text{Cd}(\text{NO}_3)_2$ were also used but $\text{Cd}(\text{NO}_3)_2$ gave the purest form of precipitated $\text{Cd}(\text{OH})_2$.</p> <p>In calculating K_{so} the ionic product constant of water at 25°C was taken as 1×10^{-14}.</p> <p>Using the expression $S = \sqrt[3]{K_{\text{so}}/4}$ the solubility of $\text{Cd}(\text{OH})_2$ in water at 25°C is calculated to be $2 \times 10^{-5} \text{ mol dm}^{-3}$.</p>		$C_{\text{OH}^-}/C_{\text{Cd}^{2+}}$	pH	$10^{14}K_{\text{so}}$	0.2	8.13	3.1	0.4	8.18	3.4	0.6	8.21	3.3	0.8	8.23	3.0	1.0	8.26	2.8	1.2	8.32	2.8	1.4	8.40	3.0	1.6	8.52	3.3
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METHOD/APPARATUS/PROCEDURE: 10 mol of $0.0996 \text{ mol dm}^{-3} \text{ Cd}(\text{NO}_3)_2$ was diluted to 50 ml with water, thermostated at $25 \pm 0.5^\circ\text{C}$, stirred vigorously, and titrated with 0.1 mol dm^{-3} carbonate-free NaOH or KOH. The pH of the solution was measured with a glass electrode. The values chosen were in the region where $\text{Cd}(\text{OH})_2$ had precipitated from the solution.	SOURCE AND PURITY OF MATERIALS: All materials were of reagent grade quality. The water was CO_2 -free.																											
ESTIMATED ERROR: No details are given about the reproducibility of any of the measurements.																												
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COMPONENTS:		ORIGINAL MEASUREMENTS:					
(1) Cadmium hydroxide; Cd(OH) ₂ ; [21041-95-2] (2) Water; H ₂ O; [7732-18-5]		Jenkins, S. H.; Keight, D. G.; Humphreys, R. E. <i>Air Water Pollution</i> 1964, 8, 537-56.					
VARIABLES:		PREPARED BY:					
Effect of successive samples of CO ₂ -free distilled water at room temperature.		T. P. Dirkse					
EXPERIMENTAL VALUES: Solubility of Cd(OH) ₂ in distilled water.							
pH of H ₂ O	temp, °C	Bottle 1 pH of soln	C _{Cd} , ppm	Bottle 2 pH of soln	C _{Cd} , ppm	Bottle 3 pH of soln	C _{Cd} , ppm
----	22.0	9.28	0.81	9.00	1.03	9.10	1.11
8.70	20.4	9.30	0.79	9.40	0.66	9.39	1.02
9.00	17.0	9.30	0.54	9.28	1.26	9.35	0.99
7.78	18.0	9.32	0.87	9.43	0.79	9.40	0.79
8.92	19.0	9.32	0.79	9.35	0.79	9.40	0.66
8.67	20.0	9.25	0.38	9.39	0.41	9.38	0.38
8.00	18.0	9.22	0.79	9.30	1.82	9.32	1.42
8.40	17.2	8.81	0.79	9.12	1.44	9.18	1.41
8.00	20.0	8.98	1.03	9.06	1.91	9.10	1.90
5.92	17.4	8.82	1.75	9.02	1.11	9.10	1.34
5.90	18.4	8.92	1.05	9.13	1.90	9.28	1.45
5.91	17.0	8.90	0.63	9.20	1.34	9.30	1.41
6.40	18.8	9.29	0.55	9.30	0.98	9.31	1.22
type of Cd(OH) ₂	pH	C _{Cd} /ppm ^a		pH	C _{Cd} /ppm ^b		
powder	8.7	1.0		8.5	0.485		
"	8.8	0.9		8.7	0.385		
"	8.8	1.1		8.8	0.425		
"	9.0	0.96		8.9	0.428		
freshly pptd	8.7	1.66		8.8	0.640		
"	8.6	2.12		8.6	0.785		
^a These solutions were filtered through a Millipore HA filter.							
^b These solutions were filtered through a Millipore VC filter.							
AUXILIARY INFORMATION							
METHOD/APPARATUS/PROCEDURE:				SOURCE AND PURITY OF MATERIALS:			
The Cd(OH) ₂ was added to distilled water and the mixture was shaken intermittently for a week and then allowed to stand for about a week. A sample of the clear supernatant liquid was removed, filtered through glass paper and analyzed for cadmium content colorimetrically using diphenylthiocarbazone. Each value reported is the average of 3 replicate samples. Successive extractions were made by the addition of distilled water, shaking the mixture for 2 days, allowing the mixture to settle, and then taking samples for analysis.				The distilled water was CO ₂ -free. The Cd(OH) ₂ apparently was a commercially available product.			
				ESTIMATED ERROR:			
				No information is given about the reproducibility of any of the measurements or procedures.			
				REFERENCES:			