

<b>COMPONENTS:</b> 1. Lead(II) selenite; $\text{PbSeO}_3$ ; [7488-51-9] 2. Hydrochloric acid; $\text{HCl}$ ; [7647-01-0] 3. Nitric acid; $\text{HNO}_3$ ; [7697-37-2] 4. Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b>  Chukhlantsev, V.G.; Tomashevsky, G.P.  <i>Zh. Anal. Khim.</i> 1957, 12, 296-301; * <i>J. Anal. Chem. USSR</i> 1957, 12, 303-9.																																													
<b>VARIABLES:</b> Hydrochloric and nitric acid concentrations One temperature: 293 K	<b>PREPARED BY:</b>  Mary R. Masson																																													
<b>EXPERIMENTAL VALUES:</b> All concentrations are expressed in units of $\text{mol dm}^{-3}$ . <table border="1" data-bbox="172 479 1139 707"> <thead> <tr> <th>Soln.</th> <th>Initial pH</th> <th>Final pH</th> <th><math>[\text{Pb}^{2+}]</math></th> <th>pPb</th> <th><math>\log \alpha_{\text{L(H)}}</math></th> <th><math>\text{p}[\text{SeO}_3^{2-}]</math></th> <th><math>\text{p}K_{\text{SO}}</math></th> </tr> </thead> <tbody> <tr> <td rowspan="2">HCl</td> <td>2.05</td> <td>2.21</td> <td><math>2.9 \times 10^{-3}</math></td> <td>2.54</td> <td>6.20</td> <td>8.74</td> <td>11.28</td> </tr> <tr> <td>2.79</td> <td>3.12</td> <td><math>4.2 \times 10^{-4}</math></td> <td>3.38</td> <td>4.95</td> <td>8.33</td> <td>11.71</td> </tr> <tr> <td rowspan="3"><math>\text{HNO}_3</math></td> <td>2.95</td> <td>3.38</td> <td><math>3.1 \times 10^{-4}</math></td> <td>3.47</td> <td>4.66</td> <td>8.13</td> <td>11.60</td> </tr> <tr> <td>2.40</td> <td>2.85</td> <td><math>8.3 \times 10^{-4}</math></td> <td>3.08</td> <td>5.25</td> <td>8.33</td> <td>11.41</td> </tr> <tr> <td>2.08</td> <td>2.25</td> <td><math>2.3 \times 10^{-3}</math></td> <td>2.64</td> <td>6.15</td> <td>8.79</td> <td>11.43</td> </tr> </tbody> </table> <p>The average value is <math>K_{\text{SO}} = 3.4 \times 10^{-12} \text{ mol}^2 \text{ dm}^{-6}</math>.  <math>(\text{p}K_{\text{SO}} = 11.5)</math></p> <p><b>Notes.</b>  <math>[\text{Se}_{\text{tot}}] = [\text{Pb}^{2+}]</math> and <math>[\text{SeO}_3^{2-}] = [\text{Se}_{\text{tot}}]/\alpha_{\text{L(H)}}</math>            where <math>\alpha_{\text{L(H)}} = (1 + [\text{H}^+]/K_2 + [\text{H}^+]^2/K_1K_2)</math>            and the acid dissociation constants have the values <math>K_1 = 4 \times 10^{-3}</math> and  <math>K_2 = 1.0 \times 10^{-8}</math> (ref. 1).</p>		Soln.	Initial pH	Final pH	$[\text{Pb}^{2+}]$	pPb	$\log \alpha_{\text{L(H)}}$	$\text{p}[\text{SeO}_3^{2-}]$	$\text{p}K_{\text{SO}}$	HCl	2.05	2.21	$2.9 \times 10^{-3}$	2.54	6.20	8.74	11.28	2.79	3.12	$4.2 \times 10^{-4}$	3.38	4.95	8.33	11.71	$\text{HNO}_3$	2.95	3.38	$3.1 \times 10^{-4}$	3.47	4.66	8.13	11.60	2.40	2.85	$8.3 \times 10^{-4}$	3.08	5.25	8.33	11.41	2.08	2.25	$2.3 \times 10^{-3}$	2.64	6.15	8.79	11.43
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<b>METHOD APPARATUS/PROCEDURE:</b> Solutions of hydrochloric and nitric acid were saturated with lead(II) selenite by shaking in a thermostat at $20 \pm 0.05^\circ\text{C}$ for 8 hr. The remaining solid phase was removed by centrifugation, then the pH was measured ("Moskip" pH meter, to 0.01 pH unit) and the lead concentration was determined by gravimetry of the sulfate.	<b>SOURCE AND PURITY OF MATERIALS:</b> C.P.-grade reagents were used. Lead selenite was prepared by mixing a 0.2N solution of lead acetate acidified with acetic acid with a 0.1N solution of sodium selenite in stoichiometric proportions at $50 - 60^\circ\text{C}$ . The precipitate was washed with water and dried at $40^\circ\text{C}$ . Lead was determined gravimetrically as the sulfate, and selenium as the element.																																													
	<b>ESTIMATED ERROR:</b> $\pm 1.3 \times 10^{-12}$ . (The spread in the results is 0.43 of a log unit.) Temperature: $\pm 0.05 \text{ K}$																																													
	<b>REFERENCES:</b>  1. Rumpf, P. <i>Compt. Rendu</i> 1933, 197, 686.																																													

<b>COMPONENTS:</b> 1. Lead selenite; $\text{PbSeO}_3$ ; [7488-51-9] 2. Water; $\text{H}_2\text{O}$ ; [7732-18-5]	<b>ORIGINAL MEASUREMENTS:</b> Dolique, R. <i>Bull. Soc.Chim. France</i> <u>1943</u> , 10, 50.
<b>VARIABLES:</b> One temperature: 283 K	<b>PREPARED BY:</b> Mary R. Masson
<b>EXPERIMENTAL VALUES:</b> <p>The author found the solubility of lead selenite in water at 10°C to be about 18.3 mg in 100 ml; after 7 days agitation in 10°C, the amount dissolved had reached only 11 mg in 100 ml.</p> <p>18.3 mg/100 ml can be expressed as <math>5.48 \times 10^{-4} \text{ mol dm}^{-3}</math>; this would give a value of <math>3.0 \times 10^{-7} \text{ mol}^2 \text{ dm}^{-6}</math> for <math>K_{\text{SO}}</math> (<math>\text{p}K_{\text{SO}} = 6.52</math>) if hydrolysis is neglected.</p>	
<b>AUXILIARY INFORMATION</b>	
<b>METHOD APPARATUS/PROCEDURE:</b> The lead selenite was agitated in water, then the concentration of selenium in solution was determined by a method developed by Dolique, Perahia and Roca.	<b>SOURCE AND PURITY OF MATERIALS:</b> Lead selenite was prepared by traditional method of "double decomposition", thoroughly washed, but not dried.  <b>ESTIMATED ERROR:</b> Temperature: $\pm 1 \text{ K}$ Solubility: no estimate possible.  <b>REFERENCES:</b>