

COMPONENTS: (1) Beryllium hydroxide; Be(OH) ₂ ; [13327-32-7] (2) Water; H ₂ O; [7732-18-5]	ORIGINAL MEASUREMENTS: Remy, H.; Kuhlmann, A. <i>Z. Anal. Chem.</i> , 1924, 65, 161-81.
VARIABLES: $T/K = 291$	PREPARED BY: H. Einaga Y. Komatsu
EXPERIMENTAL VALUES:	
<p>Specific conductivity measured on conductivity water saturated with α-BeO at 20.0 - 20.2°C was $1.795 \times 10^{-6} (\Omega \text{ cm})^{-1}$, which was converted to the value at 18°C of $1.729 \times 10^{-6} (\Omega \text{ cm})^{-1}$ by applying a temperature coefficient of 0.0190. After the correction for dissolved CO₂ (ref 1), solubility of Be(OH)₂ was calculated from the specific conductivity by using the intrinsic specific conductivity of saturated Be(OH)₂ solution of $3.29 \times 10^{-6} (\Omega \text{ cm})^{-1}$ to give 0.00020 g BeO per liter of solution. Solubility and solubility product of Be(OH)₂ were calculated by the authors to be $8.1 \times 10^{-6} \text{ mol L}^{-1}$ and $2 \times 10^{-20} (\text{mol L}^{-1})^3$ respectively, under the assumption that Be(OH)₂ dissociates completely in water.</p>	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: Conductivity water was saturated with BeO (specific conductivity, $1.258 \times 10^{-6} (\Omega \text{ cm})^{-1}$) in a conductivity cell by shaking at 20.0 - 20.2°C for 1.5 to 2.5 hours. Specific conductivity of the resulting saturated solution was measured. NOTE: The specific conductivity unit, $(\Omega \text{ cm})^{-1}$, has been replaced by electrolytic conductivity, S cm ⁻¹ .	SOURCE AND PURITY OF MATERIALS: (1) Beryllium hydroxide. Be(NO ₃) ₂ of high purity was dissolved in conductivity water followed by addition of freshly distilled NH ₃ to precipitate Be(OH) ₂ . After being washed with water, the precipitate was dissolved in acetic acid, the resultant beryllium(II) acetate was distilled at 330 - 331°C. It was dissolved in water to get a dilute aqueous solution from which Be(OH) ₂ was again precipitated by the addition of NH ₃ . The precipitate was heated at about 440°C to obtain BeO. (2) Water. Conductivity water of specific conductance $1.258 \times 10^{-6} (\Omega \text{ cm})^{-1}$ was used.
ESTIMATED ERROR: No estimates possible.	REFERENCES: 1. Remy, H. <i>Z. Elektrochem. Angew. Phys. Chem.</i> , 1925, 31, 88.

COMPONENTS: (1) Beryllium hydroxide; Be(OH) ₂ ; [13327-32-7] (2) Water; H ₂ O; [7732-18-5]	ORIGINAL MEASUREMENTS: Oka, Y. <i>Nippon Kagaku Kaishi (1921-47)</i> <u>1940, 61, 311-20.</u>
VARIABLES: $T/K = \text{Room temperature}$	PREPARED BY: H. Einaga Y. Komatsu

EXPERIMENTAL VALUES:

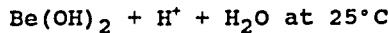
Solubility of Be(OH)₂ in water was determined by potentiometry to be
 $1.4 \times 10^{-7} \text{ mol L}^{-1}$
at room temperature (not specified).

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE: Aqueous Be(NO ₃) ₂ solution was titrated at room temperature with a standard aqueous NaOH solution potentiometrically by using glass and hydrogen electrodes to record pH vs alkali content relation from which solubility was calculated. There was no description of titration or calculation procedures.	SOURCE AND PURITY OF MATERIALS: (1) Beryllium hydroxide. (2) Water. Nothing specified.
ESTIMATED ERROR: No estimates possible.	
REFERENCES:	

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Beryllium hydroxide; Be(OH) ₂ ; [13327-32-7]	Schindler, P.; Garrett, A. B.
(2) Water; H ₂ O; [7732-18-5]	Helv. Chim. Acta 1960, 43, 2176-8.

EXPERIMENTAL VALUES:



$10^3 Z$	$10^3 B$	$-\log h$	$-\log b$	$\log K_{SO}^1$	$-\log S$		$-\log K_{Snn}$	
					n = 2	n = 3	n = 2	n = 3
0.495	0.322	5.321	3.759	6.883	4.128	4.304	6.514	11.659
0.944	0.702	5.210	3.535	6.885	3.688	3.864	6.732	11.766
2.99	2.15	5.008	3.076	6.940	3.184	3.360	6.832	11.664
4.99	3.88	4.880	2.955	6.805	2.859	3.035	6.901	11.605
6.48	5.10	4.851	2.860	6.842	2.730	2.906	6.972	11.647
7.98	6.48	4.810	2.824	6.796	2.604	2.780	7.016	11.650
9.98	8.13	4.790	2.733	6.847	2.503	2.679	7.077	11.691
11.98	9.74	4.770	2.650	6.890	2.426	2.602	7.114	11.708
Mean value				6.86 ± 0.05	Mean value		11.67 ± 0.05	

$$h = [\text{H}^+]$$

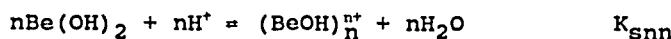
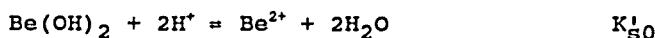
$$S = [(\text{BeOH})_n^{n+}]$$

$$b = [\text{Be}^{2+}]$$

$$K_{Snn} = [(\text{BeOH})_n^{n+}] / [\text{H}^+]^n$$

$$K_{SO}^1 = [\text{Be}^{2+}] / [\text{H}^+]^2$$

The results of Gilbert and Garrett (ref 1) in acidic medium were reinterpreted by taking into account the reactions:



with the values $n = 2$ and $n = 3$.

Quantities used in the calculations are shown in the table above with:

H = total concentration of the acid (HCl, HClO₄), see ref 1.

h = concentration of H^+ in the saturated solution.

B = total Be concentration = $[\text{Be}^{2+}] + n[(\text{BeOH})_n^{n+}]$

Z = $H - h = 2[\text{Be}^{2+}] + n[(\text{BeOH})_n^{n+}]$

b = $Z - B = [\text{Be}^{2+}]$

$S = [(\text{BeOH})_n^{n+}] = (2B - Z)/n$

The calculations show that K_{S33} is a constant and that $(\text{BeOH})_3^{3+}$ is the main polymeric species present.

$$K_{SO} = [\text{Be}^{2+}][\text{OH}^-]^2 = K_{SO}^1 K_w^2; K_{SO}^1 = [\text{Be}^{2+}] / [\text{H}^+]^2$$

K_{SO} was calculated by the compilers using $-\log K_w = 13.996$ to be

$$-\log K_{SO} = 21.13 \pm 0.05$$

(continued on next page)

COMPONENTS: (1) Magnesium hydroxide; Mg(OH) ₂ ; [1309-42-8] (2) Water; H ₂ O; [7732-18-5]	ORIGINAL MEASUREMENTS: Fresenius, R. <i>J. Liebigs Ann. Chem. Pharm.</i> 1846, 59, 117-28.	
VARIABLES: $T/K = ca. 293 \text{ and } 373$	PREPARED BY: I. Lambert	
EXPERIMENTAL VALUES:		
The solubility of Mg(OH) ₂ in water at room temperature and at the boiling point of the aqueous saturated solution.		
Temperature	Sample Mass	Magnesium Oxide
	mass/g	mass/g
Room	84.82	0.0015 ± 0.00005
Boiling	84.82	0.0016
		$m_1/\text{mol kg}^{-1}$
		4.5 × 10 ⁻⁴
		4.7 × 10 ⁻⁴
The compiler calculated the molal values.		
AUXILIARY INFORMATION		
METHOD/APPARATUS/PROCEDURE: Equilibration for 24 hours, followed by filtration. No other experimental details given.	SOURCE AND PURITY OF MATERIALS: (1) Magnesium hydroxide. Basic magnesium hydroxide was precipitated from magnesium sulfate by carbonic acid and ammonia. The precipitate was dissolved in nitric acid and reprecipitated the same way in order to obtain a pure product. It was then decomposed to MgO by heating to constant weight in a platinum crucible.	
	ESTIMATED ERROR: No estimates possible.	
	REFERENCES:	

COMPONENTS: (1) Magnesium hydroxide; Mg(OH) ₂ ; [1309-42-8] (2) Water; H ₂ O; [7732-18-5]	ORIGINAL MEASUREMENTS: Kohlrausch, F.; Rose, F. <i>Z. Phys. Chem. Stoechiom. Verwandtschaftsl.</i> 1893, 12, 235-43.
VARIABLES: $T/K = 283, 291$	PREPARED BY: I. Lambert

EXPERIMENTAL VALUES:

The authors measured the conductivity of saturated Mg(OH)₂ solutions at 10 and 18°C. From their results they estimated the solubility of Mg(OH)₂ in water to be 9 mg L⁻¹ or 1×10^{-4} mol L⁻¹ at 18°C. The solubility ratio, $c_{10}/c_{18} = 0.85$ (the same as the conductivity ratio).

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE: The conductivity of water was subtracted from the total conductivity of the saturated solution. The calculation of the solubility seems to have been performed through empirical coefficients. No details are given.	SOURCE AND PURITY OF MATERIALS: Nothing specified.
	ESTIMATED ERROR: No estimates possible.
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Magnesium hydroxide; Mg(OH) ₂ ; [1309-42-8] (2) Water; H ₂ O; [7732-18-5]	Dupre, F. T. B.; Bialas, J. Angew. Chem. 1903, 16, 54-5.
VARIABLES: T/K = 291	PREPARED BY: I. Lambert

EXPERIMENTAL VALUES:

Based on conductivity at 18°C:

Conductance of saturated solution

$\kappa_{\text{sln}} = 77.82 \times 10^{-6} \text{ S cm}^{-1}$

Conductance of distilled water

$\kappa_w = 15.23 \times 10^{-6} \text{ S cm}^{-1}$

Conductance due to Mg(OH)₂

$\kappa = 62.59 \times 10^{-6} \text{ S cm}^{-1}$

The solubility was calculated from

$c_1 = 1000\kappa/\Lambda_0(\text{Mg(OH)}_2)$

based on the data of Kohlrausch, which gives

$\Lambda_0(1/2 \text{ Mg(OH)}_2) = 217.4 \text{ S cm}^2 \text{ mol}^{-1}.$

Using

$\Lambda_0(\text{Mg(OH)}_2) = 434.8 \text{ S cm}^2 \text{ mol}^{-1}$

from the above equation,

$S_{\text{oly}} = 1.44 \times 10^{-4} \text{ mol L}^{-1}.$

AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS: (1) Magnesium hydroxide. MgO was purified from carbonate by heating in a platinum crucible. (2) Water. Distilled several times, free of air.
	ESTIMATED ERROR: No estimates possible.
	REFERENCES: 1. Kohlrausch, L.; Holborn <u>Leitvermögen von Electrolyten</u> . Leipzig: 1898.

COMPONENTS: (1) Magnesium hydroxide; Mg(OH) ₂ ; [1309-42-8] (2) Water; H ₂ O; [7732-18-5]	ORIGINAL MEASUREMENTS: Tamm, O. <i>Z. Phys. Chem. Stoechiom. Verwandtschaftsl.</i> <u>1910</u> , 74, 496-502.
VARIABLES: $T/K = 291$	PREPARED BY: H. L. Clever
EXPERIMENTAL VALUES:	
<p>The paper reports an investigation of equilibrium between Mn(OH)₂ and the oxy acids citric, glycolic, lactic malic and tartaric. Measurements were made on the solubility of both Mn(OH)₂ and Mg(OH)₂ in water at 18°C by conductivity. The saturated Mg(OH)₂ solution was reported to have a conductivity of 8.9×10^{-5} from which it was calculated the solubility of Mg(OH)₂ is 0.012 g L^{-1} or $2 \times 10^{-4} \text{ mol L}^{-1}$ at 18°C.</p>	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: Nothing specified.	SOURCE AND PURITY OF MATERIALS: Nothing specified.
	ESTIMATED ERROR: No estimates possible
	REFERENCES:

COMPONENTS:		ORIGINAL MEASUREMENTS:
(1) Magnesium hydroxide; Mg(OH) ₂ ; [1309-42-8]		Remy, H.; Kuhlmann, A.
(2) Water; H ₂ O; [7732-18-5]		Z. Anal. Chem. 1924, 65, 1-24. Z. Elektrochem. Angew. Phys. Chem. 1925, 31, 93.
VARIABLES:	PREPARED BY:	
$T/K \approx 291 - 297$		H. Einaga
EXPERIMENTAL VALUES:		
Solubility of Mg(OH) ₂ in water at 18 - 24°C		
Mg(OH) ₂ $10^4 c_1 / \text{mol L}^{-1}$	Method	Remarks
3.97	Gravimetry	Inactive form of Mg(OH) ₂
3.48	Conductivity measurement	"
3.92	Conductimetric titration	"
AUXILIARY INFORMATION		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
MgO was equilibrated with conductivity water for 3.75 - 48 hours. Solubility of Mg(OH) ₂ was determined for the saturated filtrate by a gravimetric method with evaporation of the solvent, by conductivity measurements, or by conductimetric neutralization titration with HCl and KOH solutions. Contamination by CO ₂ was avoided ultimately by the gravimetric method and the method of conductimetric titration. Influence of CO ₂ was corrected for in the calculation of solubility of Mg(OH) ₂ from the conductivity data in the method of conductivity measurements by taking equilibrium	(1) Magnesium hydroxide. MgO was calcined before use. (2) Water. Conductivity water of approximately $1 \times 10^{-6} \text{ S cm}^{-1}$ was used for the preparation of the saturated solution.	
$\text{CO}_2 + 2\text{OH}^- \rightleftharpoons \text{CO}_3^{2-} + \text{H}_2\text{O}$, into consideration.		
ESTIMATED ERROR: Temp.: precision $\pm 3 \text{ K}$ (compiler). Solv.: precision $\pm 2 \%$ (compiler).		
REFERENCES:		

COMPONENTS:		ORIGINAL MEASUREMENTS:										
(1) Magnesium hydroxide; Mg(OH) ₂ ; [1309-42-8]		Busch, W.										
(2) Water; H ₂ O; [7732-18-5]		Z. Anorg. Allg. Chem. 1927, 161, 161-79.										
VARIABLES:		PREPARED BY:										
T/K = 298		H. Einaga										
EXPERIMENTAL VALUES:		Solubility of Mg(OH) ₂ in water at 25°C										
		<table border="1"> <thead> <tr> <th>Mg(OH)₂ $10^4 c_1/\text{mol L}^{-1}$</th><th>Equilibration time t/hours</th></tr> </thead> <tbody> <tr> <td>2.14</td><td>8</td></tr> <tr> <td>2.13</td><td>8</td></tr> <tr> <td>2.08</td><td>14</td></tr> <tr> <td>2.06</td><td>20</td></tr> </tbody> </table>	Mg(OH) ₂ $10^4 c_1/\text{mol L}^{-1}$	Equilibration time t/hours	2.14	8	2.13	8	2.08	14	2.06	20
Mg(OH) ₂ $10^4 c_1/\text{mol L}^{-1}$	Equilibration time t/hours											
2.14	8											
2.13	8											
2.08	14											
2.06	20											
<p>Decrease in solubility with prolonged equilibration was explained by the original author to be due to change of Mg(OH)₂ from active (or labile) to stable form as suggested by Gjaldbaek (ref 1).</p>												
AUXILIARY INFORMATION												
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:											
Purified MgO was mixed with freshly distilled conductivity water at $29.0 \pm 0.1^\circ\text{C}$ for 8 to 20 hours. The resulting saturated solution was filtered, H ₂ SO ₄ was added to the filtrate, and the solution was titrated potentiometrically with KOH solution to determine dissolved Mg(OH) ₂ . Contamination of atmospheric CO ₂ was avoided by using stoppered flasks and liquid paraffin. Care was taken during filtration not to carry away any residual Mg(OH) ₂ from the saturated solution.	(1) Magnesium hydroxide. MgO of Merck was dissolved in HNO ₃ ; the resulting Mg(NO ₃) ₂ was recrystallized and ignited to MgO at 850°C. (2) Water.											
ESTIMATED ERROR:												
Temp.: precision ± 0.1 K. Precision in the titration procedure was about 1.2 %.												
REFERENCES:												
1. Gjaldbaek, J. K. Z. Anorg. Allg. Chem. 1925, 144, 269.												

COMPONENTS: (1) Magnesium hydroxide; Mg(OH) ₂ ; [1309-42-8] (2) Water; H ₂ O; [7732-18-5]	ORIGINAL MEASUREMENTS: Travers, A.; Nouvel <i>C. R. Hebd. Seances Acad. Sci.</i> <u>1929, 188, 499-501.</u>
VARIABLES: $T/K = 291 - 473$	PREPARED BY: H. Einaga
EXPERIMENTAL VALUES:	
Solubility of Mg(OH)₂ in water	
<u>$t/^\circ C$</u>	<u>$Mg(OH)_2$</u> <u>$10^4 c_1/\text{mol L}^{-1}$</u>
18	2.45
18	1.72
18	1.68
18	1.85
18	1.75
35	1.69
45	1.5
70 - 75	1.18
100	0.72
110	0.74
142	0.44
150	0.37
158	0.31
178	0
200	0

Solubility of Mg(OH) ₂ in water decreased linearly with increasing temperature in the range 35 - 100°C.	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: Mg(OH) ₂ and water were equilibrated in a Cu flask or autoclave for 1 to 2 days. The dissolved Mg(OH) ₂ was determined by titration with standard acid solution either potentiometrically using a hydrogen electrode or with phenol red as an indicator. A CO ₂ free atmosphere was maintained during the titration.	SOURCE AND PURITY OF MATERIALS: (1) Magnesium hydroxide. Crystal-line form used. (2) Water. Freshly distilled water (pH 6.8) was used for the preparation of the saturated solution of Mg(OH) ₂ to avoid contamination by atmospheric CO ₂ .
ESTIMATED ERROR:	
Solv.: precision \pm 9 % (18°C).	
REFERENCES:	

COMPONENTS:		ORIGINAL MEASUREMENTS:								
(1) Calcium hydroxide; Ca(OH)_2 ; [1305-62-0]		Guthrie, F.								
(2) Water; H_2O ; [7732-18-5]		<i>Philos. Mag. [5] 1878, 6, 35-44.</i>								
VARIABLES:	PREPARED BY:									
$T/K = 273$	I. Lambert									
EXPERIMENTAL VALUES:										
The $\text{Ca(OH)}_2 + \text{H}_2\text{O}$ system at -0.15°C										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding-bottom: 5px;">CaO</th> <th style="text-align: left; padding-bottom: 5px;">Solid Phase Composition</th> </tr> <tr> <th style="text-align: left; padding-bottom: 5px;">mass %</th> <th style="text-align: left; padding-bottom: 5px;"></th> </tr> </thead> <tbody> <tr> <td style="text-align: left; padding-top: 5px;">0.26</td> <td style="text-align: left; padding-top: 5px;"></td> </tr> <tr> <td style="text-align: left; padding-top: 5px;">0.29</td> <td style="text-align: left; padding-top: 5px;"></td> </tr> <tr> <td style="text-align: left; padding-top: 5px; font-weight: bold;">Av. 0.275 ± 0.02</td> <td style="text-align: left; padding-top: 5px; font-weight: bold;">$\text{CaO} + 1116 \text{ H}_2\text{O}$</td> </tr> </tbody> </table>	CaO	Solid Phase Composition	mass %		0.26		0.29		Av. 0.275 ± 0.02	$\text{CaO} + 1116 \text{ H}_2\text{O}$
CaO	Solid Phase Composition									
mass %										
0.26										
0.29										
Av. 0.275 ± 0.02	$\text{CaO} + 1116 \text{ H}_2\text{O}$									
<p>In modern terms the experiment reported here was a determination of the eutectic composition and temperature of the system.</p> <p>A solution of this composition will freeze to a solid of the same composition.</p>										
AUXILIARY INFORMATION										
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:									
A solution saturated with Ca(OH)_2 at room temperature is cooled until the temperature of formation of cryohydrate [eutectic composition] is reached and cryohydrate is solidified.	Nothing specified.									
Analysis not specified, but it is probably carbonate precipitation and weighing of CaCO_3 (method used by author for Ba determination).	ESTIMATED ERROR:									
	Std. Dev. about 8 %.									
	REFERENCES									

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Calcium hydroxide; Ca(OH)_2 ; [1305-62-0]	Lamy, A.
(2) Water; H_2O ; [7732-18-5]	<i>Ann. Chim. Phys.</i> 1878, 14, 145-90.
VARIABLES: $T/K = 273 - 373$	PREPARED BY: H. Einaga I. Lambert

EXPERIMENTAL VALUES:

The solubility of Ca(OH)_2 in water at 0 to 100°C

$t/^\circ\text{C}$	Calcium Oxide			Calcium Hydroxide		
	$\text{CaO/g (kg soln.)}^{-1}$			$10^2 m_1/\text{mol kg}^{-1}$		
	(a)	(b)	(c)	(a)	(b)	(c)
0	1.362	1.381	1.430	2.432	2.446	2.554
10	1.311	1.342	1.384	2.341	2.396	2.471
15	1.277	1.299	1.348	2.280	2.319	2.407
30	1.142	1.162	1.195	2.039	2.074	2.133
45	0.986	1.005	1.033	1.760	1.794	1.844
	0.996 (ref 1)					
60	0.844	0.868	0.885	1.506	1.549	1.579
100	0.562	0.576	0.584	1.003	1.028	1.042

(a) - (c); See Source and Purity of Materials.
 Results for the two highest temperatures were corrected
 for the dissolution of container glass.

NOTE: The unit g (kg soln.)⁻¹, used by the author.

The Ca(OH)_2 molality values were calculated by the compiler.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Ca(OH)_2 (or CaO) was equilibrated with water at the specified temperature. The resulting saturated solution was filtered, acidified with H_2SO_4 to convert the Ca^{2+} in the solution to CaSO_4 , ignited for gravimetric determination.	(1) Calcium hydroxide. (a) White marble was dissolved in HNO_3 , and treated with $(\text{NH}_4)_2\text{CO}_3$ which precipitated CaCO_3 . The CaCO_3 was calcined to CaO, which was hydrated to Ca(OH)_2 . (b) The marble was directly calcined to CaO, which was hydrated to Ca(OH)_2 . (c) Red burned CaO was also used.
	(2) Water.
	ESTIMATED ERROR: Reproducibility better than 1 %.
	REFERENCES: 1. Lamy, A. <i>C. R. Hebdo. Seances Acad. Sci.</i> 1878, 86, 333.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Calcium hydroxide; Ca(OH)_2 ; [1305-62-0]	Maben, T.
(2) Water; H_2O ; [7732-18-5]	<i>Pharm. J. Trans.</i> [3] 1883, 14, 505.

VARIABLES:	PREPARED BY:
$T/\text{K} = 273 - 372$	I. Lambert

EXPERIMENTAL VALUES: The solubility of Ca(OH)_2 in water from 0 to 99°C		
$t/\text{°C}$	Calcium Oxide	Calcium Hydroxide
	$\text{CaO/g (100 g H}_2\text{O)}^{-1}$	$10^2 m_1/\text{mol kg}^{-1}$
0	0.131	2.34
5	0.130	2.32
10	0.129	2.30
15	0.128	2.29
20	0.126	2.25
25	0.120	2.14
30	0.116	2.07
35	0.109	1.95
40	0.107	1.91
45	0.101	1.80
50	0.098	1.75
55	0.090	1.61
60	0.088	1.57
65	0.082	1.46
70	0.080	1.43
75	0.076	1.36
80	0.073	1.30
85	0.072	1.29
90	0.063	1.13
95	0.060	1.07
99	0.060	1.07

The molal solubilities were calculated by the compiler.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
A glass beaker containing Ca(OH)_2 and distilled water was placed in a water bath. The water bath was heated or cooled to bring to the desired temperature as indicated by a thermometer in the bath. The beaker contents were filtered as soon as the desired temperature was reached. The Ca(OH)_2 in solution was titrated by acidimetry.	(1) Calcium hydroxide. The material was considered as "perfectly free from impurities" by the author. (2) Water. Distilled.
	ESTIMATED ERROR: No estimates possible.
	REFERENCES:

COMPONENTS:		ORIGINAL MEASUREMENTS:		
(1) Calcium hydroxide; Ca(OH)_2 ; [1305-62-0]		Shenstone, W. A.; Cundall, J. T.		
(2) Water; H_2O ; [7732-18-5]		J. Chem. Soc. 1888, 53, 544-50.		
VARIABLES:		PREPARED BY:		
$T/K = 292, 423$		I. Lambert		
EXPERIMENTAL VALUES:				
The solubility of Ca(OH)_2 in water				
$t/^\circ\text{C}$	Parts Soln. per Part Ca(OH)_2	CaO $/\text{g kg}^{-1}$		
19	640	1.18		
150	3081	0.246		
The compiler calculated the CaO solubility values.				
AUXILIARY INFORMATION				
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:			
The vessel used in the measurement was a platinum tube. Care was taken to avoid CO_2 . No other details given.	Nothing specified.			
ESTIMATED ERROR:				
No estimates possible.				
REFERENCES:				

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Calcium hydroxide; $\text{Ca}(\text{OH})_2$; [1305-62-0]	Herzfeld, A.
(2) Water; H_2O ; [7732-18-5]	Z. Ver. Rubenzuck.-Ind. <u>1897</u> , 818-20. *Chem. Zentralbl. <u>1897</u> II, 932.

VARIABLES:	PREPARED BY:
$T/\text{K} = 288 - 353$	I. Lambert

EXPERIMENTAL VALUES: The solubility of $\text{Ca}(\text{OH})_2$ in water, 15-80 °C		
$t/\text{°C}$	Parts H_2O for 1 part CaO	Calcium Hydroxide $10^2 m_1/\text{mol kg}^{-1}$
15	776	2.30
20	813	2.20
25	848	2.10
30	885	2.02
35	924	1.93
40	962	1.86
45	1004	1.78
50	1044	1.71
55	1108	1.61
60	1158	1.54
65	1244	1.44
70	1330	1.34
75	1410	1.27
80	1482	1.20

The molal solubility of $\text{Ca}(\text{OH})_2$ was calculated by the compiler.

AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Equilibrium was reached both from undersaturation (by cooling of a saturated boiling solution) and from supersaturation (by heating a solution saturated at room temperature). Calcium hydroxide was analyzed by acidimetry of the filtered solution. No other experimental details are given.	<p>(1) Calcium oxide. Prepared from calcium oxalate by thermal decomposition. Hydrated and heated to obtain CaO free of CO_2.</p> <p>(2) Water. Not specified.</p>
	<p>ESTIMATED ERROR: No estimates possible.</p> <p>REFERENCES:</p>

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Calcium hydroxide; Ca(OH)_2 ; [1305-62-0] (2) Water; H_2O ; [7732-18-5]	Herold, I. <i>Z. Elektrochem. Angew. Phys. Chem.</i> <u>1905</u> , 11, 417-30.
VARIABLES: $T/K = 393 - 463$	PREPARED BY: H. Einaga Y. Komatsu

EXPERIMENTAL VALUES:

The solubility of Ca(OH)_2 in water, 120-190 °C

$t/^\circ\text{C}$	Calcium Oxide	Calcium Hydroxide
	/g L ⁻¹	$c_1/\text{mol L}^{-1}$
120	0.314	0.00560
	0.309	0.00551
	0.301	0.00537
150	0.167	0.00298
	0.171	0.00305
	0.169	0.00301
190	0.088	0.0016
	0.083	0.0015
	0.080	0.0014

The solid phase in equilibrium with the saturated solution was Ca(OH)_2 .

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Aqueous solutions saturated with Ca(OH)_2 at room temperature were equilibrated in a steel autoclave at the specified temperature for 6-8 h. The equilibrated solution was filtered under pressure through a platinum filter. The pressure was reduced to atmospheric, and the filtrate removed. The Ca(OH)_2 in the filtrate was determined by titration with standard HCl solution using phenolphthalein as an indicator.	(1) Calcium oxide. Merck, Inc. From marble containing traces of Fe. Used as received. (2) Water. Doubly distilled.
	ESTIMATED ERROR: Relative error: about $\pm 2\%$ or better (compiler).
	REFERENCES:

COMPONENTS: (1) Calcium hydroxide; $\text{Ca}(\text{OH})_2$; [1305-62-0] (2) Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Moody, G. T.; Leyson, L. T. <i>J. Chem. Soc., Trans.</i> 1908, 93, 1767-72.																																				
VARIABLES: $T/K = 275 - 353$	PREPARED BY: H. Einaga Y. Komatsu																																				
EXPERIMENTAL VALUES:																																					
The solubility of $\text{Ca}(\text{OH})_2$ in water at 2 to 80°C																																					
<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: center;">Calcium Oxide g H_2O required to dissolve 1 g of CaO</th> <th style="text-align: center;">Calcium Hydroxide $c_1/\text{mol L}^{-1}$</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">2</td><td style="text-align: center;">768.5</td><td style="text-align: center;">0.02320</td></tr> <tr><td style="text-align: center;">10</td><td style="text-align: center;">786.8</td><td style="text-align: center;">0.02266</td></tr> <tr><td style="text-align: center;">15</td><td style="text-align: center;">804.3</td><td style="text-align: center;">0.02216</td></tr> <tr><td style="text-align: center;">20</td><td style="text-align: center;">826.4</td><td style="text-align: center;">0.02158</td></tr> <tr><td style="text-align: center;">25</td><td style="text-align: center;">868.7</td><td style="text-align: center;">0.02052</td></tr> <tr><td style="text-align: center;">30</td><td style="text-align: center;">908.2</td><td style="text-align: center;">0.01963</td></tr> <tr><td style="text-align: center;">40</td><td style="text-align: center;">988.1</td><td style="text-align: center;">0.01805</td></tr> <tr><td style="text-align: center;">50</td><td style="text-align: center;">1083.0</td><td style="text-align: center;">0.01647</td></tr> <tr><td style="text-align: center;">60</td><td style="text-align: center;">1179.0</td><td style="text-align: center;">0.01512</td></tr> <tr><td style="text-align: center;">70</td><td style="text-align: center;">1274.8</td><td style="text-align: center;">0.01399</td></tr> <tr><td style="text-align: center;">80</td><td style="text-align: center;">1368.1</td><td style="text-align: center;">0.01303</td></tr> </tbody> </table>	$t/^\circ\text{C}$	Calcium Oxide g H_2O required to dissolve 1 g of CaO	Calcium Hydroxide $c_1/\text{mol L}^{-1}$	2	768.5	0.02320	10	786.8	0.02266	15	804.3	0.02216	20	826.4	0.02158	25	868.7	0.02052	30	908.2	0.01963	40	988.1	0.01805	50	1083.0	0.01647	60	1179.0	0.01512	70	1274.8	0.01399	80	1368.1	0.01303	
$t/^\circ\text{C}$	Calcium Oxide g H_2O required to dissolve 1 g of CaO	Calcium Hydroxide $c_1/\text{mol L}^{-1}$																																			
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The $\text{Ca}(\text{OH})_2$ concentrations were calculated by the compilers.																																					
AUXILIARY INFORMATION																																					
METHOD/APPARATUS/PROCEDURE: Water was saturated with CaO by stirring for 10 days at a specified temperature. The saturated solution was analyzed for Ca^{2+} by a neutralization titration.	SOURCE AND PURITY OF MATERIALS: (1) Calcium oxide. The purest calcite obtainable was calcined to CaO. (2) Water. Recently boiled distilled water.																																				
	ESTIMATED ERROR: No estimates possible.																																				
	REFERENCES:																																				

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Calcium hydroxide; Ca(OH)_2 ; [1305-62-0]	Tschugaeff, L.; Chlopin, W.
(2) Water; H_2O ; [7732-18-5]	Z. anorg. Chem. 1914, 86, 154-62. Zh. Russ. Fiz.-Khim. O-va., Chast Khim. 1914, 46, 1659-68.
VARIABLES:	PREPARED BY:
$T/K = 348, 368$	I. Lambert

EXPERIMENTAL VALUES.

The solubility of Ca(OH)_2 in H_2O at 75 and 95°C

$t/^\circ\text{C}$	Calcium Oxide	Calcium Hydroxide
	/g (100 g) ⁻¹	$m_1/\text{mol kg}^{-1}$
75	0.0705	0.0126
95	0.0580	0.0103

The molalities were calculated by the compiler.

Editor's Note: The authors names are listed as L. A. Chugaev and V. G. Khlopin in Chem. Abstr 1914, 8, 1897 and 1915, 9, 2176.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The temperature is controlled by the pressure over the boiling solution. Water and excess Ca(OH)_2 are placed in a glass container maintained at a fixed pressure by the combined use of a water pump and a constant air ingress. The solution is boiled at this pressure by placing the apparatus in a water bath at a temperature 5 to 10 degrees higher than the boiling point of the solution at the controlled pressure. After 1/2 hour of boiling, the solution is filtered by aspiration into a calibrated container located in the main vessel. Analysis is performed by drying and weighing.	Nothing specified.
ESTIMATED ERROR:	No estimates possible.
REFERENCES:	<ol style="list-style-type: none"> 1. Herzfeld, A. Z. Ver. Rubenzuck.-Ind. 1897, 818.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Calcium hydroxide; $\text{Ca}(\text{OH})_2$; [1305-62-0] (2) Water; H_2O ; [7732-18-5]	Shipley, J. W.; McHaffie, I. R. <i>J. Soc. Chem. Ind., London, Trans. Commun.</i> 1923, 42, 319T-26T.
VARIABLES: $T/K = 293$	PREPARED BY: I. Lambert

EXPERIMENTAL VALUES:

The solubility product of $\text{Ca}(\text{OH})_2$ in water at 20°C

The solubility product was calculated from the pH of a saturated solution and the value of the ion product of water assuming an ideal solution with no hydrolysis or complex formation.

$\text{Ca}(\text{OH})_2$ saturated solution, pH = 12.37

$$[\text{H}^+] [\text{OH}^-] = 1 \times 10^{-14}, [\text{OH}^-] = 0.0235 \text{ mol L}^{-1}$$

$$[\text{Ca}^{2+}] = (1/2) [\text{OH}^-] = 0.0117 \text{ mol L}^{-1}$$

$$\begin{aligned} \text{Solubility product, } K_{s0} &= [\text{Ca}^{2+}][\text{OH}^-]^2 \\ &= 6.46 \times 10^{-6} \end{aligned}$$

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Solubility and solubility product determined from pH measurements in saturated solutions. No other details given.	Nothing specified.
ESTIMATED ERROR:	No estimates possible.
REFERENCES:	

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Calcium hydroxide; Ca(OH)_2 ; [1305-62-0]	Haslam, R. T.; Calingaert, G.; Taylor, C. M.
(2) Water; H_2O ; [7732-18-5]	J. Am. Chem. Soc. 1924, 46, 308-11.
VARIABLES: $T/K = 283 - 353$	PREPARED BY: H. Einaga Y. Komatsu I. Lambert

EXPERIMENTAL VALUES:

Solubility of Ca(OH)_2 in water, 10-80 °C

$t/^\circ\text{C}$	Calcium Oxide	Calcium Hydroxide
	$/\text{g kg}^{-1}$ soln.	$m_1/\text{mol kg}^{-1}$
10	1.310	0.0234
42	1.018	0.0182
48	0.957	0.0171
56	0.884	0.0158
60	0.855	0.0153
61	0.842	0.0150
66	0.802	0.0143
70	0.762	0.0136
80	0.673	0.0120

The solubility of water decreased linearly with increasing solution temperature.

NOTE: The unit, g ($\text{kg soln.})^{-1}$, was used by the authors.

The Ca(OH)_2 molalities were calculated by the compilers.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Equilibration of Ca(OH)_2 in water was approached from both supersaturation and undersaturation sides. No definite procedures are given in the original paper. The dissolved Ca(OH)_2 was determined by titration with standard HCl solution using phenolphthalein as an indicator.	Nothing specified
	ESTIMATED ERROR: No estimates possible
	REFERENCES:

COMPONENTS:		ORIGINAL MEASUREMENTS:			
(1) Calcium hydroxide; $\text{Ca}(\text{OH})_2$; [1305-62-0]		Miller, L. B.; Witt, J. C.			
(2) Water; H_2O ; [7732-18-5]		<i>J. Phys. Chem.</i> 1929, 33, 285-9.			
VARIABLES:		PREPARED BY:			
$T/K = 303$		H. Einaga I. Lambert H. L. Clever			
EXPERIMENTAL VALUES:					
The solubility of $\text{Ca}(\text{OH})_2$ in water at 30°C					
Calcium Oxide $/g \text{ L}^{-1}$	Calcium Hydroxide $c_1/\text{mol L}^{-1}$	Equilibration Method	Preparation Method		
1.195	0.02131	A	a		
1.200	0.02140	B	a		
1.198	0.02136	A	a		
1.202	0.02143	B	a		
1.196	0.02133	A	a		
1.194	0.02129	A	a		
1.201	0.02142	B	b		
1.196	0.02133	B	b		
mean 0.02136 ± 0.00005					
No meaningful difference in the solubility was noticed from the origin of the starting material.					
The compiler calculated the $\text{Ca}(\text{OH})_2$ concentration values.					
AUXILIARY INFORMATION					
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:				
A. CaO was slaked with a small amount of conductivity water and allowed to stand 24 h. It was then added to conductivity water at 30°C in 1 L Pyrex bottles and shaken until equilibrium reached as indicated by conductivity measurements. B. The CaO was placed directly into 1 L Pyrex bottles nearly filled with conductivity water, allowed to slake and likewise was shaken until equilibrium was reached.	<p>(1) Calcium hydroxide. (a) Iceland spar was calcined to CaO, and hydrated to $\text{Ca}(\text{OH})_2$. (b) A chemically pure sample of CaCO_3 was dissolved in HNO_3, followed by precipitation with $(\text{NH}_4)_2\text{CO}_3$. The precipitated CaCO_3 was ignited to CaO, and hydrated to $\text{Ca}(\text{OH})_2$.</p> <p>(2) Water. Conductivity water.</p>				
The Ca^{2+} in the saturated solution was determined gravimetrically after precipitation as the oxalate and ignition to CaO.	ESTIMATED ERROR: Temp.: precision ± 0.005 K. Solv.: reproducibility better than ± 0.34 %.				
The crystals in B. are more finely divided when conductivity measurements begin. They may initially show a higher solubility. However, time-conductivity studies show both methods come to the same solubility value in 32-36 h.	REFERENCES:				

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Calcium hydroxide; Ca(OH)_2 ; [1305-62-0]	Bassett, H.
(2) Water; H_2O ; [7732-18-5]	J. Chem. Soc. <u>1934</u> , 1270-5.

EXPERIMENTAL VALUES:

Solubility of coarse grain Ca(OH)_2 in water

t/ $^{\circ}\text{C}$	CaO g/100 g solution	Ca(OH)_2 $m_1/\text{mol kg}^{-1}\text{a}$
-0.116	0.130	0.0232
0	0.130	0.0232
5	0.128	0.0228
10	0.125	0.0223
15	0.122	0.0218
25	0.113	0.0202
30	0.109	0.0195
40	0.100	0.0178
45	0.0962	0.0172
50	0.0917	0.0164
55	0.0861	0.0154
60.8	0.0818	0.0146
81.7	0.0657	0.0117
90	0.0591	0.0105
95.3	0.0561	0.0100
99	0.0523	0.0093

Solubility of fine grain Ca(OH)_2 in water

t/ $^{\circ}\text{C}$	CaO g/100 g solution	Ca(OH)_2 $m_1/\text{mol kg}^{-1}\text{a}$
-0.123	0.144	0.0257
-0.123	0.140	0.0250
0	0.151	0.0270
0	0.143	0.0255
5	0.142	0.0254
10	0.138	0.0246
15	0.133	0.0237
25	0.129	0.0230
30	0.121	0.0216
40	0.107	0.0191
50	0.0968	0.0173
60	0.0917	0.0164
70	0.0800	0.0143

^aCalculated by compilers.

(continued on next page)

COMPONENTS: (1) Calcium hydroxide; $\text{Ca}(\text{OH})_2$; [1305-62-0] (2) Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Bassett, H. <i>J. Chem. Soc.</i> 1934, 1270-5.
VARIABLES: $T/K = 273 - 372$	PREPARED BY: H. Einaga Y. Komatsu I. Lambert
EXPERIMENTAL VALUES:	
Solid phase in equilibrium with the saturated solution was $\text{Ca}(\text{OH})_2$. Influence of grain size of the starting material on the solubility was stressed.	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: Water was saturated with $\text{Ca}(\text{OH})_2$ by mechanically shaking the mixtures at the specified temperatures. The mixtures were agitated in Ag or Pt bottles for six hours a month. The supernatant portion of the saturated solutions were analyzed for Ca^{2+} by precipitation as oxalate followed by titration with standard KMnO_4 solution.	SOURCE AND PURITY OF MATERIALS: (1) Calcium hydroxide. Obtained by slaking CaO which was obtained by ignition of pure precipitated CaCO_3 . Both coarse and fine grains were used. (2) Water.
	ESTIMATED ERROR: No estimates possible.
	REFERENCES:

COMPONENTS: (1) Calcium hydroxide; $\text{Ca}(\text{OH})_2$; [1305-62-0] (2) Water; H_2O ; [7732-18-5]		ORIGINAL MEASUREMENTS: Larocque, G. L.; Maass, O. <i>Can. J. Res., Sec. B</i> <u>1935</u> , 13, 276-9.
VARIABLES: $T/K = 273 - 303$		PREPARED BY: I. Lambert
EXPERIMENTAL VALUES:		
Solubility of $\text{Ca}(\text{OH})_2$ in water at 0 to 30°C		
<u><u>$t/^\circ\text{C}$</u></u>	<u><u>CaO/g L^{-1}</u></u>	<u><u>$10^2 c_1/\text{mol L}^{-1}$</u></u>
0	1.456	2.60
5	1.430	2.55
10	1.404	2.50
15	1.370	2.45
20	1.333	2.38
25	1.284	2.29
30	1.230	2.20
The $\text{Ca}(\text{OH})_2$ concentrations were calculated by the compiler.		
AUXILIARY INFORMATION		
METHOD/APPARATUS/PROCEDURE: Electrical conductivities in lime solutions of known concentration and in saturated solutions were measured with a stirring glass system under CO_2 free air in a constant temperature bath. The system was kept one hour at each temperature with periodic conductivity readings. Equilibrium was established from both increasing and decreasing temperature, and the average result was reported. The solubility was calculated by plotting the isothermal conductivity versus concentration and taking the intercept with the level corresponding to saturation.	SOURCE AND PURITY OF MATERIALS: (1) Calcium oxide. Prepared by heating Iceland spar crystals at 100°C for several days. The absence of CO_2 was tested. (2) Water. Distilled. Freed from gases by repeated cycles of freezing, evacuating, and melting.	ESTIMATED ERROR: Temp.: not stated, but given to 0.01 K in paper; Soly.: precision $\pm 0.008 \text{ g L}^{-1} \text{ CaO}$ (authors).
Grieve, Gurd and Maas (ref 1) used the same method to obtain solubility values of 1.55, 1.45, 1.34 and 1.28 g L^{-1} at temperatures of 0, 10, 18, and 25°C , respectively. The results are considered less accurate than the present work.	REFERENCES: 1. Grieve, A. D.; Gurd, G. W.; Maass, O. <i>Can. J. Res.</i> <u>1933</u> , 8, 577.	

COMPONENTS: (1) Calcium hydroxide; Ca(OH)_2 ; [1305-62-0] (2) Water; H_2O ; [7732-18-5]		ORIGINAL MEASUREMENTS: Peppler, R. B.; Wells, L. S. <i>J. Res. Natl. Bur. Stand. (U.S.)</i> <u>1954, 52, 75-92.</u>																					
VARIABLES: $T/K = 303-523$		PREPARED BY: H. Einaga I. Lambert																					
EXPERIMENTAL VALUES:																							
The solubility of Ca(OH)_2 in water at 30 to 250°C																							
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">$t/\text{°C}$</th> <th style="text-align: center;">$\text{Ca(OH)}_2 / \text{g L}^{-1}$</th> <th style="text-align: center;">$\text{Ca(OH)}_2 / \text{mol L}^{-1}$</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">30</td><td style="text-align: center;">1.03</td><td style="text-align: center;">0.0184</td></tr> <tr> <td style="text-align: center;">125</td><td style="text-align: center;">0.380</td><td style="text-align: center;">0.00678</td></tr> <tr> <td style="text-align: center;">150</td><td style="text-align: center;">0.270</td><td style="text-align: center;">0.00481^a</td></tr> <tr> <td style="text-align: center;">150</td><td style="text-align: center;">0.247</td><td style="text-align: center;">0.00440</td></tr> <tr> <td style="text-align: center;">200</td><td style="text-align: center;">0.05</td><td style="text-align: center;">0.0009</td></tr> <tr> <td style="text-align: center;">250</td><td style="text-align: center;">0.037</td><td style="text-align: center;">0.00066</td></tr> </tbody> </table>			$t/\text{°C}$	$\text{Ca(OH)}_2 / \text{g L}^{-1}$	$\text{Ca(OH)}_2 / \text{mol L}^{-1}$	30	1.03	0.0184	125	0.380	0.00678	150	0.270	0.00481 ^a	150	0.247	0.00440	200	0.05	0.0009	250	0.037	0.00066
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<p>^a The solid in equilibrium with the saturated solution was very fine crystals. The solid used in the other runs was large crystals of Ca(OH)_2. In all cases the solid in equilibrium with the saturated solutions was well crystallized Ca(OH)_2.</p>																							
AUXILIARY INFORMATION																							
METHOD/APPARATUS/PROCEDURE: An aqueous solution saturated with Ca(OH)_2 at room temperature was heated in a pressure bomb at specified temperatures (125-250°C) for 5 to 10 days. After the equilibration the saturated solution was removed, and analyzed for Ca^{2+} by a gravimetric method by precipitation as the oxalate and calcination to CaO .	SOURCE AND PURITY OF MATERIALS: (1) Calcium hydroxide. The Ca(OH)_2 solutions were prepared by dissolving CaO in distilled water. The CaO was prepared by heating reagent grade CaCO_3 at 950°C. (2) Water. Distilled.	ESTIMATED ERROR: No estimates possible.																					
REFERENCES:																							

COMPONENTS:		ORIGINAL MEASUREMENTS:					
(1) Calcium hydroxide; $\text{Ca}(\text{OH})_2$; [1305-62-0]		Hedin, R.					
(2) Water; H_2O ; [7732-18-5]		<i>Handl. Sven. Forskningsinst. Gem. Betong. K. Tek. Hoegsk. Stockholm 1955</i> , No. 27, 14 pp (in English).					
		<i>Chem. Abstr.</i> 1956, 50, 6147c.					
EXPERIMENTAL VALUES:							
The solubility of $\text{Ca}(\text{OH})_2$ in water as a function of particle size at several temperatures							
Temperature	$\log c_{\text{CaO}}$	1/Diameter	$\text{Ca}(\text{OH})_2$ Method of Synthesis*	Quadratic mean deviation on D μm			
$t/^\circ\text{C}$	c in g L^{-1}	$1/(D/\mu\text{m})$					
24	0.064	0.00	K	-			
25.5	0.058	0.00	K	-			
30.5	0.040 0.043 0.044 0.046 0.063 0.064	0.00 0.31 0.31 0.65 1.72 1.80	K K K S K K	- 0.19 0.22 0.20 0.23 0.18			
32.0	0.033 0.042	0.00 0.65	K S	- 0.21			
33.0	0.030 0.047 0.055 0.067 0.066	0.00 1.40 1.76 2.51 2.61	K S S S S	- 0.22 0.25 0.19 0.23			
37.0	0.014 0.033 0.033 0.035 0.035 0.038 0.039 0.035 0.038 0.037 0.040 0.040 0.042	0.00 1.33 1.42 1.44 1.48 1.52 1.56 1.58 1.68 1.79 1.90 1.93 1.94	K S S S S S S S S S S S	- 0.24 0.21 0.21 0.20 0.24 0.19 0.23 0.18 0.24 0.18 0.21 0.16			
39.9	0.003	0.00	K	-			
42.0	-0.006	0.00	K	-			
44.0	-0.015	0.00	K	-			
45.6	-0.017 -0.018 0.006 0.007	0.31 0.31 1.90 2.21	K K S S	0.21 0.26 0.24 0.21			
48.2	-0.033 -0.022 -0.024 -0.002	0.00 0.66 0.66 2.21	K S S S	- 0.21 0.22 0.20			
51.6	-0.048 -0.032 -0.028 -0.021 -0.028	0.00 1.35 1.65 1.68 1.69	K S S S S	- 0.20 0.17 0.24 0.22			

Continued on the next page.

COMPONENTS:

- (1) Calcium hydroxide; $\text{Ca}(\text{OH})_2$; [1305-62-0]
 (2) Water; H_2O ; [7732-18-5]

ORIGINAL MEASUREMENTS:

Hedin, R.

Handl. Sven. Forskningsinst. Cem. Betong. K. Tek. Hoegsk. Stockholm
1955, No. 27, 14 pp (in English).

Chem. Abstr. 1956, 50, 6147c.

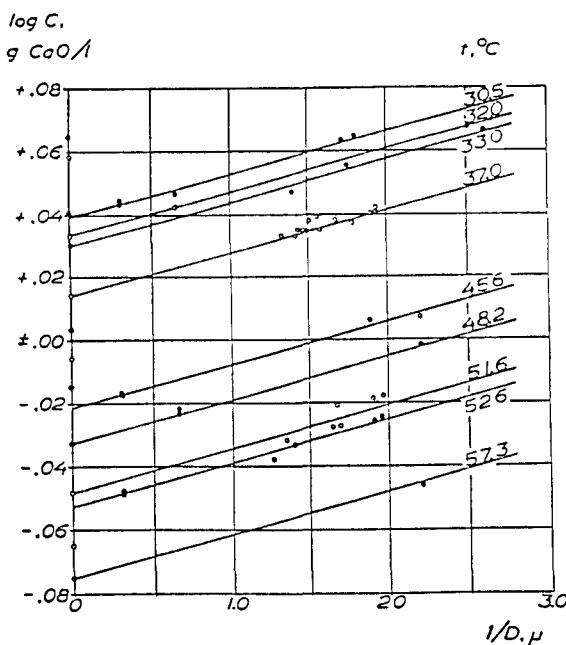
EXPERIMENTAL VALUES:

The solubility of $\text{Ca}(\text{OH})_2$ in water as a function of particle size at several temperatures (continued)

Temperature t/°C	Log c_{CaO} c in g L ⁻¹	1/Diameter 1/(D/ μm)	Ca(OH) ₂ Method of Synthesis*	Quadratic mean deviation on D μm
51.6	-0.019	1.91	S	0.24
	-0.018	1.97		0.24
52.6	-0.049	0.31	K	0.21
	-0.048	0.31		0.19
	-0.038	1.26		0.23
	-0.034	1.40		0.21
	-0.026	1.92		0.17
	-0.025	1.96		0.20
55.4	-0.065	0.00	K	-
57.3	-0.075	0.00	K	-
	-0.046	2.21		0.20

* K = Prepared by grinding crystalline product; S = prepared by slaking CaO.

ADDITIONAL DATA AND/OR COMMENTS:



Equilibrium concentrations of $\text{Ca}(\text{OH})_2$ solutions as a function of the temperature and the particle size in the solid phase.

COMPONENTS: (1) Calcium hydroxide; Ca(OH)_2 ; [1305-62-0] (2) Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Hedin, R. <i>Handl. Sven. Forskningsinst. Cem. Betong. K. Tek. Hoegsk. Stockholm 1955</i> , No. 27, 14 pp (in English). <i>Chem. Abstr.</i> 1956, 50, 6147c.
VARIABLES: $T/K = 297 - 330$	PREPARED BY: I. Lambert
EXPERIMENTAL VALUES:	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: About 100 mg of Ca(OH)_2 suspended in a few mL of water was poured into 100-150 mL of nearly saturated Ca(OH)_2 solution. The flask, equipped with a conductivity cell, was thermostated with shaking for 10 - 20 hours. The Ca(OH)_2 concentration was calculated from the equilibrium conductivity value. The relation between conductivity and concentration was taken from (ref 1). The particle size distribution of Ca(OH)_2 was determined by microscopic examination of suspended samples. The arithmetic mean value was used to characterize of particle size in each sample.	SOURCE AND PURITY OF MATERIALS: (1) Calcium hydroxide. Prepared by two methods. 1) Meth. K. Large Ca(OH)_2 crystals were formed by slow diffusion of NaOH and CaCl_2 solutions into a common vessel containing water. After washing and drying under protection from the atmosphere they were ground to powder in a mortar. 2) Meth. S. CaO , prepared by calcining commercial grade Ca(OH)_2 , was slaked with CO_2 free water to produce a thin milky suspension.
ESTIMATED ERROR:	
Temp.: $\pm 0.3 \text{ K}$ (precision) Soly.: $\pm 0.004 \text{ g L}^{-1} \text{ Ca(OH)}_2$	
REFERENCES:	
1. Ringqvist, G. <i>Handl. Sven. Forskningsinst. Cem. Betong K. Tek. Hoegsk. Stockholm 1952</i> , No. 19, 55 pp.	

COMPONENTS:		ORIGINAL MEASUREMENTS:
(1) Calcium hydroxide; $\text{Ca}(\text{OH})_2$; [1305-62-0]		Bates, R. G.; Bower, V. E.; Smith, E. R.
(2) Water; H_2O ; [7732-18-5]		J. Res. Natl. Bur. Stand. (U.S.) 1956, 56, 305-12.
VARIABLES:		PREPARED BY:
$T/K = 293 - 303$		H. Einaga I. Lambert H. L. Clever
EXPERIMENTAL VALUES:		
Solubility of $\text{Ca}(\text{OH})_2$ in water		
$t/\text{ }^\circ\text{C}$ $\text{Ca}(\text{OH})_2$ $m_1/\text{mol kg}^{-1}$		
20 0.0211		
25 $0.02037 \pm 0.00011(5)$ (initial detn) $0.02032 \pm 0.00006(4)$ (1 month) $0.02022 \quad (2)(6 \text{ months})$ 0.0203 Av.		
30 0.0196		
<p>These values are the averages determined at time 0, 1 month, and 6 months after the preparation of $\text{Ca}(\text{OH})_2$. No evolution with time was found. Detailed values given only at 25°C.</p>		
AUXILIARY INFORMATION		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
$\text{Ca}(\text{OH})_2$ was equilibrated with water at a specified temperature by agitation. The resulting saturated solutions were analyzed for Ca^{2+} by titration with standard HCl solution using phenol red as an indicator.	<p>(1) Calcium hydroxide. Chemically pure CaCO_3 containing low alkali was calcined at 1000°C for 45 minutes to CaO. The product was then hydrated to give $\text{Ca}(\text{OH})_2$. The precipitated $\text{Ca}(\text{OH})_2$ was dried at 110°C. Classified by authors as finely granular.</p> <p>(2) Water.</p>	
Equilibration was repeated at different times after the preparation of $\text{Ca}(\text{OH})_2$ in order to test its aging effect.	ESTIMATED ERROR:	
The authors state the results do not preclude a solubility lower by perhaps 1 to 3 percent for large well-defined crystals of $\text{Ca}(\text{OH})_2$.	Solv.: reproducibility is $\pm 0.5\%$ or better (authors).	
Concentrations (mol L^{-1}) and molality (mol kg^{-1}) differ by about 0.3 %.	REFERENCES:	

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Calcium hydroxide; $\text{Ca}(\text{OH})_2$; [1305-62-0]	Greenberg, S. A.; Copeland, L. E.
(2) Water; H_2O ; [7732-18-5]	J. Phys. Chem. 1960, 64, 1057-9.

EXPERIMENTAL VALUES:

An evaluation of the solubility product of $\text{Ca}(\text{OH})_2$ in water.

Solubility product values between 20 and 40 °C by several methods

$t/^\circ\text{C}$	$-\log K_{s0}^{\circ}$			
	Meth a	Meth b	Meth c	Av.
20	4.83	5.12	4.99	4.98
25	5.10	-	5.04	5.07
40	-	5.30	5.18	5.24

An evaluation was made of the solubility product of $\text{Ca}(\text{OH})_2$ from published data (ref 1 - 7). Three methods were used:

Method a. Solubility as a function of the concentration of sodium chloride solutions (ref 1 and 2). Solubility data at 20 °C (ref 1) and 25 °C (ref 2) as a function of sodium chloride concentration were analyzed by the relation

$\log m = 2A\mu^{0.5} = (1/3)\log (K_{s0}^{\circ}/4) - B\mu$, which had been derived from .

$$K_{s0} = m_{\text{Ca}^{2+}} \cdot m_{\text{OH}^-}^{-2} \cdot f_{\pm}^3 \quad \text{Eqn. I}$$

where

$m_{\text{Ca}(\text{OH})_2} = m_{\text{Ca}^{2+}} - (1/2)m_{\text{OH}^-}$, and $\log f_{\pm} = 2A\mu^{0.5} - B\mu$ Eqn. II (ref 8). Here, the authors allowed m to represent either concentration or molality since the solutions were dilute, f_{\pm} is the mean activity coefficient, and μ is the ionic strength. Solubility product values at zero ionic strength are obtained.

Method b. Solubility data as a function of hydroxyl ion concentration. Solubility data at 20 and 40 °C (ref 3) as a function of KOH or NaOH concentration were analyzed graphically by the relation

$$\log K_{s0} = 6A\mu^{0.5} = \log K_{s0}^{\circ} - 3B\mu, \text{ which had been derived from}$$

$$K_{s0} = m_{\text{Ca}^{2+}} \cdot m_{\text{OH}^-}^{-2} \text{ and Eqn. II.}$$

Method c. Solubility as a function of temperature. All the reported solubility data (ref 1 - 7) in the range of 20 to 100 °C were plotted against temperature. The good agreement among the values indicated that the equilibrium solid was always one form of crystalline $\text{Ca}(\text{OH})_2$. The values of Bates, Bower, and Smith (ref 4) were heavily weighted, and a line was put through the data. Values from this "best" line are in the following table. The Debye-Huckel equation was used to evaluate the mean activity coefficient at each temperature. It was combined with the solubility value to obtain values of the thermodynamic solubility product at five degree intervals between 20 and 100 °C.

The solubility product values were treated by a non-linear regression to obtain the equation:

$$\ln K_{s0}^{\circ} = 17.67 \ln (T/K) - 0.078(T/K) - 89.0$$

It was pointed out by the authors that the coexistence of CaOH^+ , the purity of the starting $\text{Ca}(\text{OH})_2$ samples, and the crystallinity of $\text{Ca}(\text{OH})_2$ did not influence the solubility data, and that only one form of crystalline $\text{Ca}(\text{OH})_2$ was present in equilibrium with its saturated solutions.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Calcium hydroxide; Ca(OH)_2 ; [1305-62-0]	Greenburg, S.; Copeland, L. E.
(2) Water; H_2O ; [7732-18-5]	J. Phys. Chem. 1960, 64, 1507-9.

VARIABLES:	PREPARED BY:
T/K = 293 - 373	H. Einaga I. Lambert

EXPERIMENTAL VALUES:

The solubility and solubility product of Ca(OH)_2 in water between 20 and 100 °C

$t/\text{°C}$	Calcium Hydroxide	
	$c_1/\text{mol L}^{-1}$	$10^6 K_{\text{so}}$
20	0.0211	10.2
25	0.0203	9.04
30	0.0195	8.00
35	0.0189	7.28
40	0.0183	6.64
45	0.0176	6.00
50	0.0169	5.52
55	0.0163	4.84
60	0.0155	4.24
65	0.0150	3.84
70	0.0142	3.24
75	0.0136	2.88
80	0.0128	2.44
85	0.0121	2.08
90	0.0114	1.76
95	0.0107	1.48
100	0.0100	1.24

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE: No original experimental data reported. The authors critically evaluated selected literature solubility data at various temperatures.	REFERENCES (Continued): 4. Bates, R. G.; Bower, V. E.; Smith, E. R. <i>J. Res. NBS</i> 1956, 56, 305.
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REFERENCES: 1. Dschorbenadse, D.; Mosebach, R.; Nacken, R. <i>Zement</i> 1942, 31, 513. 2. Johnstone, J.; Grove, C. <i>J. Am. Chem. Soc.</i> 1931, 53, 3976. 3. Fratini, S. <i>Ann. Chem. Appl.</i> 1949, 39, 616.	7. Mellor, J. "A Comprehensive Treatise on Inorganic and Theoretical Chemistry", Vol. III, Longmans, 1923, 623. 8. Hitchcock, D. I. <i>J. Am. Chem. Soc.</i> 1928, 50, 2076.
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COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Calcium hydroxide; Ca(OH)_2 ; [1305-62-0]	Koudelka, L.
(2) Water; H_2O ; [7732-18-5]	Chem. Prum. 1976, 26, 580-3.
VARIABLES:	PREPARED BY:
$T/K = 273$	J. Hala

EXPERIMENTAL VALUES:

The solubility of Ca(OH)_2 in water at 0°C

Equilibration time after preparation t/min	Ca(OH)_2 Initial Mixture /mass %	Ca^{2+} ^a c/mg cm^{-3}	Ca(OH)_2 ^b $c_1/\text{mg cm}^{-3}$	Ca(OH)_2 ^c $c_1/\text{mg cm}^{-3}$
0	1.5	0.89	1.65	1.67
	3.0	0.90	1.66	1.76
7	1.5	0.90	1.66	1.67
	3.0	0.92	1.70	1.67
15	1.5	0.92	1.70	1.70
	3.0	0.92	1.70	1.67
30	1.5	0.95	1.76	1.76
	3.0	0.93	1.72	1.67

^a determined by complexometric titration.^b calculated from (a).^c determined from titration with 0.1 mol L^{-1} HCl.For the 30 min experiment the average solubility is (1.73 ± 0.04) mg cm^{-3} or (0.0234 ± 0.0006) mol L^{-1} (compiler).

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Isothermal Method. Slaked lime containing about 20 mass % Ca(OH)_2 was prepared from CaO and distilled water. Mixtures containing initially either 1.5 or 3.0 mass % Ca(OH)_2 were equilibrated by mixing at 0°C for 30 minutes. Samples of the suspension were taken for analysis immediately after preparing the mixture, and then at 7, 15 and 30 minute intervals. The samples were filtered at 0°C through a sintered glass crucible (S2). The filtration took approximately 1 minute. Two aliquots of the filtrate were analyzed, one for Ca^{2+} by complexometric titration, and the other for Ca(OH)_2 by titration with standard 0.1 mol L^{-1} HCl.	(1) Calcium oxide. Lachema, Brno, Czechoslovakia. Analyzed titrimetrically and contained 96.3 mass % CaO.
ESTIMATED ERROR:	No estimates possible.
REFERENCES:	

COMPONENTS: (1) Calcium hydroxide; $\text{Ca}(\text{OH})_2$; [1305-62-0] (2) Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Edmiston, M. D.; Suter, R. W. <i>J. Chem. Ed.</i> . <u>1988</u> , 65, 279-80.
VARIABLES: $T/K = 293$	PREPARED BY: I. Lambert
EXPERIMENTAL VALUES:	
<p>The solubility of $\text{Ca}(\text{OH})_2$ in water was measured using a labelling technique at 20°C to be:</p> <p>$0.17 \text{ g } (\text{100 cm}^3)^{-1}$.</p> <p>The compiler calculated values of</p> <p>1.7 g dm^{-3} and</p> <p>$0.023 \text{ mol dm}^{-3}$ from the reported value.</p>	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: A 1.00 cm^{-3} solution of $0.100 \text{ mol dm}^{-3}$ CaCl_2 containing about 3 ppb of ^{45}Ca ($6.2 \mu\text{Ci}$, low β energy) is reacted with NaOH solution to precipitate $\text{Ca}(\text{OH})_2$. The precipitate is washed three times with pure water, and, each time separated from the water by centrifugation. The $\text{Ca}(\text{OH})_2$ is stirred twice with water, allowed to stand one minute after each stirring, and then centrifugated. The supernatant solution (1) is separated. The solid $\text{Ca}(\text{OH})_2$ is dissolved in HCl and combined with rinsing solutions from the preparation so all non-dissolved base is in solution (2). The two solutions are evaporated and the residue counted for ^{45}Ca . The quantity dissolved is calculated from $N(1)/[N(1) + N(2)]$, $N(1)$ and $N(2)$ being the number of counts for solutions (1) and (2), respectively.	SOURCE AND PURITY OF MATERIALS: (1) $\text{Ca}(\text{OH})_2$. Precipitated from CaCl_2 solution by NaOH. See method. (2) Water. Not specified.
ESTIMATED ERROR:	
Temp.: Not specified. Soly.: Not specified, compilers estimate 5 - 10 %.	
REFERENCES:	

COMPONENTS: (1) Strontium hydroxide; Sr(OH) ₂ ; [18480-07-4] (2) Water; H ₂ O; [7732-18-5]	ORIGINAL MEASUREMENTS: Guthrie, F. <i>Philos. Mag.</i> [5] <u>1878</u> , 6, 35-44.									
VARIABLES: $T/K = 273$	PREPARED BY: I. Lambert									
EXPERIMENTAL VALUES:										
The Sr(OH) ₂ + H ₂ O system at -0.1°C										
<table> <thead> <tr> <th>SrO</th> <th>Solid Phase Composition</th> </tr> <tr> <th>mass %</th> <th></th> </tr> </thead> <tbody> <tr> <td>0.3838</td> <td></td> </tr> <tr> <td>0.4020</td> <td></td> </tr> <tr> <td>Av. 0.3929 ± 0.012</td> <td>SrO + 1463 H₂O</td> </tr> </tbody> </table>	SrO	Solid Phase Composition	mass %		0.3838		0.4020		Av. 0.3929 ± 0.012	SrO + 1463 H ₂ O
SrO	Solid Phase Composition									
mass %										
0.3838										
0.4020										
Av. 0.3929 ± 0.012	SrO + 1463 H ₂ O									
<p>In modern terms the experiment reported here was a determination of the eutectic composition and temperature of the system.</p> <p>A solution of this composition will freeze to a solid of the same composition.</p>										
AUXILIARY INFORMATION										
METHOD/APPARATUS/PROCEDURE: A solution saturated with Sr(OH) ₂ at room temperature is cooled until the temperature of formation of cryohdrate [eutectic composition] is reached and cryohdrate is solidified. Analysis not specified, but it is probably carbonate precipitation and weighing of SrCO ₃ (method used by author for Ba determination).	<p>SOURCE AND PURITY OF MATERIALS: Nothing specified.</p> <p>ESTIMATED ERROR: Std. Dev. about 3 %.</p> <p>REFERENCES:</p>									

COMPONENTS:		ORIGINAL MEASUREMENTS:			
(1) Strontium hydroxide; Sr(OH) ₂ ; [18480-07-4]		Scheibler, C.			
(2) Water; H ₂ O; [7732-18-5]		J. Pharm. Chim. 1883, [5], 8, 540.			
VARIABLES:		PREPARED BY:			
$T/K = 273 - 374$		I. Lambert			
EXPERIMENTAL VALUES:					
Composition of the saturated solution					
<hr/>					
$t/^\circ\text{C}$		SrO			
<hr/>		g/1000 g solution $10^3m/\text{mol kg}^{-1}\text{a}$			
<hr/>					
0	3.5	0.34			
5	4.1	0.40			
10	4.8	0.46			
15	5.7	0.55			
20	6.8	0.66			
25	8.3	0.81			
30	10.1	0.98			
35	12.4	1.21			
40	15.1	1.48			
45	18.1	1.78			
50	21.8	2.15			
55	26.1	2.59			
60	31.2	3.11			
65	37.5	3.76			
70	45.5	4.60			
75	56.0	5.72			
80	70.2	7.29			
85	98.9	10.59			
90	136.4	15.24			
95	178.6	20.98			
100	228.5	28.55			
101.2	240.7	30.59			
<hr/>					
^a Calculated by compiler.					
<hr/>					
AUXILIARY INFORMATION					
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:			
Nothing specified. See (ref 1).		(1) Strontium hydroxide. Nothing specified.			
		(2) Water. Nothing specified.			
<hr/>					
ESTIMATED ERROR:					
No estimates possible.					
<hr/>					
REFERENCES:					
1. Scheibler C. Neue Z. Ruebenzucker-Ind. 1881, 7, 258.					

COMPONENTS: (1) Strontium hydroxide; Sr(OH) ₂ ; [18480-07-4] (2) Water; H ₂ O; [7732-18-5]		ORIGINAL MEASUREMENTS: Sidersky, M. D. Bull. Assoc. Chim. Sucr. Distill. Ind. Agri. Fr. Colon. <u>1921</u> , 39, 167.
VARIABLES: T/K = 273 - 374		PREPARED BY: I. Lambert
EXPERIMENTAL VALUES:		
Composition of the saturated solution		
<i>t</i> /°C	SrO g/100 g solution	$10^3 m/\text{mol kg}^{-1}\text{a}$
0	0.35	0.34
11	0.47	0.46
13	0.52	0.50
20	0.69	0.67
21	0.70	0.68
24	0.77	0.75
40	1.48	1.4
41	1.54	1.5
43	1.66	1.6
44	1.69	1.7
48	1.91	1.9
50	2.13	2.1
57	2.80	2.78
59	2.94	2.92
65	3.74	3.75
67	4.03	4.05
68	4.10	4.19
69	4.20	4.23
75	5.29	5.39
79	6.24	6.42
81	6.91	7.16
85	9.08	9.64
88	10.74	11.6
90	11.95	13.1
101.2	19.34	23.1
^a Calculated by compiler.		
AUXILIARY INFORMATION		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS: (1) Strontium hydroxide. Prepared from "Strontionite" (SrCO ₃ ore) ignited, dissolved in hot water, filtered, and recrystallized three times. (2) Water. Nothing specified.	
Sr(OH) ₂ and water are placed in a stoppered flask fitted with two tubes passing through the cork, one of them with a felt plug at the end. After some hours at the desired temperature, samples are withdrawn by forcing the solution through the felt plug and then the Sr(OH) ₂ concentration is analyzed by acidimetry. Temperatures are controlled by an ice bath (0°C), by flowing water (11 - 13°C), by a thermostated bath (40 - 90°C), and by boiling (101°C). 20 - 24°C are the ambient temperatures. Each experiment is repeated two or three times.	ESTIMATED ERROR: Temp.: Nothing specified. Solv.: precision < 6 ± Sr(OH) ₂ (author).	
	REFERENCES:	

COMPONENTS: (1) Strontium hydroxide; Sr(OH) ₂ ; [18480-07-4] (2) Water; H ₂ O; [7732-18-5]	ORIGINAL MEASUREMENTS: Grube, G.; Nussbaum, M. <u>Z. Elektrochem. Angew. Phys. Chem.</u> <u>1928, 34, 91-8.</u>	
VARIABLES: $T/K = 273 - 373$	PREPARED BY: H. Einaga Y. Komatsu	
EXPERIMENTAL VALUES:		
Composition of the saturated solution		
$t/^\circ C$	SrO g/100g ₂	Molality of Sr(OH) ₂ ^a m ₁ /mol kg ⁻¹
0	0.35	0.034
25	0.89	0.086
35	1.31	0.126
50	2.20	0.212
75	5.67	0.547
90	13.62	1.314
95	17.83	1.721
98	21.00	2.027
100	22.81	2.201
^a Calculated by compilers.		
Solid phase in equilibrium with the saturated solution was strontium hydroxide octahydrate, Sr(OH) ₂ ·8H ₂ O [1311-10-0].		
AUXILIARY INFORMATION		
METHOD/APPARATUS/PROCEDURE: SrO was equilibrated with pure CO ₂ free water at a definite temperature with continuous stirring. Aliquots of saturated solution were titrated with standard HCl solution for determination of dissolved Sr(OH) ₂ .	SOURCE AND PURITY OF MATERIALS: (1) Strontium hydroxide. SrO of high purity was used. (2) Water.	
ESTIMATED ERROR:		
No estimates possible.		
REFERENCES:		

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Strontium hydroxide; Sr(OH) ₂ ; [18480-07-4]	Reinders, W.; Klinkenberg, A.
(2) Water; H ₂ O; [7732-18-5]	Recd. Trav. Chim. Pays-Bas 1929, 48, 1227-45.

VARIABLES:	PREPARED BY:
T/K = 297 - 371	I. Lambert

EXPERIMENTAL VALUES:	Composition of the saturated solution
SrO	

t/°C	SrO g/100 g solution	Solid phase $10^3 m/\text{mol kg}^{-1}\text{a}$
24.2	0.822	0.799
35	1.227	1.20
45	1.81	1.78
55	2.68	2.66
55.89	3.27	3.26
70.03	5.01	5.09
74.98	6.37	6.56
79.93	8.34	8.78
85.10	12.19	13.4
87.70	11.83	12.9
90.00	11.66	12.7
90.24	11.59	12.6
94.65	11.20	12.2
98.2	10.92	11.8

^aCalculated by compiler.

AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Stoppered flasks containing weighed amounts of Sr(OH) ₂ and water were agitated in a thermostat for an undefined amount of time. The saturated solution was filtered through a cotton plug or centrifugated when the precipitate grain size was too small to allow filtration. Sr(OH) ₂ was titrated with standard acid. The composition of the hydrate stable above 85°C was determined by a study of the Sr(OH) ₂ + NaBr + H ₂ O system at 100°C. Analysis of both Sr(OH) ₂ saturated solution and wet precipitate confirmed the monohydrate, Sr(OH) ₂ ·H ₂ O.	(1) Strontium hydroxide. Commercial product from Merck, "free from barite." Used without further purification. (2) Water. Nothing specified.
ESTIMATED ERROR:	No estimates possible.
REFERENCES:	

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Barium hydroxide; Ba(OH) ₂ ; [17194-00-2] (2) Water; H ₂ O; [7732-18-5]	Rosenstiehl, A.; Ruhlmann, (?) Bull. Soc. Ind. Mulhouse 1870, 40, 127-53 [Soly study pp. 152-3 and a Figure].
VARIABLES: $T/K = 273.2 - 351.7$	PREPARED BY: Irma Lambert H. L. Clever

EXPERIMENTAL VALUES:

The solubility of BaO (Ba(OH)₂) in water from 0 to 78.5°C

$t/^\circ C$	T/K	g BaO per 100 g H ₂ O	Ba(OH) ₂	Ba(OH) ₂
			mass %	$m_1/\text{mol kg}^{-1}$
0	273.2	1.5	1.65	0.098
6	279.2	5.8 [sic]	6.13	0.38
6.5	279.7	1.9	2.1	0.12
12	285.2	2.4	2.6	0.16
15.5	288.7	2.9	3.15	0.19
16	289.2	3.	3.25	0.195
21	294.2	3.6	3.9	0.235
22	295.2	3.7	4.0	0.24
30	303.2	5.	5.3	0.33
36	309.2	6.4	6.7	0.42
41	314.2	7.6	7.9	0.50
46	319.2	9.5	9.7	0.625
54	327.2	14.	13.7	0.93
58.5	331.7	17.2	16.4	1.165
59	332.2	17.5	16.6	1.165
64	337.2	23.8	21.5	1.60
68.5	341.7	27.7	24.2	1.865
69	342.2	31.6	26.8	2.14
70	343.2	31.9	27.0	2.16
73	346.2	44.9	34.6	3.09
77.2	350.4	70.	46.0	4.97
78.5	351.7	85.	51.3	6.16

Equilibrium solid BaO·9H₂O [Ba(OH)₂·8H₂O].

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The compilers calculated the Ba(OH) ₂ mass % and molality values. Water and excess crystals of barium hydroxide were placed in a vessel which was maintained in a large water bath of known temperature (not thermostated) for 2 to 10 hours. The solution was decanted, a sample taken, weighed and titrated with oxalic acid.	(1) Barium hydroxide. Prepared by the reaction of ZnO on BaS in boiling water for 1.5 hours. The insoluble ZnS precipitates, is separated by decantation, and the barium hydroxide is crystallized from the solution by cooling. (2) Water. Nothing specified.
	ESTIMATED ERROR: No estimates possible.
	REFERENCES:

COMPONENTS: (1) Barium hydroxide; Ba(OH) ₂ ; [17194-00-2] (2) Water; H ₂ O; [7732-18-5]	ORIGINAL MEASUREMENTS: Guthrie, F. <i>Philos. Mag.</i> [5] 1878, 6, 35-44.
VARIABLES: $T/K = 273$	PREPARED BY: I. Lambert
EXPERIMENTAL VALUES:	
<u>The Ba(OH)₂ + H₂O system at ~0.5°C</u>	
BaO mass %	Solid Phase Composition
1.4995 1.4984 1.5352	
Av. 1.511 ± 0.02	BaO + 565 H ₂ O
<p>In modern terms the experiment reported here was a determination of the eutectic composition and temperature of the system.</p> <p>A solution of this composition will freeze to a solid of the same composition.</p>	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: A solution saturated with Ba(OH) ₂ at room temperature is cooled until the temperature of formation of cryohydrate [eutectic composition] is reached and cryohydrate is solidified. Barium is analyzed by addition of ammonium carbonate to precipitate BaCO ₃ , igniting and weighing.	SOURCE AND PURITY OF MATERIALS: Nothing specified.
	ESTIMATED ERROR: Std. Dev. about 1.5 %.
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Barium hydroxide; Ba(OH) ₂ ; [17194-00-2] (2) Water; H ₂ O; [7732-18-5]	Bauer, O. Z. Angew. Chem. 1903, 15, 341-50. Z. Anorg. Chem. 1906, 47, 401-20.
VARIABLES: $T/K = 282, 293$	PREPARED BY: I. Lambert

EXPERIMENTAL VALUES:

The solubility of Ba(OH)₂ · 3H₂O in water at 8.5 and 20°C

$t/^\circ\text{C}$	BaO	Solid Phase
	mass %	
8.5	2	Ba(OH) ₂ · 3H ₂ O
20	3.5	Ba(OH) ₂ · 3H ₂ O

The author compared his results with those of Rosenstiehl and Ruhlman (ref 1) for Ba(OH)₂ · 8H₂O at 10 and 20°C. They reported values of 2.2 and 3.48 mass % BaO, respectively for the two temperatures. The comparison led the author to conclude both hydrates have the same solubility.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The Ba(OH) ₂ · 3H ₂ O is added to CO ₂ free water. No other details are specified.	(1) Barium hydroxide. The Ba(OH) ₂ · 3H ₂ O is prepared by slow cooling from boiling Ba(OH) ₂ · 8H ₂ O. The starting material was the hydroxide, controlled by chemical analysis by the author and found to be 99.5 % purity. The octahydrate melts at 78°C, boils at 103 with an increase in temperature to 109 at which the trihydrate separate out.
	ESTIMATED ERROR: No estimates possible.
	REFERENCES: 1. Rosenstiel, A.; Ruhlman, Bull. Soc. Mulhouse 1870, 40, 153; Forshritte Chem. 1870, 314.

COMPONENTS: (1) Barium hydroxide; Ba(OH) ₂ ; [17194-00-2] (2) Water; H ₂ O; [7732-18-5]	ORIGINAL MEASUREMENTS: Sill, H. F. <i>J. Am. Chem. Soc.</i> 1916, 38, 2632-43.																																		
VARIABLES: $T/K = 298$ $p/MPa = 0.1 - 49$	PREPARED BY: H. Einaga Y. Komatsu H. L. Clever																																		
EXPERIMENTAL VALUES:																																			
The solubility of Ba(OH) ₂ in water as a function of pressure at 25°C																																			
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="text-align: left; padding-bottom: 5px;">Pressure</th> <th colspan="3" style="text-align: center; border-bottom: 1px solid black;">Barium Hydroxide</th> <th rowspan="2" style="text-align: right; vertical-align: bottom; padding-top: 5px;">Comments</th> </tr> <tr> <th style="text-align: center;">p/bar</th> <th style="text-align: center;">$\text{Ba}(\text{OH})_2 \cdot 8\text{H}_2\text{O}$ mass %</th> <th style="text-align: center;">$\text{Ba}(\text{OH})_2$ mass %</th> <th style="text-align: center;">$m_1/\text{mol kg}^{-1}$</th> </tr> </thead> <tbody> <tr> <td style="text-align: left; padding-top: 10px;">1</td><td style="text-align: center;">8.304</td><td style="text-align: center;">4.510</td><td style="text-align: center;">0.2754</td><td style="text-align: right;">a</td></tr> <tr> <td style="text-align: left;">1</td><td style="text-align: center;">8.295</td><td style="text-align: center;">4.505</td><td style="text-align: center;">0.2756</td><td style="text-align: right;">b</td></tr> <tr> <td style="text-align: left;">245</td><td style="text-align: center;">8.779</td><td style="text-align: center;">4.768</td><td style="text-align: center;">0.2924</td><td style="text-align: right;">a</td></tr> <tr> <td style="text-align: left;">245</td><td style="text-align: center;">8.802</td><td style="text-align: center;">4.780</td><td style="text-align: center;">0.2932</td><td style="text-align: right;">b</td></tr> <tr> <td style="text-align: left;">490</td><td style="text-align: center;">9.366</td><td style="text-align: center;">5.087</td><td style="text-align: center;">0.3130</td><td style="text-align: right;">c</td></tr> </tbody> </table>	Pressure	Barium Hydroxide			Comments	p/bar	$\text{Ba}(\text{OH})_2 \cdot 8\text{H}_2\text{O}$ mass %	$\text{Ba}(\text{OH})_2$ mass %	$m_1/\text{mol kg}^{-1}$	1	8.304	4.510	0.2754	a	1	8.295	4.505	0.2756	b	245	8.779	4.768	0.2924	a	245	8.802	4.780	0.2932	b	490	9.366	5.087	0.3130	c	
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<p>Comments: a. Solution first saturated at 30, then cooled to 25°C (approach from over sat.). b. Solution first saturated at 20, then warmed to 25°C (approach from under sat.). c. no information.</p> <p>Solid phase in equilibrium with saturated solution was Ba(OH)₂·8H₂O.</p> <p>The molal solubility of Ba(OH)₂ was calculated by the compiler assuming the mass % referred to Ba(OH)₂·8H₂O. He also calculated mass % Ba(OH)₂.</p>																																			
AUXILIARY INFORMATION																																			
METHOD/APPARATUS/PROCEDURE: Mixtures of Ba(OH) ₂ and H ₂ O were equilibrated at either 20 or 30°C for 0.5 hour then 2-3 hours at 25°C in a U-tube type pressure bomb which permitted solution sample withdrawing without pressure relief. The Ba(OH) ₂ content of the saturated solution was determined by titration with standard HCl solution.	SOURCE AND PURITY OF MATERIALS: (1) Barium hydroxide. Chemically pure Ba(OH) ₂ ·8H ₂ O was used. (2) Water. Nothing specified.																																		
NOTE: The author labeled the pressure unit as megabar and used definition Megabar = 10^6 dynes = 1.02 kg cm ⁻²	ESTIMATED ERROR: No estimates possible.																																		
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VARIABLES: $T/K = 295 - 305$	PREPARED BY: Y. Komatsu H. Einaga	
EXPERIMENTAL VALUES:		
<u>Concentration solubility product of Ba(OH)₂</u>		
<u>$t/^\circ C$</u>	<u>K_{s0}</u>	<u>Method (See below)</u>
room	2.00×10^{-2}	A
room	1.02×10^{-2}	A
room	2.14×10^{-2}	A
room	4.28×10^{-2}	B
room	1.25×10^{-2}	B
room	3.00×10^{-2}	B
22	4.03×10^{-2}	C
28	1.08×10^{-1}	C
32	2.56×10^{-1}	C
Solid phase recovered on drying at room temperature was Ba(OH) ₂ ·H ₂ O (Method A).		
AUXILIARY INFORMATION		
METHOD/APPARATUS/PROCEDURE: Method A. Distilled water was saturated with Ba(OH) ₂ ·8H ₂ O by shaking. After equilibration, the residual solid phase was filtered (the filtrate was reserved for Method B); it was dried for two days and then weighed. The solubility, c_1 , and the solubility product, $K_{s0} = 4c_1^3$, were calculated. All procedures were carried out at a not specified room temperature. Method B. The filtrate reserved in Method A was titrated with standard HNO ₃ to determine the [OH ⁻], from which the solubility product was calculated from $K_{s0} = (1/2)[OH^-]^3$. Method C. Methods A and B were carried out at an elevated temperature using a water bath for preparation of the saturated solution.	SOURCE AND PURITY OF MATERIALS: (1) Barium hydroxide. Specified to be the hydrate Ba(OH) ₂ ·8H ₂ O. (2) Water. Distilled. ESTIMATED ERROR: No estimates possible. REFERENCES:	