

<p>COMPONENTS:</p> <p>1. Hydrogen sulfide; H₂S; [7783-06-4]</p> <p>2. Water; H₂O; [7732-18-5]</p>	<p>EVALUATOR:</p> <p>Peter G.T. Fogg, Department of Applied Chemistry and Life Sciences, Polytechnic of North London, Holloway, London N7 8DB, U.K.</p> <p>February 1987</p>
<p>CRITICAL EVALUATION:</p> <p>The solubility of hydrogen sulfide in water has been investigated by numerous workers since the nineteenth century. Some of this early work (1-3) is in good agreement with more recent work.</p> <p>Hydrogen sulfide exists, in aqueous solution, in equilibrium with its ions. Solubilities which have been compiled correspond to bulk solubilities. For this purpose the number of moles of hydrogen sulfide in solution has been taken to be the sum of the number of moles of the uncharged H₂S plus those of HS⁻ and those of S⁻⁻.</p> <p>Measurements have been made at pressures from 0.02 to 207 bar and temperatures from 273.2 to 603.2 K. The most extensive series of measurements over a pressure range were carried out by Lee & Mather (4) and by Selleck <i>et al.</i> (5). Above 344 K the mole fraction solubilities found by Lee & Mather tend to be higher than those found by Selleck <i>et al.</i> but there is better agreement at lower temperatures. However measurements indicate that, for many purposes, the mole fraction solubility can be considered to be close to a linear function of pressure to mole fraction solubilities of about 0.02. i.e. Henry's law is a useful approximation. The higher the concentration of hydrogen sulfide the greater the deviation from linear behaviour. The measurements of solubilities at partial pressures of hydrogen sulfide less than 1.013 bar made by Clarke & Glew (6) are consistent with the earlier measurements by Wright & Maass (7). When values for 298.2 K are extrapolated down to about 0.1 bar there is good agreement with solubilities measured by McLauchlan (1).</p> <p>Many values of mole fraction solubilities for a partial pressure of hydrogen sulfide of 1.013 bar (1 atm) at temperatures in the range 273.2 K to 453.2 K have been published or may be obtained by extrapolation from published solubilities (1-13). Measurements published by Kozintseva (8) are the only set of measurements made in the range 453.2 K to 603.2 K. Available values indicate that mole fraction solubilities for a partial pressure of 1.013 bar decrease with increase in temperature to about 450 K but at higher temperatures values increase. Although there is no reason to doubt the reliability of the measurements reported by Kozintseva these high temperature values must be considered to be tentative until they are confirmed by other workers.</p> <p>Mole fraction solubilities for a partial pressure of hydrogen sulfide of 1.013 bar, based upon measurements made since 1930, may be represented by the equation:</p> $\ln x_{\text{H}_2\text{S}} = -24.912 + 3477.1/(T/K) + 0.3993 \ln (T/K) + 0.015700 T/K$ <p>The standard deviation for $x_{\text{H}_2\text{S}}$ is given by:</p> $\delta x_{\text{H}_2\text{S}} = \pm 0.000065$ <p>This equation is valid for temperatures from 283.2 K to 603.2 K. The variation of $x_{\text{H}_2\text{S}}$ with T/K corresponding to this equation and the values of $x_{\text{H}_2\text{S}}$ from experimental measurements made since 1930 are plotted in fig 1.</p> <p>Values in the range 273.2 to 283.2 are better fitted by the equation:</p> $\ln x_{\text{H}_2\text{S}} = -14.761 + 2507.2/(T/K)$ $\delta x_{\text{H}_2\text{S}} = \pm 0.000030$ <p>The average value of $x_{\text{H}_2\text{S}}$ for a partial pressure of 1.013 bar at 298.15 K is 0.001830 ± 0.000007. This is based upon five sets of measurements (6,9, 11-13).</p>	

COMPONENTS:

1. Hydrogen sulfide; H₂S; [7783-06-4]
2. Water; H₂O; [7732-18-5]

EVALUATOR:

Peter G.T. Fogg,
 Department of Applied Chemistry
 and Life Sciences,
 Polytechnic of North London,
 Holloway, London N7 8DB, U.K.

February 1987

CRITICAL EVALUATION:

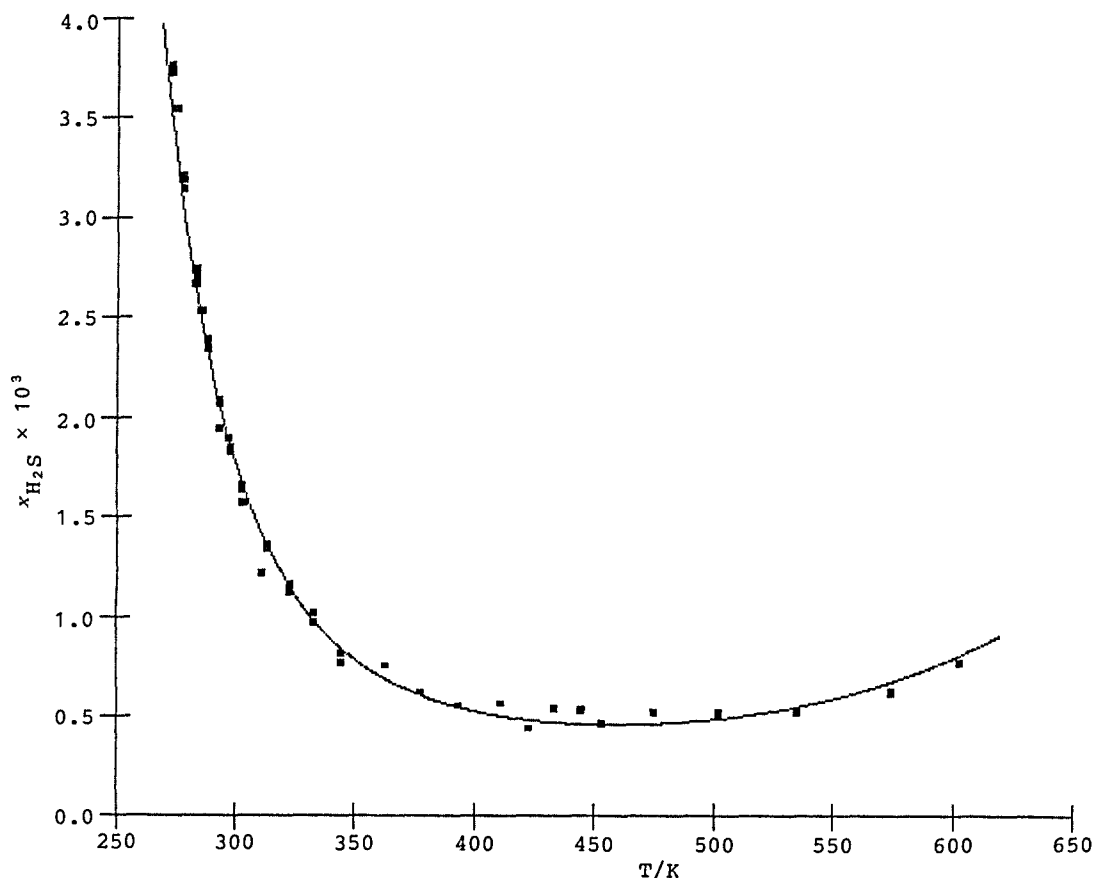


Fig. 1. Variation with temperature of the mole fraction solubility of hydrogen sulfide in water at a partial pressure of 1.013 bar from experimental measurements published since 1930

Experimental points have been superimposed upon the curve corresponding to the equation:

$$\ln x_{H_2S} = -24.912 + 3477.1/(T/K) + 0.3993 \ln (T/K) + 0.015700 T/K$$

COMPONENTS:

1. Hydrogen sulfide; H₂S; [7783-06-4]
2. Water; H₂O; [7732-18-5]

EVALUATOR:

Peter G.T. Fogg,
Department of Applied Chemistry
and Life Sciences,
Polytechnic of North London,
Holloway, London N7 8DB, U.K.

February 1987

CRITICAL EVALUATION:

References

1. McLauchlan, W.H. *Zeit. physik. Chem.* 1903, 44, 600-633.
2. Winkler, L.W. *Zeit. physik. Chemie, (Leipzig)* 1906, 55, 344-354.
3. Pollitzer, F. *Zeit. anorg. Chem.* 1909, 64, 121-148.
4. Lee, J.I.; Mather, A.E. *Ber. Bunsenges. phys. Chem.* 1977, 81, 1020-3.
5. Selleck, F.T.; Carmichael, L.T; Sage, B.H. *Ind. Eng. Chem.* 1952, 44, 2219-2226.
6. Clarke, E.C.W.; Glew, D.N. *Can. J. Chem.* 1971, 49, 691-698.
7. Wright, R.H.; Maass, D. *Can. J. Research* 1932, 6, 94-101.
8. Kozintseva, T.N.; *Geokhimiya* 1964, 8, 758-765.
9. Kapustinsky, A.F.; Anvaer, B.I. *Compt. Rend. Acad. Sci. URSS* 1941, 30, 625-628.
10. Byeseda, J.J. *Proc. Laurance Reid Gas. Cond. Conf.* 1985.
11. Gamsjäger, H.; Rainer, W.; Schindler, P. *Monatsh. Chem.* 1967, 98, 1782-1802.
12. Douabul, A.A.; Riley, J.P. *Deep-Sea Res.* 1979, 26A, 259-268.
13. Kiss, A. v.; Lajtai, I.; Thury, G. *Zeit. anorg. allgem. Chem.* 1937, 233, 346-352.

Hydrogen Sulfide in Aqueous Solvents

COMPONENTS:		ORIGINAL MEASUREMENTS:
1. Hydrogen sulfide; H ₂ S; [7783-06-4] 2. Water; H ₂ O; [7732-18-5]		McLauchlan, W.H. <i>Z. physik. Chem.</i> <u>1903</u> , 44, 600-633.
VARIABLES:		PREPARED BY:
Pressure		P.G.T. Fogg
EXPERIMENTAL VALUES:		
$P_{\text{H}_2\text{S}}/\text{mmHg}$	$P_{\text{H}_2\text{S}}/\text{bar}^*$	Conc. of H ₂ S in solution / mol dm ⁻³
74.7	0.0996	0.0100
88.7	0.1183	0.01194
99.8	0.1331	0.0135
101.4	0.1352	0.01400
105.5	0.1407	0.0144
T/K = 298.2		
* calculated by compiler.		
AUXILIARY INFORMATION		
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:
Solutions of hydrogen sulfide were prepared by dilution of a stock solution. The concentration of H ₂ S in solution was determined by iodimetry. Hydrogen, generated by electrolysis of water, was passed through a solution under test. The H ₂ S in the emergent gas stream was absorbed in copper sulfate solution and estimated from the change in electrical conductivity of this solution. The partial pressure of H ₂ S was calculated from the volume of hydrogen and the total pressure of the emergent gas stream.		1. prepared from FeS.
		ESTIMATED ERROR:
		REFERENCES:

COMPONENTS: 1. Hydrogen sulfide; H ₂ S; [7783-06-4] 2. Water; H ₂ O; [7732-18-5]	ORIGINAL MEASUREMENTS: Winkler, L.W. <i>Zeit. phys. Chem. (Leipzig)</i> <u>1906</u> , 55, 344-354.																								
VARIABLES: Temperature	PREPARED BY: P.G.T. Fogg																								
EXPERIMENTAL VALUES: <table border="1" data-bbox="104 527 1230 878"> <thead> <tr> <th data-bbox="104 527 406 605">T/K</th> <th data-bbox="406 527 801 605">Bunsen absorption coeff. α</th> <th data-bbox="801 527 1230 605">Mole fraction solubility, $x_{\text{H}_2\text{S}}$, (1.013 bar)*</th> </tr> </thead> <tbody> <tr> <td>273.2</td> <td>4.621</td> <td>0.003747</td> </tr> <tr> <td>283.2</td> <td>3.362</td> <td>0.002729</td> </tr> <tr> <td>293.2</td> <td>2.554</td> <td>0.002078</td> </tr> <tr> <td>303.2</td> <td>2.014</td> <td>0.001643</td> </tr> <tr> <td>313.2</td> <td>1.642</td> <td>0.001345</td> </tr> <tr> <td>323.2</td> <td>1.376</td> <td>0.001132</td> </tr> <tr> <td>333.2</td> <td>1.176</td> <td>0.000972</td> </tr> </tbody> </table> <p data-bbox="225 901 646 942">* calculated by the compiler.</p>		T/K	Bunsen absorption coeff. α	Mole fraction solubility, $x_{\text{H}_2\text{S}}$, (1.013 bar)*	273.2	4.621	0.003747	283.2	3.362	0.002729	293.2	2.554	0.002078	303.2	2.014	0.001643	313.2	1.642	0.001345	323.2	1.376	0.001132	333.2	1.176	0.000972
T/K	Bunsen absorption coeff. α	Mole fraction solubility, $x_{\text{H}_2\text{S}}$, (1.013 bar)*																							
273.2	4.621	0.003747																							
283.2	3.362	0.002729																							
293.2	2.554	0.002078																							
303.2	2.014	0.001643																							
313.2	1.642	0.001345																							
323.2	1.376	0.001132																							
333.2	1.176	0.000972																							
AUXILIARY INFORMATION																									
METHOD/APPARATUS/PROCEDURE: No information	SOURCE AND PURITY OF MATERIALS: No information ESTIMATED ERROR: REFERENCES:																								

Hydrogen Sulfide in Aqueous Solvents

COMPONENTS:		ORIGINAL MEASUREMENTS:			
1. Hydrogen sulfide; H ₂ S [7783-06-4] 2. Water; H ₂ O; [7732-18-5]		Wright, R.H.; Maass, O. <i>Can. J. Research</i> , <u>1932</u> , <i>6</i> , 94-101.			
VARIABLES:		PREPARED BY:			
Temperature, concentration		P.G.T. Fogg			
EXPERIMENTAL VALUES:					
T/K	Total pressure /mmHg	P _{H₂S} /mmHg	H ₂ S in vapor /mol dm ⁻³	H ₂ S in liquid /mol dm ⁻³	Mole fraction in liquid ^x H ₂ S
278.15	274.5	268.0	0.0155	0.0635	0.00114
	560	553	0.0321	0.1302	0.00234
	838	831	0.0484	0.1910	0.00343
	1176	1169	0.0685	0.2682	0.00481
283.15	303.8	294.7	0.0168	0.0597	0.00107
	615	606	0.0346	0.1220	0.00219
	914	905	0.0518	0.1801	0.00324
	1279	1270	0.0731	0.2511	0.00450
	1567	1558	0.0900	0.3060	0.00548
	2112	2103	0.1221	0.4099	0.00733
288.15	333.3	320.6	0.0179	0.0560	0.00101
	670	657	0.0369	0.1144	0.00206
	991	978	0.0551	0.1693	0.00304
	1382	1369	0.0774	0.2346	0.00421
	1692	1679	0.0953	0.2877	0.00516
	2284	2271	0.1297	0.3866	0.00692
* calculated by compiler on the assumption that dissolution of H ₂ S caused negligible change in the volume of the liquid phase.					
AUXILIARY INFORMATION					
METHOD/APPARATUS/PROCEDURE:			SOURCE AND PURITY OF MATERIALS:		
A measured quantity of water was run into the a cell of known volume attached to a glass diaphragm manometer. Dissolved air was removed by repeated freezing and melting <i>in vacuo</i> . A measured amount of H ₂ S was condensed in the cell by liquid air and the cell sealed. The temperature of the cell and manometer were then controlled to 0.1 °C. P _{H₂S} was taken to be P _{total} - P _{H₂O} where P _{H₂O} is the vapor pressure of pure water. The weight of H ₂ S in the gas phase was calculated from P _{H₂S} and the volume of the gas phase. The difference between this weight and the total weight of H ₂ S used gave the weight of H ₂ S in solution.			1. From a cylinder; purified by fractional distillation as described in ref. (1). 2. Laboratory distilled and degassed.		
			ESTIMATED ERROR:		
			δT = ± 0.1 K (authors)		
			REFERENCES:		
			1. Wright, R.H.; Maass, O.; <i>Can. J. Research</i> , <u>1931</u> , <i>5</i> , 436.		

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Hydrogen sulfide; H ₂ S ; [7783-06-4]	Wright, R.H.; Maass, O.
2. Water; H ₂ O; [7732-18-5]	<i>Can. J. Research</i> , <u>1932</u> , 6, 94-101.

EXPERIMENTAL VALUES:					
T/K	Total pressure /mmHg	$P_{\text{H}_2\text{S}}$ /mmHg	H ₂ S in vapor /mol dm ⁻³	H ₂ S in liquid /mol dm ⁻³	Mole fraction * in liquid $x_{\text{H}_2\text{S}}$
293.15	362.8	345.4	0.0190	0.0528	0.00095
	724	707	0.0390	0.1074	0.00193
	1067	1050	0.0581	0.1594	0.00287
	1483	1466	0.0816	0.2188	0.00393
	1817	1800	0.1005	0.2696	0.00484
	2454	2437	0.1371	0.3642	0.00653
298.15	392.6	369.1	0.0199	0.0497	0.00090
	778	754	0.0409	0.1010	0.00182
	1144	1120	0.0610	0.1499	0.00270
	1581	1557	0.0851	0.2050	0.00369
	1935	1911	0.1049	0.2544	0.00458
	2622	2598	0.1437	0.3437	0.00617
303.15	422.8	391.3	0.0208	0.0470	0.00085
	830	798	0.0425	0.0955	0.00173
	1219	1187	0.0636	0.1413	0.00255
	1672	1640	0.0882	0.1932	0.00348
	2052	2020	0.1091	0.2398	0.00432
	2785	2753	0.1498	0.3247	0.00584
313.15	486.5	431.6	0.0222	0.0426	0.00077
	934	879	0.0454	0.0858	0.00156
	1370	1315	0.0682	0.1260	0.00229
	1853	1798	0.0937	0.1722	0.00312
	2278	2223	0.1162	0.2149	0.00389
	3095	3040	0.1603	0.2921	0.00529
323.15	562.4	470.4	0.0235	0.0387	0.00071
	1040	948	0.0474	0.0789	0.00144
	1522	1430	0.0719	0.1139	0.00207
	2033	1941	0.0979	0.1560	0.00284
	2505	2413	0.1223	0.1937	0.00352
	3402	3310	0.1690	0.2647	0.00480
333.15	652.2	503.3	0.0243	0.0359	0.00066
	1162	1013	0.0492	0.0730	0.00134
	1681	1532	0.0747	0.1045	0.00191
	2213	2064	0.1010	0.1440	0.00263
	2731	2582	0.1269	0.1777	0.00325
	3707	3558	0.1762	0.2424	0.00442

* calculated by compiler on the assumption that dissolution of H₂S caused negligible change in the volume of the liquid phase.

Values of $x_{\text{H}_2\text{S}}$ from interpolated values of $x_{\text{H}_2\text{S}}/P_{\text{H}_2\text{S}}$ supplied by authors:

T/K	$P_{\text{H}_2\text{S}}=1$ atm.	$P_{\text{H}_2\text{S}}=2$ atm.	$P_{\text{H}_2\text{S}}=3$ atm.
278.15	0.00321	0.00626	0.00921
283.15	0.00275	0.00543	0.00807
288.15	0.00239	0.00473	0.00707
293.15	0.00209	0.00416	0.00620
298.15	0.00185	0.00368	0.00549
303.15	0.00166	0.00330	0.00492
313.15	0.00136	0.00271	0.00404
323.15	0.00116	0.00228	0.00340
333.15	0.00102	0.00199	0.00296

760 mmHg = 1 atm = 1.01325 bar

COMPONENTS: 1. Hydrogen sulfide; H ₂ S [7783-06-4] 2. Water; H ₂ O; [7732-18-5]	ORIGINAL MEASUREMENTS: Kapustinsky, A.F.; Anvaer, B.I. <i>Compt. Rend. Acad. Sci. URSS</i> <u>1941</u> , 30, 625-8.								
VARIABLES:	PREPARED BY: P.G.T. Fogg								
EXPERIMENTAL VALUES: <table border="1" data-bbox="171 541 1042 705"> <thead> <tr> <th>T/K</th> <th>P_{H₂S}/mmHg</th> <th>Concn. of H₂S in liquid / mol dm⁻³</th> <th>Mole fraction in liquid* ^xH₂S</th> </tr> </thead> <tbody> <tr> <td>298.2</td> <td>760</td> <td>0.1013</td> <td>0.001826</td> </tr> </tbody> </table> <p>* calculated by the compiler 760 mmHg = 1.01325 bar</p>		T/K	P _{H₂S} /mmHg	Concn. of H ₂ S in liquid / mol dm ⁻³	Mole fraction in liquid* ^x H ₂ S	298.2	760	0.1013	0.001826
T/K	P _{H₂S} /mmHg	Concn. of H ₂ S in liquid / mol dm ⁻³	Mole fraction in liquid* ^x H ₂ S						
298.2	760	0.1013	0.001826						
AUXILIARY INFORMATION									
METHOD/APPARATUS/PROCEDURE: Hydrogen sulfide, saturated with water vapor, was bubbled through a 300 cm ³ thermostatted absorption vessel for 3 - 4 hours. Samples of solution were then withdrawn for analysis by iodimetry. Allowance was made for the vapor pressure of water.	SOURCE AND PURITY OF MATERIALS: 1. from chemically pure hydrochloric acid and NaHS; CO ₂ removed by Ba(OH) ₂ . ESTIMATED ERROR: $\delta T/K = \pm 0.1$ (authors) REFERENCES:								

COMPONENTS:			ORIGINAL MEASUREMENTS:			
1. Hydrogen sulfide; H ₂ S; [7783-06-4]			Selleck, F.T.; Carmichael, L.T.; Sage, B.H.			
2. Water; H ₂ O; [7732-18-5]			Ind. Eng. Chem. <u>1952</u> , 44, 2219-2226			
VARIABLES:			PREPARED BY:			
Temperature, pressure			P.G.T. Fogg			
EXPERIMENTAL VALUES:						
T/°F	T/K	Total pressure /(Lb/Sq.Inch Absolute)	Total pressure /bar*	Mole fraction of H ₂ S		
				Gas phase	Liquid phase	
100	310.93	100	6.89	0.9894	0.0082	
		150	10.34	0.9925	0.0123	
		200	13.79	0.9940	0.0165	
		250	17.24	0.9949	0.0207	
		300	20.68	0.9954	0.0250	
160	344.26	390.1†	26.90	0.9960	0.0333	
		100	6.89	0.9493	0.0050	
		150	10.34	0.9643	0.0076	
		200	13.79	0.9726	0.0102	
		250	17.24	0.9771	0.0128	
		300	20.68	0.9801	0.0154	
		400	27.58	0.9837	0.0206	
		500	34.47	0.9856	0.0258	
		600	41.37	0.9865	0.0310	
		700	48.26	0.9868	0.0364	
		759.4†	52.36	0.9869	0.0395	
* calculated by the compiler; † three-phase equilibria involving aqueous liquid, H ₂ S-rich liquid, & gas.						
AUXILIARY INFORMATION						
METHOD/APPARATUS/PROCEDURE:			SOURCE AND PURITY OF MATERIALS:			
The measurements were obtained as part of a study of the complete phase behaviour of the H ₂ S/H ₂ O system. The apparatus consisted of a spherical pressure vessel from which samples of gas or liquid phases could be withdrawn for analysis. The vessel was fitted with a metal diaphragm which responded to pressure differentials. The pressure within the system was measured by a pressure balance calibrated against the vapor pressure of CO ₂ at the ice point (1).			1. prepared by hydrolysis of Al ₂ S ₃ ; dried and fractionated.			
			2. distilled; deaerated at low pressure.			
			ESTIMATED ERROR: δP = ± 0.1% or 0.07 bar, whichever the greater. δT = ± 0.02 K; δx _{H₂S} /x _{H₂S} = ± 0.0015 (authors)			
			REFERENCES: 1. Sage, B.H.; Lacey, W.N. <i>Trans.Am.Inst.Mining Met.Engrs.</i> <u>1948</u> , 174, 102.			

Hydrogen Sulfide in Aqueous Solvents

COMPONENTS:			ORIGINAL MEASUREMENTS:		
1. Hydrogen sulfide; H ₂ S; [7783-06-4]			Selleck, F.T.; Carmichael, L.T.; Sage, B.H.		
2. Water; H ₂ O; [7732-18-5]			<i>Ind. Eng. Chem.</i> <u>1952</u> , 44, 2219-2226.		
T/°F	T/K	Total pressure /(Lb/Sq.Inch Absolute)	Total pressure /bar*	Mole fraction of H ₂ S Gas phase Liquid phase	
220	377.59	200	13.79	0.9046	0.0077
		400	27.58	0.9477	0.0156
		600	41.37	0.9597	0.0230
		800	55.16	0.9647	0.0301
		1000	68.95	0.9664	0.0371
		1250	86.18	0.9665	0.0463
		1500	103.4	0.9651	0.0577
		1750	120.7	0.9630	0.0690 [§]
		2000	137.9	0.9602	0.0823
		2250	155.1	0.9568	0.0973
		2500	172.4	0.9531	0.1145
		2750	189.6	0.9491	0.1346
280	410.93	3000	206.8	0.9451	0.1586
		200	13.79	0.7375	0.0057
		400	27.58	0.8589	0.0127
		600	41.37	0.8984	0.0191
		800	55.16	0.9155	0.0250
		1000	68.95	0.9248	0.0308
		1250	86.18	0.9307	0.0382
		1500	103.4	0.9330	0.0463
		1750	120.7	0.9327	0.0550
		2000	137.9	0.9303	0.0647 [§]
		2250	155.1	0.9263	0.0750
		2500	172.4	0.9213	0.0860
340	444.26	2750	189.6	0.9159	0.0978
		3000	206.8	0.9104	0.1106
		200	13.79	0.3981	0.0029
		400	27.58	0.6828	0.0094
		600	41.37	0.7772	0.0155
		800	55.16	0.8224	0.0214
		1000	68.95	0.8466	0.0273
		1250	86.18	0.8646	0.0351
		1500	103.4	0.8742	0.0435
		1750	120.7	0.8788	0.0520
		2000	137.9	0.8797	0.0610 [§]
		2250	155.1	0.8779	0.0705
2500	172.4	0.8740	0.0805		
2750	189.6	0.8681	0.0910		
3000	206.8	0.8606	0.1024		

* calculated by the compiler;

§ at this temperature the authors obtained the composition of aqueous layers at all higher pressures by extrapolation.

COMPONENTS:				ORIGINAL MEASUREMENTS:			
1. Hydrogen sulfide; H ₂ S; [7783-06-4]				Kozintseva, T.N.			
2. Water; H ₂ O; [7732-18-5]				Geokhimiya 1964, 8, 758-765.			
VARIABLES:				PREPARED BY:			
Temperature, concentration				P.G.T. Fogg			
EXPERIMENTAL VALUES:							
T/K	Composition of gas phase			Composition of liquid phase			Henry's constant [†] /atm
	Conc. of H ₂ S /mol dm ⁻³	Mole ratio H ₂ S/H ₂ O	P _{H₂S} /atm	Conc. of H ₂ S /mol dm ⁻³	Mole ratio H ₂ S/H ₂ O	Mole fraction* x _{H₂S}	
433.2	0.00831	0.224	1.44	0.0440	0.00078	0.00078	1850
475.2	0.00618	0.0663	1.17	0.0339	0.00061	0.00061	1920
502.2	0.00507	0.0325	1.02	0.0296	0.000532	0.000532	1920
502.2	0.00419	0.0269	0.84	0.0234	0.000422	0.000422	2000
502.2	0.00725	0.0465	1.46	0.0423	0.000762	0.000761	1910
535.2	0.00792	0.0283	1.69	0.0494	0.000887	0.000886	1910
535.2	0.00507	0.0181	1.08	0.0319	0.000575	0.000575	1890
535.2	0.00583	0.0208	1.25	0.0368	0.000660	0.000660	1890
535.2	0.00677	0.0242	1.45	0.0432	0.000778	0.000777	1860
535.2	0.00675	0.0241	1.44	0.0428	0.000770	0.000769	1880
574.2	0.00740	0.0138	1.70	0.0585	0.00105	0.00105	1620
574.2	0.00531	0.0099	1.22	0.0428	0.000767	0.000766	1590
603.2	0.00860	0.0098	2.07	0.0884	0.00159	0.00159	1300
603.2	0.00746	0.0085	1.80	0.0756	0.00136	0.00136	1320
* calculated by compiler.							
† Henry's constant = P_{H_2S}/x_{H_2S}							
1 atm = 760 mmHg = 1.01325 bar							
AUXILIARY INFORMATION							
METHOD/APPARATUS/PROCEDURE:				SOURCE AND PURITY OF MATERIALS:			
A special bomb, from which samples of either gas phase or liquid phase could be withdrawn, was used. The bomb was flushed with oxygen-free nitrogen, water (50 cm ³) added and the apparatus saturated with H ₂ S (pressure not stated). The bomb and contents were then heated in a 'stirrer-furnace' to the required temperature for 25 to 50 hrs. A sample of the liquid phase was then analysed iodimetrically. A sample of the hot gas phase was passed through traps to collect the condensed water and through iodine solution. The H ₂ S in the hot gas phase was determined iodimetrically and the water content found from the weight of condensate.				No information			
				ESTIMATED ERROR:			
				δT/K = ± 2 (author)			
				REFERENCES:			

EXPERIMENTAL VALUES:			MOLE FRACTIONS		
T/K	Total Pressure P/atm	Pressure P/kPa	H ₂ S in gas $y_{\text{H}_2\text{S}}$	H ₂ S in liquid $10^3 x_{\text{H}_2\text{S}}$	HS ⁻ in liquid $10^6 x_{\text{HS}^-}$
273.151	0.53985	54.700	0.98964	2.0189	1.14
273.151	0.64663	65.520	0.99048	2.4198	1.25
273.150	0.81496	82.576	0.99240	3.0497	1.40
278.106	0.49205	49.857	0.98228	1.5515	1.11
278.108	0.57457	58.218	0.98478	1.8146	1.20
278.105	0.69533	69.533	0.98738	2.1988	1.32
278.105	0.89032	90.212	0.99008	2.8171	1.50
283.169	0.46154	46.766	0.97334	1.2365	1.09
283.168	0.54041	54.757	0.97717	1.4522	1.18
283.169	0.65667	66.537	0.98115	1.7697	1.31
283.169	0.84654	85.776	0.98529	2.2864	1.49
288.158	0.57265	58.024	0.97010	1.3234	1.24
288.158	0.70044	70.972	0.97546	1.6255	1.37
288.156	0.91275	92.484	0.98105	2.1258	1.57
293.160	0.49456	50.111	0.95265	0.9847	1.16
293.161	0.58325	59.098	0.95975	1.1689	1.27
293.161	0.71673	72.622	0.96712	1.4456	1.41
293.159	0.94115	95.362	0.97479	1.9091	1.62
298.168	0.55244	55.976	0.94250	0.9616	1.25
298.166	0.66766	67.651	0.95227	1.1729	1.38
298.165	0.85319	86.449	0.96245	1.5122	1.56
298.168	0.58192	58.963	0.94536	1.0162	1.28
298.167	0.71834	72.786	0.95557	1.2663	1.43
298.167	0.95039	96.298	0.96620	1.6904	1.65
298.180	0.55377	56.111	0.94259	0.9645	1.25
298.179	0.68442	69.349	0.95338	1.2042	1.39

AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: Static equilibrium cell described in source. Vapor pressures over saturated aqueous solutions were measured with a fused quartz precision Bourdon gauge. Great care was taken to make the necessary correction for water in the vapor phase.	SOURCE AND PURITY OF MATERIALS: 1. Prepared by the action of distilled water on aluminium sulfide (pure grade K and K Lab). 2. Distilled.
	ESTIMATED ERROR: $\delta T/K = 0.0015$; $\delta P/P = \pm 0.0002$; $\delta x_{\text{H}_2\text{S}}/x_{\text{H}_2\text{S}} = \pm 0.002$
	REFERENCES:

COMPONENTS:			ORIGINAL MEASUREMENTS:		
1. Hydrogen sulfide; H ₂ S; [7783-06-4]			Clarke, E.C.W.; Glew, D.N.		
2. Water; H ₂ O; [7732-18-5]			Can. J. Chem. <u>1971</u> , <u>49</u> , 691-698		
EXPERIMENTAL VALUES:					
T/K	Total Pressures		Mole fractions		
	P/atm	P/kPa	H ₂ S in gas $y_{\text{H}_2\text{S}}$	H ₂ S in liquid $10^3 x_{\text{H}_2\text{S}}$	HS ⁻ in liquid $10^6 x_{\text{HS}^-}$
298.181	0.90833	92.036	0.96465	1.6137	1.61
303.145	0.56822	57.575	0.92521	0.8680	1.27
303.142	0.70403	71.336	0.93942	1.0907	1.43
303.145	0.93731	94.973	0.95421	1.4719	1.66
313.141	0.49072	49.722	0.84998	0.5616	1.17
313.141	0.61249	62.061	0.87943	0.7245	1.33
313.142	0.82651	83.746	0.91016	1.0100	1.57
323.137	0.54699	55.424	0.77499	0.4801	1.22
323.134	0.68605	69.154	0.82000	0.6364	1.40
323.135	0.93305	94.541	0.86687	0.9132	1.68
Values of x_{HS^-} were calculated from the equation					
$\log_{10} K_{\text{H}_2\text{S}} = 55.06 - 3760 (T/K) - 20 \log(T/K)$					

COMPONENTS:			ORIGINAL MEASUREMENTS:		
1. Hydrogen sulfide; H ₂ S; [7783-06-4] 2. Water; H ₂ O; [7732-18-5]			Lee, J.I.; Mather, A.E. <i>Ber. Bunsenges. phys. Chem.</i> 1977, 81, 1020-1023. (Numerical data deposited in the National Depository of Unpublished Data, Ottawa, Canada)*		
VARIABLES:			PREPARED BY:		
Temperature, pressure			P.G.T. Fogg		
EXPERIMENTAL VALUES:					
T/K	Total pressure /kPa	Mole fraction of H ₂ S in liquid	T/K	Total pressure /kPa	Mole fraction of H ₂ S in liquid
283.2	154.8	0.00405	293.2	1073.1	0.02058
	182.4	0.00500		1086.9	0.02068
	200.3	0.00556		1183.5	0.02212
	265.8	0.00692		1273.1	0.02409
	271.8	0.00716		1355.8	0.02519
	283.0	0.00697	303.2	214.5	0.00326
	292.4	0.00762		352.4	0.00556
	292.8	0.00747		507.5	0.00792
	361.7	0.00894		614.4	0.00936
293.2	173.4	0.00328		724.6	0.01124
	323.7	0.00649		934.8	0.01433
	452.6	0.00916		1024.6	0.01590
	569.8	0.01137		1196.8	0.01790
	684.7	0.01340		1273.4	0.01923
	783.3	0.01500		1278.9	0.01945
	824.7	0.01577		1466.4	0.02203
	835.0	0.01605		1569.8	0.02337
	955.9	0.01817		1590.5	0.02355
	976.6	0.01821		1623.4	0.02430
	1045.6	0.01986		1645.7	0.02426
* National Depository of Unpublished Data, National Science Library, National Research Council, Ottawa, Ontario, K1A 0S2, Canada					
AUXILIARY INFORMATION					
METHOD/APPARATUS/PROCEDURE:			SOURCE AND PURITY OF MATERIALS:		
A recirculating equilibrium cell was used. It consisted of a high pressure liquid level gauge and vapor reservoir. The gas phase was circulated by a magnetic pump. Samples of the liquid phase could be withdrawn. The total quantity of H ₂ S in a sample was found from the volume of gas evolved when the pressure over the sample dropped to atmospheric and the residual gas in solution, as measured by gas-liquid chromatography.			1. Matheson C.P. grade. 2. Laboratory distilled.		
			ESTIMATED ERROR:		
			$\delta T/K = \pm 0.5$ below 403 K; $\delta T/K = \pm 0.7$ above 403 K (authors)		
			REFERENCES:		

COMPONENTS:			ORIGINAL MEASUREMENTS:		
1. Hydrogen sulfide; H ₂ S; [7783-06-4]			Lee, J.I.; Mather, A.E.		
2. Water; H ₂ O; [7732-18-5]			<i>Ber. Bunsenges. phys. Chem.</i> 1977, 81, 1020-1023. (Numerical data deposited in the National Depository of Unpublished Data, Ottawa, Canada)*		
EXPERIMENTAL VALUES:					
T/K	Total pressure /kPa	Mole fraction of H ₂ S in liquid	T/K	Total pressure /kPa	Mole fraction of H ₂ S in liquid
303.2	1659.5	0.02453	313.2	2452.9	0.02822
	1758.9	0.02582		2458.9	0.02926
	1900.5	0.02806		2479.4	0.02873
	1945.3	0.02873		2561.6	0.02983
	1955.9	0.02833	323.1	718.3	0.00783
	1997.0	0.02956		892.9	0.00963
	2034.3	0.02993		1005.5	0.01090
	2059.1	0.03054		1165.5	0.01231
	2079.1	0.03063		1510.9	0.01542
	2106.7	0.03077		1510.9	0.01525
	2169.0	0.03195		1683.2	0.01750
	2262.1	0.03275		1848.4	0.01878
	2265.5	0.03292		1928.1	0.01997
313.2	472.0	0.00620		1940.1	0.01996
	730.4	0.00915		1976.3	0.01975
	970.8	0.01249		2010.1	0.02022
	1070.6	0.01373		2048.1	0.02048
	1133.0	0.01434		2133.8	0.02114
	1235.8	0.01565		2178.0	0.02210
	1469.9	0.01810		2265.8	0.02327
	1534.6	0.01950		2383.1	0.02383
	1583.1	0.01979		2482.5	0.02458
	1609.1	0.01941		2518.3	0.02437
	1636.8	0.01975		2637.1	0.02588
	1671.4	0.02013		2637.1	0.02594
	1671.5	0.02061		2658.1	0.02564
	1707.2	0.02077		2711.2	0.02640
	1788.3	0.02126		2737.2	0.02663
	1892.8	0.02282		2744.5	0.02743
	1934.1	0.02334		2755.4	0.02710
	1981.9	0.02347		2806.1	0.02779
	1983.1	0.02398		2808.4	0.02742
	2052.2	0.02408		2816.5	0.02722
	2059.9	0.02498		2893.7	0.02822
	2061.3	0.02517	333.2	240.6	0.00211
	2100.7	0.02526		406.1	0.00365
	2100.8	0.02546		575.0	0.00530
	2128.3	0.02529		836.9	0.00769
	2227.0	0.02612		1195.4	0.01100
	2417.4	0.02826		1541.7	0.01425

* National Depository of Unpublished Data, National Science Library,
National Research Council, Ottawa, Ontario, K1A 0S2, Canada.

COMPONENTS:			ORIGINAL MEASUREMENTS:		
1. Hydrogen sulfide; H ₂ S; [7783-06-4]			Lee, J.I.; Mather, A.E.		
2. Water; H ₂ O; [7732-18-5]			Ber. Bunsenges. phys. Chem. 1977, 81, 1020-1023. (Numerical data deposited in the National Depository of Unpublished Data, Ottawa, Canada)*		
EXPERIMENTAL VALUES:					
T/K	Total pressure /kPa	Mole fraction of H ₂ S in liquid	T/K	Total pressure /kPa	Mole fraction of H ₂ S in liquid
333.2	1650.4	0.01546	333.2	3961.9	0.03402
	1762.3	0.01626		4003.6	0.03425
	1914.0	0.01779		4111.8	0.03487
	2015.6	0.01858		4160.6	0.03497
	2077.6	0.01913		4160.7	0.03516
	2105.2	0.01951		4217.2	0.03557
	2148.4	0.01967		4223.6	0.03553
	2284.5	0.02118		4224.1	0.03525
	2325.8	0.02141	344.2	374.8	0.00277
	2346.5	0.02168		546.3	0.00421
	2348.4	0.02127		760.9	0.00583
	2444.0	0.02221		802.2	0.00622
	2546.5	0.02322		829.0	0.00647
	2554.3	0.02304		1022.9	0.00783
	2560.3	0.02292		1050.5	0.00814
	2567.4	0.02333		1132.4	0.00914
	2569.0	0.02328		1450.3	0.01147
	2679.6	0.02436		1492.0	0.01184
	2692.0	0.02454		1518.5	0.01210
	2693.1	0.02438		1780.5	0.01429
	2843.2	0.02562		1905.7	0.01478
	2871.3	0.02615		2181.4	0.01720
	3038.1	0.02717		2214.9	0.01735
	3098.6	0.02765		2511.3	0.01981
	3174.7	0.02821		2636.5	0.02012
	3210.5	0.02863		2877.5	0.02230
	3250.0	0.02922		2919.2	0.02280
	3257.1	0.02885		3091.5	0.02406
	3326.1	0.02974		3215.4	0.02515
	3415.7	0.03046		3381.1	0.02622
	3457.1	0.03052		3546.3	0.02646
	3498.7	0.03102		3911.7	0.03029
	3601.6	0.03184		4194.4	0.03196
	3651.5	0.03175		4711.5	0.03546
	3652.0	0.03204		4757.3	0.03518
	3734.2	0.03281		5091.7	0.03662
	3844.7	0.03358		5112.3	0.03694
	3877.9	0.03407		5126.1	0.03715
	3892.9	0.03397	363.2	238.2	0.00126
	3899.7	0.03380		514.0	0.00317

* National Depository of Unpublished Data, National Science Library,
National Research Council, Ottawa, Ontario, K1A 0S2, Canada.

COMPONENTS:			ORIGINAL MEASUREMENTS:		
1. Hydrogen sulfide; H ₂ S; [7783-06-4]			Lee, J.I.; Mather, A.E.		
2. Water; H ₂ O; [7732-18-5]			Ber. Bunsenges. phys. Chem. 1977, 81, 1020-1023. (Numerical data deposited in the National Depository of Unpublished Data, Ottawa, Canada)*		
EXPERIMENTAL VALUES:					
T/K	Total pressure /kPa	Mole fraction of H ₂ S in liquid	T/K	Total pressure /kPa	Mole fraction of H ₂ S in liquid
363.2	896.5	0.00577	363.2	6574.0	0.03943
	1217.1	0.00793	393.2	496.2	0.00164
	1530.8	0.01012		858.2	0.00375
	1834.2	0.01217		1154.7	0.00547
	2120.3	0.01370		1499.4	0.00707
	2341.0	0.01522		1762.1	0.00860
	2616.6	0.01729		2072.3	0.01050
	2733.6	0.01786		2427.4	0.01236
	2774.9	0.01823		2617.0	0.01367
	2850.8	0.01855		2941.2	0.01536
	2988.9	0.01959		3196.3	0.01666
	3216.4	0.02092		3527.2	0.01831
	3264.4	0.02142		3610.0	0.01887
	3436.4	0.02231		3891.9	0.02043
	3532.7	0.02299		3954.7	0.02073
	3533.3	0.02300		4023.6	0.02116
	3698.4	0.02403		4205.6	0.02199
	3843.2	0.02481		4643.4	0.02426
	4029.3	0.02620		4849.8	0.02545
	4222.4	0.02749		4919.2	0.02571
	4256.9	0.02756		4953.2	0.02590
	4470.6	0.02841		5518.6	0.02879
	4574.0	0.02925		5746.5	0.02984
	4733.5	0.03006		5863.3	0.03050
	4939.4	0.03132		5987.4	0.03099
	4954.2	0.03129		6049.5	0.03168
	5091.1	0.03205		6194.7	0.03206
	5126.5	0.03223		6208.5	0.03177
	5229.0	0.03311		6228.7	0.03223
	5264.4	0.03323		6394.6	0.03317
	5277.3	0.03317		6394.7	0.03315
	5526.0	0.03438		6491.1	0.03332
	5608.8	0.03456		6573.9	0.03359
	5609.2	0.03469		6587.3	0.03388
	5622.5	0.03500		6670.4	0.03416
	5642.7	0.03500	423.2	692.5	0.00095
	5712.6	0.03533		933.8	0.00216
	5828.8	0.03610		1154.4	0.00333
	6043.1	0.03709		1388.8	0.00442
	6332.7	0.03804		1471.4	0.00499

* National Depository of Unpublished Data, National Science Library,
National Research Council, Ottawa, Ontario, K1A 0S2, Canada.

COMPONENTS:			ORIGINAL MEASUREMENTS:		
1. Hydrogen sulfide; H ₂ S; [7783-06-4]			Lee, J.I.; Mather, A.E.		
2. Water; H ₂ O; [7732-18-5]			<i>Ber. Bunsenges. phys. Chem.</i> 1977, 81, 1020-1023. (Numerical data deposited in the National Depository of Unpublished Data, Ottawa, Canada)*		
EXPERIMENTAL VALUES:					
T/K	Total pressure /kPa	Mole fraction of H ₂ S in liquid	T/K	Total pressure /kPa	Mole fraction of H ₂ S in liquid
423.2	1568.9	0.00552	423.2	5560.2	0.02520
	1741.0	0.00635		5863.6	0.02650
	1768.2	0.00626		6277.3	0.02822
	1898.9	0.00749		6339.3	0.02896
	2031.8	0.00787		6401.4	0.02897
	2078.2	0.00816		6601.3	0.02993
	2223.6	0.00863	453.2	1071.3	0.00032
	2230.5	0.00877		1422.9	0.00199
	2376.5	0.00957		1865.1	0.00397
	2575.2	0.01036		2154.7	0.00531
	2775.2	0.01147		2354.6	0.00621
	2980.0	0.01268		2451.1	0.00657
	3051.0	0.01283		2540.8	0.00700
	3202.0	0.01364		2629.3	0.00742
	3450.2	0.01498		3229.2	0.01033
	3739.8	0.01644		3484.3	0.01158
	4105.2	0.01846		3911.7	0.01356
	4256.9	0.01893		4242.7	0.01497
	4403.4	0.01978		4615.0	0.01650
	4623.0	0.02056		5076.9	0.01866
	4691.9	0.02109		5421.7	0.02029
	5133.2	0.02324		5918.1	0.02257
	5222.8	0.02347			
T/K	Total pressure /kPa	Mole fraction of H ₂ S in vapour	T/K	Total pressure /kPa	Mole fraction of H ₂ S in vapour
363.2	1921	0.9614	423.2	1942	0.7409
	2011	0.9606		2196	0.7812
	2389	0.9709		2624	0.8199
393.2	1486	0.8865		2699	0.8373
	2500	0.9298		3003	0.8292
	3161	0.9415		3079	0.8356
	3174	0.9529			
	3230	0.9314			
	3401	0.9526			
* National Depository of Unpublished Data, National Science Library, National Research Council, Ottawa, Ontario, K1A OS2, Canada.					

COMPONENTS: 1. Hydrogen sulfide; H ₂ S; [7783-06-4] 2. Water; H ₂ O; [7732-18-5]	ORIGINAL MEASUREMENTS: Byeseda, J.J.; Deetz, J.A.; Manning, W.P. <i>Proc. Laurance Reid Gas Cond. Conf.</i> <u>1985.</u>										
VARIABLES:	PREPARED BY: P.G.T. Fogg										
EXPERIMENTAL VALUES: <table border="1" data-bbox="97 541 1214 643"> <thead> <tr> <th>T/K</th> <th>P_{H₂S}/psia</th> <th>P_{H₂S}/bar*</th> <th>Ostwald coeff. L</th> <th>Mole fraction in liquid* x_{H₂S}</th> </tr> </thead> <tbody> <tr> <td>297.1</td> <td>14.73</td> <td>1.016</td> <td>2.5</td> <td>0.0019</td> </tr> </tbody> </table> <p data-bbox="246 786 596 827">* calculated by compiler</p>		T/K	P _{H₂S} /psia	P _{H₂S} /bar*	Ostwald coeff. L	Mole fraction in liquid* x _{H₂S}	297.1	14.73	1.016	2.5	0.0019
T/K	P _{H₂S} /psia	P _{H₂S} /bar*	Ostwald coeff. L	Mole fraction in liquid* x _{H₂S}							
297.1	14.73	1.016	2.5	0.0019							
AUXILIARY INFORMATION											
METHOD/APPARATUS/PROCEDURE: The H ₂ S was contained in a thermostatted metal cylinder connected to a pressure gage, vacuum pump and supply of gas. A tight fitting internal piston sealed with an O-ring fitted into the cylinder so that the volume of gas could be changed by controlled movement of the piston. A measured volume of solvent was injected into the cylinder by a syringe. The absorption of gas was found from the movement of the piston which was necessary to maintain constant pressure.	SOURCE AND PURITY OF MATERIALS: No information. ESTIMATED ERROR: REFERENCES:										