COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]
2. Alkanes, C_5 to C_{10}

ORIGINAL MEASUREMENTS:

Makranczy, J.; Megyery-Balog, K.; Rusz, L.; Patyi, L.

Hung. J. Ind. Chem. 1976, *4*, 269-280.

VARIABLES:

Temperature

PREPARED BY:

P.G.T. Fogg

EXPERIMENTAL VALUES:

Solvent	T/K	Ostwald coefficient L	Mole fraction of H_2S* x_{H_2S} (1.013 bar)
Pentane; C_5H_{12}; [109-66-0]	298.15	9.147	0.0421
	313.15	6.93	0.0314
Hexane; C_6H_{14}; [110-54-3]	298.15	8.230	0.0429
	313.15	6.23	0.0319
Heptane; C_7H_{16}; [142-82-5]	298.15	7.520	0.0439
	313.15	5.69	0.0325
Octane; C_8H_{18}; [111-65-9]	298.15	6.986	0.0451
	313.15	5.28	0.0335
Nonane; C_9H_{20}; [111-84-2]	298.15	6.560	0.0465
	313.15	4.96	0.0345
Decane; $C_{10}H_{22}$; [124-18-5]	298.15	6.232	0.0481
	313.15	4.71	0.0356

P_{H_2S} = 1.013 bar.

* estimated by the compiler using densities from the chemical literature.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

The authors stated that apparatus described previously by Bodor *et al.* was used (ref. (1)). However Bodor *et al.* described apparatus for use below 273 K and referred to another paper (2) in which an apparatus for use above 273 K was described. Bodor *et al.* stated that, in each case, the volume of gas absorbed by a given quantity of liquid at a particular pressure was measured by a gas burette. Bodor *et al.* gave details of a method of calculating gas solubilities applicable to either apparatus, with allowance for the vapor pressure of the solvent.

SOURCE AND PURITY OF MATERIALS:

Analytical grade reagents were used.

ESTIMATED ERROR:

$\delta L/L$ = ± 0.03 (authors)

REFERENCES:

1. Bodor, E; Bor, G.J. Mohai, B.; *Sipos, G. Veszpremi. Vegyip. Egy. Kozl.* 1957, *1*, 55.
2. Schay, G.; Szekely, G.; Racz, Gy. *Periodica Polytechnica Ser. Chem. Eng. (Budapest)* 1958, 2, 1.

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]
2. Alkanes, C_{11} to C_{16}

ORIGINAL MEASUREMENTS:

Makranczy, J.; Megyery-Balog, K.; Rusz, L.; Patyi, L.

Hung. J. Ind. Chem. 1976, *4*, 269-280.

VARIABLES:

Temperature

PREPARED BY:

P.G.T. Fogg

EXPERIMENTAL VALUES:

Solvent	T/K	Ostwald coefficient L	Mole fraction of H_2S^* x_{H_2S} (1.013 bar)
Undecane; $C_{11}H_{24}$;	298.15	5.949	0.0496
[1120-21-4]	313.15	4.50	0.0368
Dodecane; $C_{12}H_{26}$;	298.15	5.698	0.0511
[112-40-3]	313.15	4.31	0.0379
Tridecane; $C_{13}H_{28}$;	298.15	5.501	0.0528
[629-50-5]	313.15	4.15	0.0390
Tetradecane; $C_{14}H_{30}$;	298.15	5.305	0.0541
[629-59-4]	313.15	4.02	0.0402
Pentadecane; $C_{15}H_{32}$;	298.15	5.152	0.0558
[629-62-9]	313.15	3.89	0.0413
Hexadecane; $C_{16}H_{34}$;	298.15	4.999	0.0573
[544-76-3]	313.15	3.80	0.0427

P_{H_2S} = 1.013 bar.

* estimated by the compiler using densities from the chemical literature.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

The authors stated that apparatus described previously by Bodor *et al.* was used (ref. (1)). However Bodor *et al.* described apparatus for use below 273 K and referred to another paper (2) in which an apparatus for use above 273 K was described. Bodor *et al.* stated that, in each case, the volume of gas absorbed by a given quantity of liquid at a particular pressure was measured by a gas burette. Bodor *et al.* gave details of a method of calculating gas solubilities applicable to either apparatus, with allowance for the vapor pressure of the solvent.

SOURCE AND PURITY OF MATERIALS:

Analytical grade reagents were used.

ESTIMATED ERROR:

$\delta L/L$ = ± 0.03 (authors)

REFERENCES:

1. Bodor, E; Bor, G.J. Mohai, B.; *Sipos, G. Veszpremi. Vegyip. Egy. Kozl.* 1957, *1*, 55.
2. Schay, G.; Szekely, G.; Racz, Gy. *Periodica Polytechnica Ser. Chem. Eng. (Budapest)* 1958, 2, 1.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Hydrogen sulfide; H_2S; [7783-06-4] 2. Alkanes	Bell, R.P. *J. Chem. Soc.* 1931, 1371-1382.
VARIABLES:	PREPARED BY: C.L. Young

EXPERIMENTAL VALUES:

Solvent	T/K	Partition coefficient, s^+	Mole fraction of hydrogen sulfide in liquid, x_{H_2S} §
Hexane; C_6H_{14}; [110-54-3]	293.15	6.30	0.0341
Octane; C_8H_{18}; [111-65-9]		6.80	0.0440
Dodecane; $C_{12}H_{26}$; [112-40-3]		5.71	0.0513
Hexadecane; $C_{16}H_{34}$; [544-76-3]		5.05	0.0578
Cyclohexane; C_6H_{12}; [110-82-7]		7.50	0.0338

s^+ defined as $s = 22.4 \times \frac{293}{273} \times c$ where c is the "solubility in equivalents/litre".

§ for a partial pressure of 101.325 kPa.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Volumetric apparatus consisting of bulb (~50cm^3 capacity) extended at the top as a graduated tube and joined at bottom to a capillary u-tube. Liquid saturated with gas at atmospheric pressure. Gas withdrawn in a current of air absorbed in sodium hydroxide and hydrogen peroxide. Excess hydrogen peroxide removed by heating and excess sodium hydroxide titrated.	1. Prepared by reaction of sodium sulfide on hydrochloric acid. 2. Merck and Kahlbaum samples dried over calcium chloride and fractionally distilled.
	ESTIMATED ERROR: $\delta T/K = \pm 0.1$; $\delta x_{H_2S} = \pm 1\%$. (estimated by compiler)
	REFERENCES:

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]
2. Propane, C_3H_8; [74-98-6]

ORIGINAL MEASUREMENTS:

Gilliland, E.R.; Scheeline, H.W.

Ind. Eng. Chem. 1940, *32*, 48-54.

VARIABLES:

Temperature, pressure

PREPARED BY:

C.L. Young

EXPERIMENTAL VALUES:

T/K	$P/10^5$Pa	Mole fraction of hydrogen sulfide in liquid, x_{H_2S}	in gas, y_{H_2S}
340.9	27.65	0.037	0.122
338.2	27.58	0.054	0.159
327.0	27.58	0.241	0.379
324.3	27.58	0.332	0.499
355.4	34.54	0.014	0.021
349.8	34.47	0.081	0.130
335.9	34.47	0.395	0.547
367.0	41.44	0.055	0.076
364.8	41.44	0.078	0.101
351.5	41.37	0.342	0.451
343.2	41.37	0.455	0.592

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Mixture studied in a high pressure glass equilibrium still. Analysis of gas and liquid samples used absorption of hydrogen sulfide in caustic soda solution and subsequent titration with iodine and sodium thiosulfate. Remaining propane measured volumetrically. Details of apparatus in ref. (1).

SOURCE AND PURITY OF MATERIALS:

1. Matheson Co. C.P. grade.
2. Phillips Petroleum C.P. grade purity 99.9 mole per cent.

ESTIMATED ERROR:

$\delta T/K = \pm 0.6$; $\delta P/10^5\text{Pa} = \pm 0.15$; $\delta x_{H_2S}, = \delta y_{H_2S} = \pm 0.005$.

REFERENCES:

1. Scheeline, H.W.; Gilliland, D.R.

Ind. Eng. Chem. 1939, *31*, 1050

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]
2. Butane; C_4H_{10}; [106-97-8]

ORIGINAL MEASUREMENTS:

Robinson, D.B.; Hughes, R.E.; Sandercock, J.A.W.

Can. J. Chem. Eng. 1964, *42,(4)*, 143-6.†

VARIABLES:

Temperature, pressure

PREPARED BY:

P.G.T. Fogg

EXPERIMENTAL VALUES:

T/°F	T/K*	Total pressure /psia	Total pressure /bar*	Mole fraction of H_2S in liquid phase	Mole fraction of H_2S in gas phase
100	310.93	60.4	4.16	0.021	0.133
		69.4	4.78		0.243
		75.3	5.19		0.322
		84.8	5.85	0.066	0.386
		88.0	6.07	0.076	
		111.0	7.65	0.131	0.539
		117.0	8.07		0.564
		146.8	10.12	0.209	0.655
		176.6	12.18		0.713
		203.4	14.02	0.355	0.763
		230.4	15.89		0.805
		239.3	16.50	0.468	0.818
		249.0	17.17	0.497	
		283.8	19.57	0.607	0.870
		315.8	21.77	0.716	0.904
		329.8	22.74		0.924
		343.0	23.65	0.805	
		350.7	24.18		0.945
		358.8	24.74	0.858	

* calculated by compiler; psia = pound-force per square inch (absolute)

† data in document no. 7952 with the Auxiliary Publications Project, Photoduplication Service, Library of Congress, Washington DC, USA.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Mixtures of hydrogen sulfide and butane were confined in a stainless steel cell. This cell was thermostatted and the contents were compressed by a mercury pump. Contents of the cell could be mixed by spraying liquid phase through the vapor phase and observed through a glass window. Pressures were measured by Heise bourdon tube gauges. There was provision for withdrawing either samples of the liquid or the vapor and subsequent analysis by chromatography.

SOURCE AND PURITY OF MATERIALS:

1. commercial sample dried, frozen and evacuated; purity at least 99.9 mol%
2. commercial sample distilled, frozen, evacuated and dried; purity at least 99.9 mol%

ESTIMATED ERROR:

$\delta T/K = \pm 0.02$

$\delta P/\text{psia} = \pm 0.5$ (1-1000 psia);

$= \pm 5$ (> 1000 psia) [authors]

REFERENCES:

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]

2. Butane; C_4H_{10}; [106-97-8]

ORIGINAL MEASUREMENTS:

Robinson, D.B.; Hughes, R.E.; Sandercock, J.A.W.

Can. J. Chem. Eng. 1964, *42*,*(4)*, 143-6

EXPERIMENTAL VALUES:

T/°F	T/K*	Total pressure /psia	Total pressure /bar*	Mole fraction of H_2S in liquid phase	Mole fraction of H_2S in gas phase
125	324.82	102	7.03	0.035	
		128	8.83	0.096	0.405
		144	9.93	0.118	0.460
		160	11.03	0.150	
		201	13.86	0.247	0.635
		214	14.75	0.262	0.633
		234	16.13		0.688
		246	16.96	0.325	
		247	17.03	0.332	
		253	17.44	0.349	0.725
		275	18.96		0.769
		282	19.44	0.399	
		312	21.51	0.469	0.811
		392	27.03	0.631	0.877
		419	28.89		0.891
		420	28.96	0.716	
		447	30.82	0.778	0.913
		457	31.51	0.791	
		483	33.30		0.945
		487	33.58	0.862	
175	352.59	291	20.06	0.184	0.525
		411	28.34	0.364	0.680
		477	32.89	0.465	0.749
		627	43.23	0.692	0.840
		741	51.09	0.810	0.900
200	366.48	340	23.44		0.431
		343	23.65	0.172	
		435	29.99	0.275	0.582
		437	30.13	0.287	
		537	37.02	0.414	
		554	38.20		0.693
		654	45.09	0.520	0.770
		683	47.09	0.560	
		768	52.95	0.674	
		853	58.81	0.767	0.854
		990	68.26		0.906
		994	68.53	0.861	
		1060	73.1	0.920	
		1100	75.8		0.955
		1105	76.2	0.937	
		1139	78.5		0.985
225	380.37	365	25.17	0.133	0.322
		509	35.09	0.270	0.509
		705	48.61	0.465	0.631
		745	51.37		0.683
		785	54.12	0.540	
		930	64.12	0.709	0.784
		1008	69.5	0.725	0.800
		1050	72.4	0.785	0.812
		1080	74.5	0.809	
250	394.26	494	34.06	0.159	0.319
		537	37.02	0.187	0.380
		628	43.30	0.284	0.454
		751	51.78	0.396	0.523
		820	56.54	0.459	
		818	56.40		0.558
		907	62.54	0.530	0.581
		931	64.19	0.541	0.588

* calculated by compiler; psia = pound-force per square inch (absolute)

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]
2. 2-Methylpropane; C_4H_{10}; [75-28-5]

ORIGINAL MEASUREMENTS:

Besserer, G.J.; Robinson, D.B.

J.Chem.Eng.Japan 1975, *8*, 11 - 13.

VARIABLES:

Temperature, concentration

PREPARED BY:

P.G.T. Fogg

EXPERIMENTAL VALUES:

T/°F	T/K*	P_{total}/psia	P_{total}/bar*	Mole fraction in liquid phase x_{H_2S}	Mole fraction in gas phase y_{H_2S}
40.1	277.65	26.4	1.82	0.0000	0.0000
		30.0	2.07	0.0175	0.1270
		56.9	3.92	0.1231	0.6025
		67.0	4.62	0.1792	0.6700
		92.1	6.35	0.3090	0.7831
		112.8	7.78	0.4460	0.8460
		131.0	9.03	0.6011	0.8819
		147.9	10.20	-	0.9239
		152.7	10.53	0.8287	-
		165.0	11.38	0.9772	0.9846
		168.0	11.58	1.0000	1.0000

* calculated by compiler.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

The apparatus is described in ref. (1). It consisted of a variable volume metal cell with a piston at each end and an observation window at the centre. Pressures were measured with a pressure transducer attached to the cell. Gas and liquid phases were analysed by gas chromatography.

SOURCE AND PURITY OF MATERIALS:

1. Matheson C.P. grade; purity > 99.8 mol%; distilled before use.
2. Matheson instrument grade; purity > 99.9 mol%.

ESTIMATED ERROR:

REFERENCES:

1. Besserer, G.J.; Robinson, D.B. *Can. J. Chem. Eng.* 1971, *49*, 651.

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]
2. 2-Methylpropane; C_4H_{10}; [75-28-5]

ORIGINAL MEASUREMENTS:

Besserer, G.J.; Robinson, D.B.

J.Chem.Eng.Japan 1975, *8*, 11 - 13.

EXPERIMENTAL VALUES:

T/°F	T/K*	P_{total}/psia	P_{total}/bar*	Mole fraction in liquid phase x_{H_2S}	Mole fraction in gas phase y_{H_2S}
100.0	310.93	72.5	5.00	0.0000	0.0000
		107.4	7.40	0.0849	0.3755
		153.2	10.56	0.1985	0.5912
		176.3	12.16	0.2574	0.6559
		224.3	15.46	0.3927	0.7563
		259.1	10.97	0.4895	0.8024
		310.8	21.43	0.6600	0.8621
		343.1	23.66	0.7680	0.8992
		365.8	25.22	0.8646	0.9304
		385.4	26.57	0.9497	0.9713
		394.0	27.17	1.0000	1.0000
160.2	344.37	160.2	11.05	0.000	0.000
		211.2	14.56	0.0774	0.2746
		267.2	18.42	0.1613	0.4353
		344.5	23.75	0.2809	0.5834
		405.2	27.94	0.3824	0.6658
		515.6	35.55	0.5464	0.7662
		620.5	42.78	0.7299	0.8654
		701.4	48.36	0.8548	0.9186
		741.9	51.15	0.9316	0.9576
		773.0	53.30	1.0000	1.0000
220.0	377.59	313.5	21.62	0.000	0.000
		383.1	26.41	0.0663	0.1543
		497.2	34.28	0.1851	0.3485
		618.2	42.62	0.3303	0.5138
		692.2	47.73	0.4047	0.5810
		738.2	50.90	0.4524	0.6043
		787.9	54.32	0.5065	0.6271
		811.8	55.97	0.5205	0.6330
		867.0	59.78	0.5804	0.6635
		872.5	60.16	0.5847	0.6653
		894.6	61.68	0.6023	0.6775

* calculated by compiler.

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]
2. Pentane; C_5H_{12}; [109-66-0]

ORIGINAL MEASUREMENTS:

Reamer, H.H.; Sage, B.H.; Lacey, W.N.

Ind. Eng. Chem., 1953, *45*, 1805-1812.

VARIABLES:

Temperature, pressure

PREPARED BY:

C. L. Young

EXPERIMENTAL VALUES:

T/K	P/bar	Mole fraction of hydrogen sulfide in liquid, x_{H_2S}	in gas, y_{H_2S}
277.6	1.38	0.0617	0.7842
	2.76	0.1425	0.8950
	4.14	0.2260	0.9304
	5.52	0.3232	0.9534
	6.89	0.4372	0.9685
	8.62	0.6106	0.9820
	10.34	0.821	0.993
310.9	3.45	0.0788	0.6684
	6.89	0.1951	0.8310
	10.34	0.3151	0.8970
	13.79	0.4380	0.9280
	17.24	0.5662	0.9491
	20.68	0.7080	0.9675
	24.13	0.860	0.985
344.3	6.89	0.0799	0.5124
	13.79	0.2218	0.7355
	20.68	0.3626	0.8279
	27.58	0.4995	0.8840
	34.47	0.6372	0.9277
	41.37	0.7687	0.9553
	48.26	0.900	0.981

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

PVT cell pressure measured with pressure balance, temperature measured with platinum resistance thermometer. Co-existing phases sampled and analysed by gas density measurements. Details in source and ref. (1).

SOURCE AND PURITY OF MATERIALS:

1. Prepared by hydration of pure aluminium sulfide. Fractionated twice.
2. Phillips Petroleum Co. sample, minimum purity 99.5 mole per cent. Dried and fractionated.

ESTIMATED ERROR:

$\delta T/K = \pm 0.01$; $\delta P/\text{bar} = \pm 0.02$;

$\delta x_{H_2S} = \pm 0.003$ (Calculated by compiler)

REFERENCES:

1. Sage, B.H.; Lacey, W.N., *Trans. Am. Inst. Mining and Met. Eng.*, 1940, *136*, 136.

T/K	P/bar	Mole fraction of hydrogen sulfide in liquid, x_{H_2S}	in gas, y_{H_2S}
377.6	6.89	0.0062	0.0559
	13.79	0.1014	0.4698
	20.68	0.1965	0.6251
	27.58	0.2912	0.7147
	34.47	0.3838	0.7745
	41.37	0.4740	0.8185
	48.26	0.5604	0.8518
	55.16	0.6421	0.8769
	62.05	0.7165	0.8963
	68.95	0.7859	0.9125
	75.84	0.8506	0.9289
	82.74	0.9110	0.9474
	89.63	0.966	0.968
410.9	13.79	0.0118	0.0662
	20.68	0.0897	0.3452
	27.58	0.1630	0.4850
	34.47	0.2326	0.5698
	41.37	0.3003	0.6292
	48.26	0.3655	0.6709
	55.16	0.4294	0.7018
	62.05	0.4910	0.7230
	68.95	0.5510	0.7356
	75.84	0.6108	0.7420
	82.74	0.680	0.749
444.3	27.58	0.0402	0.1385
	34.47	0.0983	0.2732
	41.37	0.1585	0.3689
	48.26	0.2217	0.4420
	55.16	0.2880	0.4990
	62.05	0.3547	0.5352
	68.95	0.428	0.566
	75.84	0.515	0.575

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Hydrogen sulfide; H_2S; [7783-06-4] 2. Hexane; C_6H_{14}; [110-54-3]	King, M. B.; Al-Najjar, H. *Chem. Eng. Sci.* 1977, *32*, 1241-6.
VARIABLES:	**PREPARED BY:**
Temperature	C. L. Young

EXPERIMENTAL VALUES:

T/K	Mole fraction of hydrogen sulfide* at a partial pressure of 101.3 kPa
288.2	0.0483
293.2	0.0446
298.2	0.0412
303.2	0.0381

* allowance was made for the non-ideal gas behaviour of hydrogen sulfide.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Solvent degassed by spraying into a continuously evacuated chamber. Solvent flows in a thin film down a glass spiral into a buret system containing the gas to be dissolved. Flow rates may be varied over a wide range without affecting the solubility. Similar to the apparatus of Morrison and Billett.

SOURCE AND PURITY OF MATERIALS:

No details given.

ESTIMATED ERROR:

$\delta T/K = \pm 0.1$; $\delta x_{H_2S} = \pm 2\%$

(estimated by compiler).

REFERENCES:

1. Morrison, T. J.; Billett, F.
J. Chem. Soc.
1952, 3819.

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]
2. Ethyl Acetate; $C_3H_8O_2$; [141-78-6]
   Hexane; C_6H_{14}; [110-54-3]
   Chlorobenzene; C_6H_5Cl; [108-90-7]

ORIGINAL MEASUREMENTS:

Hayduk, W.; Pahlevanzadeh, H.

Can. J. Chem. Eng. 1987, *65*, 299-307.

VARIABLES:

Temperature

PREPARED BY:

P.G.T. Fogg

EXPERIMENTAL VALUES:

T/K	Total press. /kPa	Mole fraction solubility at total press.	Mole fraction solubility at partial press. of 101.325 kPa.	Ostwald* coeff. *L*
Ethyl Acetate				
268.15	101.6	0.183	0.186	52.2
298.15	101.3	0.0764	0.0866	23.3
333.15	100.8	0.0187	0.0413	11.3
Hexane				
268.15	100.4	0.0902	0.0905	18.0
298.15	101.0	0.0299	0.0372	7.10
Chlorobenzene				
298.15	100.7	0.0497	0.0508	12.7

* The Oswald coefficient was calculated as the volume of gas at a gas partial pressure of 1 atm. which will completely dissolve in one volume of solvent.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Solubilities were measured using a constant solvent flow apparatus described in (1). Solvent vapor pressures were calculated from Antoine constants given in (2). Densities of solvents were as reported in (3). The gas molar volumes were calculated using the second virial coefficient given in (4).

SOURCE AND PURITY OF MATERIALS:

1. from Matheson of Canada.
2. from Aldrich Chemicals;
   ethyl acetate & chlorobenzene HPLC grade of minimum purity 99.9%;
   hexane of minimum purity 99.0%

ESTIMATED ERROR:

REFERENCES:

1. Asatani, H.; Hayduk, W. *Can.J.Chem.Eng.* 1983, *61*, 227.
2. Reid, R.C.; Prausnitz, J.M.; Sherwood, T.K. *The Properties of Gases and Liquids*, 1977, McGraw-Hill, New York.
3. Zhang, G.; Hayduk, W. *Can.J.Chem. Eng.* 1984, *62*, 713.
4. Dymond, J.H.; Smith, E.B. *The Virial Coefficients of Pure Gases and Mixtures*, 1980, Oxford University Press, New York.

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]
2. Heptane; C_7H_{16}; [142-82-5]

ORIGINAL MEASUREMENTS:

Ng, H.-J.; Kalra, H.; Robinson, D. B.; Kubota, H.
J. Chem. Eng. Data 1980, *25*, 51-55.

VARIABLES:

Temperature, pressure

PREPARED BY:

C. L. Young

EXPERIMENTAL VALUES:

T/K	P/psia	P/MPa	Mole fraction of hydrogen sulfide in liquid, x_{H_2S}	in vapor, y_{H_2S}
310.93	23.2	0.160	0.043	0.933
	81.9	0.565	0.166	0.977
	88.0	0.607	0.180	0.978
	148	1.02	0.311	0.988
	149	1.03	0.318	0.989
	194	1.34	0.435	0.992
	234	1.61	0.538	0.992
	236	1.63	0.545	0.991
	293	2.02	0.675	0.993
	294	2.03	0.680	0.994
	332	2.29	0.819	0.996
	335	2.31	0.845	0.996
	351	2.42	0.927	0.997
352.59	40.5	0.279	0.037	0.780
	151	1.04	0.164	0.937
	154	1.06	0.167	0.937
	286	1.97	0.347	0.963
	289	1.99	0.351	0.963
	451	3.11	0.556	0.976
	455	3.14	0.561	0.977
	619	4.27	0.745	0.985
	625	4.31	0.750	0.986

(cont.)

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Stirred static cell used at highest temperature as described in ref. (1). Variable volume static cell used in measurement at lower temperatures. Details in ref. (2). Temperature measured with thermocouple and pressure measured with Bourdon gauge. After equilibrium established gas and liquid phase sampled and analysed by gas chromatography using a thermal conductivity detector. Details in source.

SOURCE AND PURITY OF MATERIALS:

1. Thio-Pet Chemicals sample, distilled, final purity at least 99.9 mole per cent, as determined by GC.
2. Aldrich Chemicals sample, purity better than 99.9 mole per cent as determined by GC.

ESTIMATED ERROR:

$\delta T/K = \pm 0.06$; $\delta P/MPa = \pm 0.02$;
δx_{H_2S}, $\delta y_{H_2S} = \pm 0.003$.

REFERENCES:

1. Ng, H.-J.; Robinson, D. B.
J. Chem. Eng. Data 1978, *23*, 325.
2. Besserer, G. J.; Robinson, D. B.
Can. J. Chem. Eng. 1971, *8*, 334.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Hydrogen sulfide; H_2S; [7783-06-4] 2. Heptane; C_7H_{16}; [142-82-5]	Ng, H.-J.; Kalra, H.; Robinson, D. B.; Kubota, H. *J. Chem. Eng. Data* 1980, *25*, 51-55.

EXPERIMENTAL VALUES:

T/K	*P*/psia	*P*/MPa	Mole fraction of hydrogen sulfide in liquid, x_{H_2S}	in vapor, y_{H_2S}
352.59	790	5.45	0.896	0.992
	807	5.56	0.908	0.991
394.26	87.8	0.605	0.041	0.702
	159	1.10	0.094	0.812
	162	1.12	0.096	0.810
	338	2.33	0.234	0.916
	509	3.51	0.385	0.933
	509	3.51	0.384	0.935
	729	5.03	0.549	0.948
	909	6.27	0.665	0.953
	912	6.29	0.667	0.955
	1063	7.33	0.749	0.957
	1079	7.44	0.757	0.959
	1198	8.26	0.811	0.959
	1221	8.42	0.821	0.960
	1354	9.34	0.871	0.957
	1385	9.55	0.880	0.954
477.59	182	1.25	0.0177	0.104
	242	1.67	0.0414	0.260
	334	2.30	0.0929	0.443
	488	3.36	0.188	0.589
	652	4.50	0.279	0.652
	856	5.90	0.386	0.677
	964	6.65	0.447	0.760
	1093	7.54	0.514	0.707
	1168	8.05	0.552	0.704
	1213	8.36	0.578	0.676

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Hydrogen sulfide, H_2S; [7783-06-4] 2. Octane; C_8H_{18}; [111-65-9]	King, M. B.; Al-Najjar, H. *Chem. Eng. Sci.* 1977, *32*, 1241-6.
VARIABLES:	**PREPARED BY:**
Temperature	C. L. Young

EXPERIMENTAL VALUES:

T/K	Mole fraction of hydrogen sulfide* at a partial pressure of 101.3 kPa
288.2	0.0513
293.2	0.0474
298.2	0.0437
303.2	0.0402

* allowance was made for the non-ideal gas behaviour of hydrogen sulfide.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Solvent degassed by spraying into a continuously evacuated chamber. Solvent flows in a thin film down a glass spiral into a buret system containing the gas to be dissolved. Flow rates may be varied over a wide range without affecting the solubility. Similar to the apparatus of Morrison and Billett.

SOURCE AND PURITY OF MATERIALS:

No details given.

ESTIMATED ERROR:

$\delta T/K = \pm 0.1$; $\delta x_{H_2S} = \pm 2\%$

(estimated by compiler).

REFERENCES:

1. Morrison, T. J.; Billett, F.
J. Chem. Soc.
1952, 3819.

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]
2. Nonane; C_9H_{20}; [111-84-2]

ORIGINAL MEASUREMENTS:

Eakin, B.E.; DeVaney, W.E.

Am. Inst. Chem. Engnrs. Symp. Ser. 1974, No. 140. *70*, 80-90.

VARIABLES:

Temperature, pressure

PREPARED BY:

C.L. Young

EXPERIMENTAL VALUES:

T/K	$P/10^5$Pa	Mole fraction of hydrogen sulfide in liquid, x_{H_2S}	in gas, y_{H_2S}
310.9	1.37	0.0448	0.99131
	2.26	0.0747	0.99436
	3.43	0.1160	0.99666
	4.61	0.1584	0.99693
	5.79	0.2004	0.99749
366.5	2.55	0.0419	0.9052
	4.88	0.0799	0.9670
	7.39	0.1234	0.9760
	9.71	0.1645	0.9824
	12.27	0.2088	0.9864
477.6	8.23	0.0441	0.5449
	12.88	0.0778	0.6635
	17.58	0.1222	0.7314
	22.55	0.1616	0.8054
	27.65	0.2035	0.8048

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Rocking stainless steel equilibrium vessel, fitted with liquid and gas sampling ports. Pressure measured with Bourdon gauge. Components charged into cell under pressure, equilibrated and samples withdrawn. Samples analysed by G.C. using thermal conductivity detector and Porapak P column.

SOURCE AND PURITY OF MATERIALS:

1. Matheson Gas sample, purity better than 99 mole per cent.
2. Phillips Petroleum sample, purity 99.6 mole per cent.

ESTIMATED ERROR:

$\delta T/K = \pm 0.06$ (at 310.9 K and 366.5 K) ± 0.12 (at 477.6K) $\delta P/MPa = \pm 0.2$ δx_{H_2S}, $\delta y_{H_2S} = \pm 0.001$. (estimated by compiler)

REFERENCES:

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]
2. Decane, $C_{10}H_{22}$; [124-18-5]

ORIGINAL MEASUREMENTS:

Reamer, H.H.; Selleck, F.T.; Sage, B.H.; Lacey, W.N.

Ind. Eng. Chem. 1953, *45*, 1810-1812

VARIABLES:

Temperature, pressure

PREPARED BY:

C.L. Young

EXPERIMENTAL VALUES:

T/K	$P/10^5$Pa	Mole fraction of hydrogen sulfide in liquid x_{H_2S}	in gas y_{H_2S}
277.6	1.38	0.075	0.999
	2.76	0.154	0.999
	4.14	0.238	0.999
	5.52	0.339	0.999
	6.89	0.446	0.999
	8.62	0.613	0.999
	10.34	0.814	0.999
310.9	3.45	0.1153	0.999
	6.89	0.2332	0.999
	10.34	0.3543	0.999
	13.79	0.4780	0.999
	17.24	0.6045	0.999
	20.68	0.7363	0.999
	24.13	0.8738	0.999
344.3	6.89	0.1572	0.9970
	13.79	0.3051	0.9973
	20.68	0.4444	0.9976
	27.58	0.5760	0.9979
	34.47	0.6971	0.9982
	41.37	0.8107	0.9985
	48.26	0.9192	0.9990

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

PVT static cell used. Pressure measured with pressure balance. Temperature measured using platinum resistance thermometer. Samples of co-existing phases analysed by removing hydrogen sulfide from known weight of sample. Details in source and ref. (1).

SOURCE AND PURITY OF MATERIALS:

1. Prepared by hydration of pure aluminium sulfide. Fractionated twice.
2. Eastman Kodak sample. Fractionated sample impurities mainly isomers.

ESTIMATED ERROR:

$\delta T/K = \pm 0.1$; $\delta P/\text{bar} = \pm 0.015$; $\delta x_{H_2S} = \pm 0.15\%$

REFERENCES:

1. Sage, B.H.; Lacey, W.N.; *Trans. Am. Inst. Mining.Met. Engnrs.* 1940, *136*, 136.

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]
2. Decane, $C_{10}H_{22}$; [124-18-5]

ORIGINAL MEASUREMENTS:

Reamer, H.H.; Selleck, F.T.
Sage, B.H.; Lacey, W.N.

Ind. Eng. Chem. 1953, *45*, 1810-1812

EXPERIMENTAL VALUES:

T/K	$P/10^5$Pa	Mole fraction of hydrogen sulfide in liquid, x_{H_2S}	in gas, y_{H_2S}
377.6	13.79	0.2157	0.9914
	27.58	0.4044	0.9927
	41.37	0.5681	0.9938
	55.16	0.7086	0.9949
	68.95	0.8308	0.9960
	82.74	0.9324	0.9966
410.9	13.79	0.1660	0.9690
	27.58	0.3149	0.9808
	41.37	0.4439	0.9832
	55.16	0.5558	0.9839
	68.95	0.6552	0.9841
	82.74	0.7423	0.9843
	96.53	0.8201	0.9831
	110.32	0.8970	0.9807
444.3	13.79	0.1352	0.9234
	27.58	0.2612	0.9560
	41.37	0.3703	0.9646
	55.16	0.4662	0.9682
	68.95	0.5530	0.9688
	82.74	0.6297	0.9663
	96.53	0.7010	0.9632
	110.32	0.7668	0.9577
	124.11	0.8307	0.9478

COMPONENTS: 1. Hydrogen sulfide; H_2S; [7783-06-4] 2. Decane; $C_{10}H_{22}$; [124-18-5]	ORIGINAL MEASUREMENTS: Gerrard, W. *J. Appl. Chem. Biotechnol.* 1972, 22, 623-650.
VARIABLES: Temperature	PREPARED BY: P.G.T. Fogg

EXPERIMENTAL VALUES:

T/K	Mole ratio	Mole fraction of H_2S^* x_{H_2S}
267.15	0.096	0.088
273.15	0.080	0.074

The total pressure was equal to barometric pressure (not stated).

* calculated by the compiler for the stated total pressure.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Hydrogen sulfide was bubbled into a weighed amount of component 2 in a bubbler tube as described in detail in the source. The amount of gas absorbed at equilibrium for the observed temperature was found by weighing.

SOURCE AND PURITY OF MATERIALS:

It was stated that "All materials purified and attested by conventional methods.

ESTIMATED ERROR:

δx_{H_2S} = ± 4% (author)

REFERENCES:

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]
2. Decane; $C_{10}H_{22}$; [124-18-5]

ORIGINAL MEASUREMENTS:

King, M. B.; Al-Najjar, H.
Chem. Eng. Sci.
1977, *32*, 1241-6.

VARIABLES:

Temperature

PREPARED BY:

C. L. Young

EXPERIMENTAL VALUES:

T/K	Mole fraction of hydrogen sulfide* at a partial pressure of 101.3 kPa
288.2	0.0541
293.2	0.0502
298.2	0.0465
303.2	0.0428
323.2	0.0325
343.2	0.0252

* allowance was made for the non-ideal gas behaviour of hydrogen sulfide.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Solvent degassed by spraying into a continuously evacuated chamber. Solvent flows in a thin film down a glass spiral into a buret system containing the gas to be dissolved. Flow rates may be varied over a wide range without affecting the solubility. Similar to the apparatus of Morrison and Billett.

SOURCE AND PURITY OF MATERIALS:

No details given.

ESTIMATED ERROR:

$\delta T/K = \pm 0.1$; $\delta x_{H_2S} = \pm 2\%$

(estimated by compiler).

REFERENCES:

1. Morrison, T. J.; Billett, F. *J. Chem. Soc.* 1952, 3819.

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]
2. Dodecane; $C_{12}H_{26}$; [112-40-3]

ORIGINAL MEASUREMENTS:

King, M. B.; Al-Najjar, H.
Chem. Eng. Sci.
1977, *32*, 1241-6.

VARIABLES:

Temperature

PREPARED BY:

C. L. Young

EXPERIMENTAL VALUES:

T/K	Mole fraction of hydrogen sulfide* at a partial pressure of 101.3 kPa
288.2	0.0572
293.2	0.0533
298.2	0.0495
303.2	0.0475
323.2	0.0347
343.2	0.0268

* allowance was made for the non-ideal gas behaviour of hydrogen sulfide.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Solvent degassed by spraying into a continuously evacuated chamber. Solvent flows in a thin film down a glass spiral into a buret system containing the gas to be dissolved. Flow rates may be varied over a wide range without affecting the solubility. Similar to the apparatus of Morrison and Billett.

SOURCE AND PURITY OF MATERIALS:

No details given.

ESTIMATED ERROR:

$\delta T/K = \pm 0.1$; $\delta x_{H_2S} = \pm 2\%$

(estimated by compiler).

REFERENCES:

1. Morrison, T. J.; Billett, F.
J. Chem. Soc.
1952, 3819.

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]
2. Tetradecane; $C_{14}H_{30}$; [629-59-4]

ORIGINAL MEASUREMENTS:

King, M. B.; Al-Najjar, H.
Chem. Eng. Sci.
<u>1977</u>, *32*, 1241-6.

VARIABLES:

Temperature

PREPARED BY:

C. L. Young

EXPERIMENTAL VALUES:

T/K	Mole fraction of hydrogen sulfide* at a partial pressure of 101.3 kPa
288.2	0.0615
293.2	0.0571
298.2	0.0530
303.2	0.0490
323.2	0.0370
343.2	0.0284

* allowance was made for the non-ideal gas behaviour of hydrogen sulfide.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Solvent degassed by spraying into a continuously evacuated chamber. Solvent flows in a thin film down a glass spiral into a buret system containing the gas to be dissolved. Flow rates may be varied over a wide range without affecting the solubility. Similar to the apparatus of Morrison and Billett.

SOURCE AND PURITY OF MATERIALS:

No details given.

ESTIMATED ERROR:

$\delta T/K = \pm 0.1$; $\delta x_{H_2S} = \pm 2\%$

(estimated by compiler).

REFERENCES:

1. Morrison, T. J.; Billett, F.
J. Chem. Soc.
<u>1952</u>, 3819.

COMPONENTS: 1. Hydrogen sulfide; H_2S; [7783-06-4] 2. Hexadecane; $C_{16}H_{34}$; [544-76-3]	ORIGINAL MEASUREMENTS: Lenoir, J-Y.; Renault, P.; Renon, H. *J. Chem. Eng. Data*, 1971, *16*, 340-2
VARIABLES:	PREPARED BY: C. L. Young

EXPERIMENTAL VALUES:

T/K	Henry's constant H_{H_2S}/atm	Mole fraction at 1 atm* x_{H_2S}
298.2	18.7	0.0535

* Calculated by compiler assuming a linear function of p_{H_2S} vs x_{H_2S}, i.e., $x_{H_2S}(1\text{ atm}) = 1/H_{H_2S}$

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

A conventional gas-liquid chromatographic unit fitted with a thermal conductivity detector was used. The carrier gas was helium. The value of Henry's law constant was calculated from the retention time. The value applies to very low partial pressures of gas and there may be a substantial difference from that measured at 1 atm. pressure. There is also considerable uncertainty in the value of Henry's constant since surface adsorption was not allowed for although its possible existence was noted.

SOURCE AND PURITY OF MATERIALS:

(1) L'Air Liquide sample, minimum purity 99.9 mole per cent.

(2) Touzart and Matignon or Serlabo sample, purity 99 mole per cent.

ESTIMATED ERROR:

$\delta T/K = \pm 0.1$; $\delta H/\text{atm} = \pm 6\%$ (estimated by compiler).

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Hydrogen sulfide; H_2S; [7783-06-4] 2. Hexadecane; $C_{16}H_{34}$; [544-76-3]	Tremper, K.K.; Prausnitz, J.M. *J. Chem. Engng. Data* 1976, *21*, 295-9
VARIABLES:	**PREPARED BY:**
Temperature	C.L. Young

EXPERIMENTAL VALUES:

T/K	Henry's Constant[a] /atm	Mole fraction[b] of hydrogen sulfide at 1atm partial pressure, x_{H_2S}
300	25.2	0.0397
325	32.6	0.0307
350	40.9	0.0244
375	49.7	0.0201
400	58.9	0.0170
425	68.0	0.0147
450	76.6	0.0131
475	82.7	0.0121

a. Authors stated measurements were made at several pressures and values of solubility used were all within the Henry's Law region.

b. Calculated by compiler assuming linear relationship between mole fraction and pressure.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Volumetric apparatus similar to that described by Dymond and Hildebrand (1). Pressure measured with a null detector and precision gauge. Details in ref. (2).

SOURCE AND PURITY OF MATERIALS:

Solvent degassed. No other details given.

ESTIMATED ERROR:

$\delta T/K = \pm 0.1$; $\delta x_{H_2S} = \pm 1\%$

REFERENCES:

1. Dymond, J.; Hildebrand, J.H. *Ind. Chem. Eng. Fundam.* 1967, *6*, 130.
2. Cukor, P.M.; Prausnitz, J.M. *Ind. Chem. Eng. Fundam.* 1971, *10*, 638.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Hydrogen sulfide; H_2S; [7783-06-4] 2. Hexadecane; $C_{16}H_{34}$; [544-76-3]	King, M. B.; Al-Najjar, H. *Chem. Eng. Sci.* <u>1977</u>, *32*, 1241-6.
VARIABLES:	PREPARED BY:
Temperature	C. L. Young

EXPERIMENTAL VALUES:

T/K	Mole fraction of hydrogen sulfide* at a partial pressure of 101.3 kPa
298.2	0.0573
303.2	0.0529
323.2	0.0401
343.2	0.0308

* allowance was made for the non-ideal gas behaviour of hydrogen sulfide.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Solvent degassed by spraying into a continuously evacuated chamber. Solvent flows in a thin film down a glass spiral into a buret system containing the gas to be dissolved. Flow rates may be varied over a wide range without affecting the solubility. Similar to the apparatus of Morrison and Billett.

SOURCE AND PURITY OF MATERIALS:

No details given.

ESTIMATED ERROR:

$\delta T/K = \pm 0.1$; $\delta x_{H_2S} = \pm 2\%$

(estimated by compiler).

REFERENCES:

1. Morrison, T. J.; Billett, F. *J. Chem. Soc.* <u>1952</u>, 3819.

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]
2. Octane; C_8H_{18}; [111-65-9]
3. Methane; CH_4; [74-82-8]

ORIGINAL MEASUREMENTS:

Asano.K.; Nakahara, T.; Kobayashi, R.

J.Chem.Eng.Data 1971, *16*, 16-18.

VARIABLES:

Temperature, Pressure of methane

PREPARED BY:

P.G.T. Fogg

EXPERIMENTAL VALUES:

T/K	P_{CH_4}/psia	P_{CH_4}/bar	Mole fraction of CH_4 in liquid phase*	K-value for H_2S Exptl.	K-value for H_2S Smoothed**
233.15	20	1.38	0.0070	2.77	2.20
	100	6.89	0.0336	0.649	0.650
	200	13.79	0.0658	0.364	0.390
	400	27.58	0.1282	0.230	0.230
	600	41.37	0.1869	0.184	0.184
	800	55.16	0.2410	0.181	0.181
	1000	68.95	0.2882	0.186	0.186
	1250	86.18	0.3367	0.217	0.217
	1500	103.42	0.3774	0.275	0.265

The K-value for H_2S is defined as:

mole fraction of H_2S in vapor phase/mole fraction of H_2S in liquid phase

These K-values correspond to essentially infinite dilution.

* calculated by the compiler from K-values for methane in octane from ref.(1).

** given by the authors

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Retention volumes for small samples of hydrogen sulfide were measured by gas chromatography with octane as the stationary phase and methane the carrier gas. Temperatures were maintained to ± 0.1 K and the pressure of methane measured to ± 0.2%. Experimental details are given in refs. (2) - (4).

SOURCE AND PURITY OF MATERIALS:

1. 99.6% pure.
2. 99.88% pure.
3. 99.99% pure.

ESTIMATED ERROR:

δ T/K = ± 0.1; δP_{CH_4} = ± 2%
(authors)

REFERENCES:

1. Kohn, J.P.; Bradish, W.F. *J.Chem.Eng.Data* 1964, *9*, 5.
2. Van Horn, L.D.; Kobayashi, R. *J.Chem.Eng.Data* 1967, *12*, 294.
3. Masukawa, S.; Kobayashi, R. *J.Gas Chromatogr.* 1968, *6*, 257.
4. Koonce, K.T.; Kobayashi, R. *J.Chem.Eng.Data* 1964, *9*, 494.

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]
2. Octane; C_8H_{18}; [111-65-9]
3. Methane; CH_4; [74-82-8]

ORIGINAL MEASUREMENTS:

Asano.K.; Nakahara, T.; Kobayashi, R.

J.Chem.Eng.Data 1971, *16*, 16-18.

EXPERIMENTAL VALUES:

T/K	P_{CH_4}/psia	P_{CH_4}/bar	Mole fraction of CH_4 in liquid phase*	K-value for H_2S	
				Exptl.	Smoothed**
253.15	20	1.38	0.0070	5.81	4.00
	100	6.89	0.0336	1.26	1.16
	200	13.79	0.0658	0.670	0.670
	400	27.58	0.1282	0.407	0.400
	600	41.37	0.1869	0.306	0.310
	800	55.16	0.2410	0.290	0.284
	1000	68.95	0.2882	0.275	0.280
	1250	86.18	0.3367	0.298	0.298
	1500	103.42	0.3774	0.318	0.318
273.15	20	1.38	0.0070	9.37	6.70
	100	6.89	0.0336	2.05	1.90
	200	13.79	0.0658	1.10	1.10
	400	27.58	0.1282	0.626	0.650
	600	41.37	0.1869	0.488	0.488
	800	55.16	0.2410	0.421	0.421
	1000	68.95	0.2882	0.399	0.400
	1250	86.18	0.3367	0.378	0.390
	1500	103.42	0.3774	0.392	0.318
293.15	20	1.38	0.0070	12.5	10.5
	100	6.89	0.0336	3.17	2.99
	200	13.79	0.0658	1.67	1.70
	400	27.58	0.1282	0.954	0.970
	600	41.37	0.1869	0.714	0.714
	800	55.16	0.2410	0.589	0.589
	1000	68.95	0.2882	0.517	0.540
	1250	86.18	0.3367	0.525	0.520
	1500	103.42	0.3774	0.518	0.518

The K-value for H_2S is defined as:

mole fraction of H_2S in vapor phase/mole fraction of H_2S in liquid phase

These K-values correspond to essentially infinite dilution.

* calculated by the compiler from K-values for methane in octane from ref.(1).

COMPONENTS:

(1) Hydrogen sulfide; H_2S; [7783-06-4]

(2) Kerosene A-1

ORIGINAL MEASUREMENTS:

Hannaert, H.; Haccuria, M.; Mathieu, M. P.

Ind. Chim. Belge 1967, *32*, 156-164.

VARIABLES:

$T/K = 233.15 - 273.15$

PREPARED BY:

E. L. Boozer
H. L. Clever

EXPERIMENTAL VALUES:

Temperature Interval of Measurements T/K	Hydrogen Sulfide Mol % Range $10^2 x_1$/mol %	$K\pi\nu$/atm[1] at 293.15 K	Enthalpy of Dissolution ΔH/kcal mol^{-1}	Constant A
233.15-273.15	1 - 6	(18)	3.17	3.63

[1] $\log (K\pi\nu/\text{atm}) = A - (\Delta H/\text{cal mol}^{-1})/(2.3\ R(T/K))$

The author's definitions are:

$$K = y_1/x_1 = \frac{\text{mole fraction gas in gas phase}}{\text{mole fraction gas in liquid phase}}$$

π/atm = total pressure,

ν = coefficient of fugacity.

The function, $K\pi\nu$/atm, is equivalent to a Henry's constant in the form $H_{1,2}/\text{atm} = (f_1/\text{atm})/x_1$ where f_1 is the fugacity.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

The authors describe three methods:

1.A. [Saturat. n°1]. A measure of the static pressure of saturation in an apparatus which gave a precision of 10 - 15 %.

1.B. [Saturat. n°2]. A measure of the static pressure of saturation in an apparatus which gave a precision of 2 - 5 %.

2. [Chromato]. A Gas liquid chromatographic method estimated to have a precision of 2 - 5 %.

3. [Anal. directe]. Direct analysis of the gaseous and liquid phases.

Method 1.B. was used for this system.

SOURCE AND PURITY OF MATERIALS:

(1) Hydrogen sulfide. Matheson Co., Inc. Purity 99.5 per cent.

(2) Kerosene A-1

Distillation range, °C	density gcm^{-3},20°C	mol wt
A-1 150-280	0.7805	170

ESTIMATED ERROR:

REFERENCES:

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]
2. Cyclohexane; C_6H_{12}; [110-82-7]

ORIGINAL MEASUREMENTS:

Tsiklis, D.S.; Svetlova, G.M.

Zh. Fiz. Khim. 1958, *32*, 1476-1480.

VARIABLES:

Temperature, pressure

PREPARED BY:

P.G.T. Fogg

EXPERIMENTAL VALUES:

P_{H_2S}/mmHg	P_{H_2S}/bar	Mole fraction, x_{H_2S}		
		283.2 K	293.2 K	313.2 K
100	0.133	0.0034	0.0024	0.0020
200	0.267	0.0076	0.0058	0.0046
300	0.400	0.0126	0.0100	0.0080
400	0.533	0.0186	0.0154	0.0122
500	0.667	0.0265	0.0218	0.0170
600	0.800	0.0334	0.0290	0.0224
700	0.933	0.0424	0.0370	0.0288
800	1.067	0.0524	0.0458	0.0360

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

A known weight of hydrogen sulfide was dissolved in a known weight of cyclohexane and the resulting total pressure was measured by a manometer. The pressure of hydrogen sulfide was equal to the total pressure minus the vapor pressure of cyclohexane. Temperatures were controlled to ± 0.1 K.

SOURCE AND PURITY OF MATERIALS:

Not stated.

ESTIMATED ERROR:

$\delta T/K = \pm 0.1$ (authors)

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Hydrogen sulfide; H_2S; [7783-06-4] 2. Methylcyclohexane; C_7H_{14}; [108-87-2]	Ng, H-J.; Robinson, D. B. *Fluid Phase Equilibria* <u>1979</u>, *2*, 283-292.
VARIABLES:	**PREPARED BY:**
Temperature, pressure	C. L. Young

EXPERIMENTAL VALUES:

T/K	P/MPa	Mole fraction of hydrogen sulfide in liquid, x_{H_2S}	Mole fraction of hydrogen sulfide in gas, y_{H_2S}	T/K	P/MPa	Mole fraction of hydrogen sulfide in liquid, x_{H_2S}	Mole fraction of hydrogen sulfide in gas, y_{H_2S}
310.9	0.265	0.065	0.963	394.3	0.470	0.030	0.630
	0.682	0.204	0.988		1.303	0.127	0.860
	1.372	0.449	0.993		2.841	0.307	0.932
	2.061	0.732	0.995		4.406	0.470	0.950
	2.434	0.913	0.999		5.681	0.600	0.958
	2.599	0.970	0.999		7.433	0.762	0.963
352.6	0.250	0.029	0.800		8.701	0.858	0.967
	0.752	0.114	0.934		9.322	0.900	0.963
	1.600	0.265	0.969	477.6	1.820	0.071	0.411
	2.689	0.462	0.981		3.199	0.184	0.644
	3.757	0.659	0.983		4.316	0.256	0.740
	4.847	0.844	0.991		5.426	0.341	0.787
	5.654	0.943	0.994		5.722	0.351	0.799
					7.329	0.460	0.833
					8.536	0.549	0.816
					9.453	0.612	0.801

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Stirred static cell fitted with glass window. Temperature measured with thermocouple and pressure measured with Bourdon gauge. After equilibrium established gas and liquid phases sampled and analysed by gas chromatography using a thermal conductivity detector. Details in ref. (1).

SOURCE AND PURITY OF MATERIALS:

1. Thio-Pet Chemicals sample, distilled, final purity about 99.9 mole per cent.
2. Baker Analyzed Reagent grade, purity better than 99.9 mole per cent.

ESTIMATED ERROR:

$\delta T/K = \pm 0.06$; $\delta P/MPa = \pm 0.2$;

δx_{H_2S}, $\delta y_{H_2S} = \pm 0.005$.

REFERENCES:

1. Ng, H-J.; Robinson, D. B. *J. Chem. Engng. Data* <u>1978</u>, *23*, 325.

COMPONENTS: 1. Hydrogen sulfide; H_2S; [7783-06-4] 2. Ethylcyclohexane; C_8H_{16}; [1678-91-7]	ORIGINAL MEASUREMENTS: Huang, S. S.-S.; Robinson, D. B. *J. Chem. Eng. Data* <u>1985</u>, *30*, 154-157.
VARIABLES: Temperature, pressure	PREPARED BY: C. L. Young

EXPERIMENTAL VALUES:

		Mole fraction of hydrogen sulfide		K-values	
T/K	*P*/MPa	in liquid, x_{H_2S}	in vapor, y_{H_2S}	K_{H_2S}	$K_{C_8H_{16}}$
310.0	0.170	0.0490	0.9811	20.0	0.0199
	0.465	0.1495	0.9936	6.65	0.00753
	0.972	0.3060	0.9964	3.26	0.00519
	1.54	0.5362	0.9975	1.86	0.00539
	2.21	0.8178	0.9988	1.22	0.00659
	2.52	0.9447	0.9995	1.06	0.00904
	2.66	0.9840	0.9998	1.02	0.0125
352.6	0.273	0.0465	0.9324	20.1	0.0709
	0.848	0.1518	0.9770	6.44	0.0271
	1.72	0.3157	0.9876	3.13	0.0181
	3.25	0.5822	0.9921	1.70	0.0189
	4.59	0.8014	0.9947	1.24	0.0267
	5.67	0.9443	0.9971	1.06	0.0521
	6.10	0.9841	0.9988	1.01	0.0755
394.3	0.383	0.0362	0.8067	22.3	0.201
	1.14	0.1273	0.9332	7.33	0.0765
	2.36	0.2767	0.9644	3.49	0.0492
	4.42	0.5045	0.9769	1.94	0.0466
	6.39	0.6820	0.9801	1.44	0.0626
	8.68	0.8604	0.9801	1.14	0.143
	9.65	0.9198	0.9787	1.06	0.266
477.6	0.820	0.0163	0.3444	21.1	0.666
	1.65	0.0735	0.6593	8.97	0.368
	3.92	0.2368	0.8325	3.52	0.219
	6.63	0.4109	0.8742	2.13	0.214
	8.82	0.5437	0.8814	1.62	0.260
	11.13	0.6702	0.8698	1.30	0.395
	12.50	0.8313	0.8416	1.01	0.939

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE: Stirred static cell fitted with glass window. Temperature measured with thermocouple and pressure with Bourdon gauge. After equilibrium established gas and liquid phases sampled and analysed using gas chromatography using a thermal conductivity detector. Details in source and ref. (1).	SOURCE AND PURITY OF MATERIALS: 1. Matheson sample, purity 99.9 mole per cent. Distilled. 2. Obtained from Aldrich Chemical; purity 99 mole per cent or better; no impurity detected by chromatography.
	ESTIMATED ERROR: $\delta T/K = \pm 0.06$; $\delta P/MPa = \pm 0.007$; (up to 6.9 MPa); ±0.02 (above 6.9 MPa).
	REFERENCES: 1. Ng, H.-J.; Robinson, D. B. *J. Chem. Eng. Data* <u>1978</u>, *23*, 325.

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]
2. Propylcyclohexane; C_9H_{18}; [1678-92-8]

ORIGINAL MEASUREMENTS:

Huang, S. S.-S.; Robinson, D. B.
J. Chem. Eng. Data
1985, *30*, 154-157.

VARIABLES:

Temperature, pressure

PREPARED BY:

C. L. Young

EXPERIMENTAL VALUES:

T/K	*P*/MPa	Mole fraction of hydrogen sulfide in liquid, x_{H_2S}	Mole fraction of hydrogen sulfide in vapor, y_{H_2S}	K-values K_{H_2S}	K-values $K_{C_9H_{18}}$
310.9	0.177	0.0642	0.9913	15.5	0.0093
	0.585	0.2096	0.9981	4.76	0.0024
	1.01	0.3810	0.9988	2.62	0.00194
	1.54	0.5670	0.9992	1.76	0.00185
	2.03	0.7804	0.9995	1.28	0.00228
	2.28	0.8503	0.9996	1.18	0.00267
	2.58	0.9598	0.9998	1.04	0.00498
352.6	0.220	0.0455	0.9651	21.2	0.0366
	0.752	0.1543	0.9892	6.41	0.0128
	1.80	0.3623	0.9947	2.75	0.00831
	3.40	0.6455	0.9966	1.54	0.00959
	4.93	0.8676	0.9974	1.15	0.0196
	5.65	0.9494	0.9983	1.05	0.0336
	6.02	0.9832	0.9993	1.02	0.0417
394.3	0.342	0.0418	0.8980	21.5	0.106
	1.11	0.1505	0.9668	6.42	0.0391
	2.47	0.3230	0.9823	3.04	0.0261
	4.53	0.5400	0.9876	1.83	0.0270
	6.40	0.7010	0.9886	1.41	0.0381
	8.52	0.8748	0.9879	1.13	0.0966
	8.56	0.8701	0.9864	1.13	0.105
	9.65	0.9263	0.9857	1.06	0.194
	9.99	0.9427	0.9839	1.04	0.281
477.6	0.841	0.0448	0.6356	14.2	0.381
	1.72	0.1215	0.7989	6.58	0.229

(cont.)

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Stirred static cell fitted with glass window. Temperature measured with thermocouple and pressure with Bourdon gauge. After equilibrium established gas and liquid phases sampled and analysed using gas chromatography using a thermal conductivity detector. Details in source and ref. (1).

SOURCE AND PURITY OF MATERIALS:

1. Matheson sample, purity 99.9 mole per cent. Distilled.
2. Obtained from Koch-Light Lab., purity 99 mole per cent or greater. No impurity detected by chromatography.

ESTIMATED ERROR:

$\delta T/K = \pm 0.06$; $\delta P/MPa = \pm 0.007$; (up to 6.9 MPa); ±0.02 (above 6.9 MPa).

REFERENCES:

1. Ng, H.-J.; Robinson, D. B. *J. Chem. Eng. Data* 1978, *23*, 325.

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]

2. Propylcyclohexane; C_9H_{18}; [1678-92-8]

ORIGINAL MEASUREMENTS:

Huang, S. S.-S.; Robinson, D. B.
J. Chem. Eng. Data
1985, *30*, 154-157.

EXPERIMENTAL VALUES:

T/K	*P*/MPa	Mole fraction of hydrogen sulfide		K-values	
		in liquid, x_{H_2S}	in vapor, y_{H_2S}	K_{H_2S}	$K_{C_9H_{18}}$
477.6	3.68	0.2805	0.8922	3.18	0.150
	6.32	0.4515	0.9179	2.03	0.150
	8.65	0.5909	0.9200	1.56	0.196
	10.70	0.6850	0.9178	1.34	0.261
	10.83	0.6888	0.9160	1.33	0.270
	11.58	0.7249	0.9142	1.26	0.312
	12.16	0.7463	0.9070	1.22	0.367
	12.31	0.7620	0.8999	1.18	0.421
	12.75	0.7912	0.8912	1.13	0.521
	13.06	0.8270	0.8786	1.06	0.702

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Hydrogen sulfide; H_2S; [7783-06-4]. 2. (1-Methylethyl)-cyclohexane, (*iso*-propylcyclohexane); C_9H_{18}; [696-29-7]	Eakin, B.E.; DeVaney, W.E. *Am. Inst. Chem. Engnrs. Symp. Ser.* 1974, No. 140, *70*, 80-90.
VARIABLES: Temperature, pressure	PREPARED BY: C.L. Young.

EXPERIMENTAL VALUES:

T/K	$P/10^5$Pa	Mole fraction of hydrogen sulfide in liquid, x_{H_2S}	in gas, y_{H_2S}
310.9	1.12	0.0394	0.98835
	1.62	0.0533	0.99184
	2.09	0.0710	0.99316
	3.24	0.1058	0.99582
	4.32	0.1378	0.99579
	5.34	0.1747	0.99705
366.5	2.50	0.0389	0.9315
	3.69	0.0568	0.9530
	4.30	0.0652	0.9649
	7.12	0.1113	0.9756
	9.90	0.1508	0.9810
	12.25	0.1834	0.9880
477.6	7.93	0.0398	0.5779
	10.71	0.0655	0.7079
	13.27	0.0842	0.7490
	18.41	0.1188	0.8078
	24.13	0.1570	0.8571
	29.65	0.1937	0.8649

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Rocking stainless steel equilibrium vessel, fitted with liquid and gas sampling ports. Pressure measured with Bourdon gauge. Components charged into cell under pressure, equilibrated and samples withdrawn. Samples analysed by G.C. using thermal conductivity detector and Porapak P column.

SOURCE AND PURITY OF MATERIALS:

1. Matheson Gas sample purity better than 99 mole per cent.

2. Phillips Petroleum sample, purity better than 99.9 mole per cent.

ESTIMATED ERROR:

$\delta T/K = \pm 0.06$ (at 310.9K and 366.5K) ± 0.12 (at 477.6K) $\delta P/MPa = \pm 0.2$. δx_{H_2S}, $\delta y_{H_2S} = \pm 0.001$. (estimated by compiler)

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Hydrogen sulfide; H_2S; [7783-06-4] 2. Decahydronaphthalene, (Decalin); $C_{10}H_{18}$; [91-17-8]	Lenoir, J-Y.; Renault, P.; Renon, H. *J. Chem. Eng. Data*, 1971, *16*, 340-2.
VARIABLES:	PREPARED BY:
Temperature	C. L. Young

EXPERIMENTAL VALUES:

T/K	Henry's constant H_{H_2S}/atm	Mole fraction at 1 atm* x_{H_2S}
298.2	29.8	0.0336
323.2	37.6	0.0266

* Calculated by compiler assuming a linear function of P_{H_2S} vs x_{H_2S}, i.e., $x_{H_2S}(1 \text{ atm}) = 1/H_{H_2S}$

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

A conventional gas-liquid chromatographic unit fitted with a thermal conductivity detector was used. The carrier gas was helium. The value of Henry's law constant was calculated from the retention time. The value applies to very low partial pressures of gas and there may be a substantial difference from that measured at 1 atm. pressure. There is also considerable uncertainty in the value of Henry's constant since surface adsorption was not allowed for although its possible existence was noted.

SOURCE AND PURITY OF MATERIALS:

(1) L'Air Liquide sample, minimum purity 99.9 mole percent.

(2) Touzart and Matignon or Serlabo sample, purity 99 mole per cent.

ESTIMATED ERROR:

$\delta T/K = \pm 0.1$; $\delta H/\text{atm} = \pm 6\%$ (estimated by compiler).

REFERENCES:

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]
2. 1,1'-Bicyclohexyl; $C_{12}H_{22}$; [92-51-3]

ORIGINAL MEASUREMENTS:

Tremper, K.K.; Prausnitz, J.M.

J. Chem.Engng.Data 1976, *21*, 295-9

VARIABLES:

Temperature

PREPARED BY:

C.L. Young

EXPERIMENTAL VALUES:

T/K	Henry's Constant[a] /atm	Mole fraction[b] of of hydrogen sulfide at 1 atm partial pressure, x_{H_2S}
300	43.0	0.0233
325	55.9	0.0179
350	72.0	0.0139
375	91.6	0.0109
400	112.0	0.00893
425	129.0	0.00775
450	135.0	0.00741
475	129.0	0.00775

a Authors stated measurements were made at several pressures and values of solubility used were all within the Henry's-Law region.

b Calculated by compiler assuming linear relationship between mole fraction and pressure.

AUXILIARY INFORMATION

METHOD /APPARATUS/PROCEDURE

Volumetric apparatus similar to that described by Dymond and Hildebrand (1). Pressure measured with a null detector and precision gauge. Details in ref. (2).

SOURCE AND PURITY OF MATERIALS:

Solvent degassed, no details given.

ESTIMATED ERROR:

$\delta T/K = \pm 0.1$; $\delta x_{H_2S} = \pm 1\%$.

REFERENCES:

1. Dymond, J,; Hildebrand, J.H. *Ind. Eng. Chem. Fundam.* 1967, *6*, 130
2. Cukor, P.M.; Prausnitz, J.M. *Ind. Eng.Chem.Fundam.* 1971, *10*, 638

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]
2. Aromatic compounds

ORIGINAL MEASUREMENTS:

Bell, R.P.

J. Chem. Soc. 1931, 1371-1382.

VARIABLES:

PREPARED BY:

C.L. Young

EXPERIMENTAL VALUES:

Solvent	T/K	Partition coefficient, s^+	Mole fraction[§] of hydrogen sulfide liquid, x_{NH_3}
Benzene; C_6H_6; [71-43-2]	293.15	15.68	0.0563
Methylbenzene, (Toluene); C_7H_8; [108-88-3]		16.90	0.0672
Bromobenzene; C_6H_5Br; [108-86-1]		12.92	0.0376
Chlorobenzene; C_6H_5Cl; [108-90-7]		13.80	0.0388

s^+ is defined as $s = 22.4 \times \frac{293}{273} \times c$ where c is the "solubility in equivalents/litre".

[§] for a partial pressure of 1 atmosphere

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Volumetric apparatus consisting of bulb (~50cm^3 capacity) extended at the top as a graduated tube and joined at bottom to a capillary u-tube. Liquid saturated with gas at atmospheric pressure. Gas withdrawn in a current of air, absorbed in sodium hydroxide and hydrogen peroxide. Excess hydrogen peroxide removed by heating and excess sodium hydroxide titrated.

SOURCE AND PURITY OF MATERIALS:

1. Prepared by reaction of sodium sulfide on hydrochloric acid.
2. Merck and Kahlbaum samples dried over calcium chloride and fractionally distilled.

ESTIMATED ERROR:

$\delta T/K = \pm 0.1$; $\delta x_{H_2S} = \pm 1\%$.

(estimated by compiler)

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Hydrogen sulfide; H_2S; [7783-06-4] 2. Benzene; C_6H_6; [71-43-2]	Gerrard, W. *J. Appl. Chem. Biotechnol.* 1972, 22, 623-650.
VARIABLES:	PREPARED BY:
Temperature	P.G.T. Fogg

EXPERIMENTAL VALUES:

T/K	P(total)/mmHg	P(total)/bar	Mole ratio	Mole fraction of H_2S^* x_{H_2S}
278.15	766	1.021	0.088	0.081
283.15	766	1.021	0.073	0.068
293.15	766	1.021	0.060	0.057

* calculated by the compiler for the stated total pressure.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Hydrogen sulfide was bubbled into a weighed amount of component 2 in a bubbler tube as described in detail in the source. The amount of gas absorbed at equilibrium for the observed temperature and pressure was found by weighing. Pressure was measured with a mercury manometer.

SOURCE AND PURITY OF MATERIALS:

It was stated that "All materials purified and attested by conventional methods."

ESTIMATED ERROR:

$\delta x_{H_2S} = \pm 4\%$ (author)

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Hydrogen sulfide; H_2S; [7783-06-4] 2. Benzene; C_6H_6; [71-43-2]	Patyi, L.; Furmer, I. E.; Makranczy, J.; Sadilenko, A. S.; Stepanova, Z. G.; Berengarten, M. G. *Zh. Prikl. Khim.* <u>1978</u>, *51*, 1296-1300.
VARIABLES:	PREPARED BY:
	C. L. Young

EXPERIMENTAL VALUES:

T/K	$\alpha^{\dagger}$	Mole fraction of hydrogen sulfide at a partial pressure of 101.325 kPa x_{H_2S}
298.15	9.3	0.0358

† volume of gas (measured at 101.325 kPa and 273.15 K) dissolved per volume of solvent.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Volumetric method. Pressure measured when known amounts of gas were added, in increments, to a known amount of liquid in a vessel of known dimensions. Corrections were made for the partial pressure of solvent. Details in ref. (1).	Purity better than 99 mole per cent as determined by gas chromatography.
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.1$; $\delta\alpha = \pm 4\%$ or less.
	REFERENCES:
	1. Bodor, E.; Bor, G. J.; Mohai, B.; Sipos, G. *Veszpremi. Vegyip. Egy. Kozl.* <u>1957</u>, *1*, 55.

COMPONENTS: 1. Hydrogen sulfide; H_2S; [7783-06-4] 2. Methylbenzene, (toluene); C_7H_8; [108-88-3]	ORIGINAL MEASUREMENTS: Gerrard, W. *J. Appl. Chem. Biotechnol.*, 1972, *22*, 623-650
VARIABLES: Temperature	PREPARED BY: C.L. Young

EXPERIMENTAL VALUES:

T/K	P^*/mmHg	P^*/kPa	Mole ratio	Mole fraction$^+$ of hydrogen sulfide in liquid, x_{H_2S}
265.15	754	100.5	0.150	0.130
267.15	754	100.5	0.138	0.121
273.15	754	100.5	0.115	0.103
283.15	754	100.5	0.082	0.076
293.15	754	100.5	0.071	0.066

$^+$calculated by compiler

*total pressure

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Hydrogen sulfide was bubbled into a weighed amount of component 2. in a bubbler tube as described in detail in the source. The amount of gas absorbed at equilibrium and at the observed temperature and pressure was determined by weighing. Pressure was measured with a mercury manometer. The amount of gas absorbed at successively lower pressures was measured. Eventually the pressure was reduced to the vapor pressure os component 2. The refractive index and infrared spectrum of the liquid showed it to be essentially pure component 2.

SOURCE AND PURITY OF MATERIALS:

1 and 2. Components were purified and attested by conventional methods.

ESTIMATED ERROR:

$\delta T/K = \pm 0.2$; $\delta x_{H_2S} = \pm 4\%$

REFERENCES:

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]
2. Methylbenzene (toluene); C_7H_8; [108-88-3]

ORIGINAL MEASUREMENTS:

Ng, H.-J.; Kalra, H.; Robinson, D. B.; Kubota, H.

J. Chem. Eng. Data 1980, *25*, 51-55.

VARIABLES:

Temperature, pressure

PREPARED BY:

C. L. Young

EXPERIMENTAL VALUES:

T/K	P/psia	P/MPa	Mole fraction of hydrogen sulfide in liquid, x_{H_2S}	in vapor, y_{H_2S}
310.93	29.5	0.203	0.077	0.971
	79.3	0.547	0.226	0.990
	150	1.03	0.427	0.996
	230	1.59	0.643	0.998
	317	2.19	0.836	0.998
	370	2.55	0.954	0.999
352.59	59.6	0.411	0.071	0.913
	165	1.14	0.238	0.971
	296	2.04	0.442	0.985
	459	3.16	0.651	0.991
	632	4.36	0.817	0.995
	762	5.25	0.914	0.996
	818	5.64	0.953	0.998
394.26	54.5	0.376	0.031	0.677
	154	1.06	0.135	0.891
	350	2.41	0.305	0.944
	589	4.06	0.502	0.963
	853	5.88	0.686	0.975
	1114	7.68	0.816	0.975
	1309	9.03	0.891	0.975
	1413	9.74	0.932	0.978

(cont.)

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Stirred static cell fitted with glass window. Temperature measured with thermocouple and pressure measured with Bourdon gauge. After equilibrium established gas and liquid phases sampled and analysed by gas chromatography using a thermal conductivity detector. Details in ref. (1).

SOURCE AND PURITY OF MATERIALS:

1. Thio-Pet Chemicals sample, distilled, final purity at least 99.9 mole per cent as determined by GC.
2. Phillips Petroleum research grade sample, purity 99.94 mole per cent.

ESTIMATED ERROR:

$\delta T/K = \pm 0.06$; $\delta P/MPa = \pm 0.02$;

δx_{H_2S}, $\delta y_{H_2S} = \pm 0.003$.

REFERENCES:

1. Ng, H.-J.; Robinson, D. B. *J. Chem. Eng. Data* 1978, *23*, 325.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Hydrogen sulfide; H_2S; [7782-06-4] 2. Methylbenzene (toluene); C_7H_8; [108-88-3]	Ng, H.-J.; Kalra, H.; Robinson, D. B.; Kubota, H. *J. Chem. Eng. Data* 1980, *25*, 51-55.

EXPERIMENTAL VALUES:

T/K	P/psia	P/MPa	Mole fraction of hydrogen sulfide in liquid, x_{H_2S}	Mole fraction of hydrogen sulfide in vapor, y_{H_2S}
477.59	200	1.38	0.037	0.352
	399	2.75	0.142	0.666
	619	4.27	0.247	0.752
	1036	7.14	0.433	0.807
	1468	10.12	0.598	0.826
	1679	11.58	0.689	0.797

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Hydrogen sulfide; H_2S; [7783-06-4] 2. 1,2-Dimethylbenzene, (o-xylene); C_8H_{10}; [95-47-6]	Gerrard, W. *J. Appl. Chem. Biotechnol.*, <u>1972</u>, *22*, 623-650
VARIABLES:	**PREPARED BY:**
Temperature	C.L. Young

EXPERIMENTAL VALUES:

T/K	P^*/mmHg	P^*/kPa	Mole ratio	Mole fraction$^+$ of hydrogen sulfide in liquid, x_{H_2S}
265.15	754	100.5	0.155	0.134
267.15	754	100.5	0.145	0.127
273.15	754	100.5	0.120	0.107
283.15	754	100.5	0.084	0.077
293.15	754	100.5	0.075	0.070

$^+$calculated by compiler

*total pressure

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Hydrogen sulfide was bubbled into a weighed amount of component 2. in a bubbler tube as described in detail in the source. The amount of gas absorbed at equilibrium and at the observed temperature and pressure was determined by weighing. Pressure was measured with a mercury manometer. The amount of gas absorbed at successively lower pressures was measured. Eventually the pressure was reduced to the vapor pressure of component 2. The refractive index and infrared spectrum of the liquid showed it to be essentially pure component 2.

SOURCE AND PURITY OF MATERIALS:

1 and 2. Components were purified and attested by conventional methods.

ESTIMATED ERROR:

$\delta T/K = \pm 0.2$; $\delta x_{H_2S} = \pm 4\%$

REFERENCES:

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]
2. 1,3-Dimethylbenzene; C_8H_{10}; [108-38-3]

ORIGINAL MEASUREMENTS:

Huang, S. S.-S.; Robinson, D.B.

Fluid Phase Equilibria 1984, *17*, 373 - 382.

VARIABLES:

Temperature, pressure

PREPARED BY:

P.G.T. Fogg

EXPERIMENTAL VALUES:

T/K	P_{total}/MPa	Mole fraction of H_2S in liquid phase	Mole fraction of H_2S in gas phase
310.9	0.146	0.0403	0.9834
	0.383	0.1334	0.9949
	0.779	0.3139	0.9980
	1.17	0.4651	0.9987
	1.75	0.6873	0.9992
	1.92	0.7514	0.9994
	2.13	0.8394	0.9995
	2.48	0.9501	0.9997
	2.63	0.9931	0.9999
352.6	0.365	0.0690	0.9624
	1.10	0.2525	0.9874
	1.72	0.3899	0.9912
	3.24	0.6637	0.9960
	4.41	0.8233	0.9969
	5.41	0.9319	0.9980
	6.14	0.9888	0.9994
394.3	0.256	0.0206	0.7957
	0.869	0.1106	0.9381
	2.44	0.3242	0.9741
	4.63	0.5637	0.9834
	7.03	0.7656	0.9860
	8.94	0.8783	0.9858
	10.21	0.9490	0.9824
477.6	0.938	0.0310	0.5592
	1.59	0.0826	0.7125
	3.87	0.2582	0.8610
	6.31	0.4240	0.8956
	9.13	0.5859	0.9035
	11.32	0.6908	0.8989
	13.12	0.8450	0.8610

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE

A stirred static cell, fitted with a glass window, was used. Temperature was measured with a thermocouple and pressure with a Bourdon gauge. After equilibrium was established gas and liquid phases were analysed by gas chromatography. Techniques were similar to those described in refs. (1) & (2).

SOURCE AND PURITY OF MATERIALS

1. from Matheson; purity 99.9 mol%.
2. Matheson *Chromatoquality*; purity > 99 mol%; no impurities detected by chromatography.

ESTIMATED ERROR

REFERENCES

1. Ng, H-J.; Robinson, D.B. *Fluid Phase Equilibria*, 1979, 2, 283.
2. Ng, H-J., Robinson, D.B. *J. Chem. Eng. Data*, 1980, 25, 51.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Hydrogen sulfide; H_2S; [7783-06-4] 2. 1,3,5-Trimethylbenzene, (mesitylene); C_9H_{12}; [108-67-8]	Eakin, B.E.; DeVaney, W.E. *Am. Inst. Chem. Engnrs.Symp.Ser.* 1974, No. 140, *70*, 80-90.
VARIABLES:	**PREPARED BY:**
Temperature, pressure	C.L. Young

EXPERIMENTAL VALUES:

T/K	$P/10^5$Pa	Mole fraction of hydrogen sulfide, in liquid, x_{H_2S}	in gas, y_{H_2S}
310.9	1.31	0.0511	0.99457
	2.14	0.0846	0.99663
	3.24	0.1314	0.99701
	4.62	0.1866	0.99787
	5.58	0.2354	0.99816
366.5	2.59	0.0411	0.9369
	5.26	0.0838	0.9590
	7.85	0.1292	0.9758
	10.52	0.1781	0.9871
	13.19	0.2321	0.9888
477.6	8.18	0.0391	0.6359
	14.07	0.0774	0.7517
	19.93	0.1270	0.8408
	26.20	0.1825	0.8715
	32.61	0.2215	0.8945

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Rocking stainless steel equilibrium vessel, fitted with liquid and gas sampling ports. Pressure measured with Bourdon gauge. Components charged into cell under pressure, equilibrated and samples withdrawn. Samples analysed by G.C. using thermal conductivity detector and Porapak P column.

SOURCE AND PURITY OF MATERIALS:

1. Matheson Gas sample purity better than 99 mole per cent.
2. Eastman Kodak Co. sample, boiling point range 160-163°C.

ESTIMATED ERROR:

$\delta T/K = \pm 0.06$ (at 310.9K and 366.5K) ± 0.12 (at 477.6K) $\delta P/\text{MPa} = \pm 0.2$. δx_{H_2S}, $\delta y_{H_2S} = \pm 0.001$. (estimated by compiler).

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Hydrogen sulfide; H_2S; [7783-06-4] 2. Alkylbenzenes	Patyi, L.; Furmer, I. E. Makranczy, J.; Sadilenko, A. S.; Stepanova, Z. G.; Berengarten, M. G. *Zh. Prikl. Khim.* 1978, *51*, 1296-1300.
VARIABLES:	PREPARED BY: C. L. Young

EXPERIMENTAL VALUES:

T/K	$\alpha^{\dagger}$	Mole fraction of hydrogen sulfide at a partial pressure of 101.325 kPa x_{H_2S}
	Ethylbenzene; C_8H_{10}; [100-41-4]	
298.15	8.0	0.042
	Propylbenzene; C_9H_{12}; [103-65-1]	
298.15	8.8	0.052
	(1-methylethyl)-benzene (isopropylbenzene); C_9H_{12}; [98-82-8]	
298.15	8.9	0.053
	1,3,5-Trimethylbenzene (mesitylene); C_9H_{12}; [108-67-8]	
298.15	8.22	0.0487

† volume of gas (measured at 101.325 kPa and 273.15 K) dissolved per volume of solvent.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Volumetric method. Pressure measured when known amounts of gas were added, in increments, to a known amount of liquid in a vessel of known dimensions. Corrections were made for the partial pressure of solvent. Details in ref. (1).

SOURCE AND PURITY OF MATERIALS:

Purity better than 99 mole per cent as determined by gas chromatography.

ESTIMATED ERROR:

$\delta T/K = \pm 0.1$; $\delta\alpha = \pm 4\%$ or less.

REFERENCES:

1. Bodor, E.; Bor, G. J.; Mohai, B.; Sipos, G. *Veszpremi. Vegyip. Egy. Kozl.* 1957, *1*, 55.

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]
2. 1,3,5-trimethylbenzene; C_9H_{12}; [108-67-8]

ORIGINAL MEASUREMENTS:

Huang, S. S.-S.; Robinson, D.B.

Fluid Phase Equilibria 1984, *17*, 373 - 382.

VARIABLES:

Temperature, pressure

PREPARED BY:

P.G.T. Fogg

EXPERIMENTAL VALUES:

T/K	P_{total}/MPa	Mole fraction of H_2S in liquid phase	Mole fraction of H_2S in gas phase
310.9	0.172	0.0668	0.9963
	0.424	0.1721	0.9985
	0.827	0.3435	0.9991
	1.36	0.5832	0.9994
	2.02	0.8075	0.9997
	2.48	0.9407	0.9998
	2.63	0.9775	0.9999
352.6	0.186	0.0296	0.9732
	0.620	0.1247	0.9922
	1.17	0.2420	0.9958
	1.97	0.3976	0.9970
	3.45	0.6722	0.9981
	4.86	0.8605	0.9988
	5.58	0.9425	0.9992
	6.22	0.9953	0.9999
394.3	0.339	0.0340	0.9204
	1.08	0.1375	0.9762
	2.16	0.2772	0.9866
	4.12	0.5138	0.9907
	6.95	0.7676	0.9918
	9.00	0.8943	0.9900
	10.41	0.9639	0.9872
477.6	0.674	0.0280	0.6247
	1.85	0.1160	0.8607
	3.53	0.2401	0.9211
	5.72	0.3889	0.9391
	9.45	0.6007	0.9427
	11.78	0.7146	0.9367
	13.75	0.8697	0.9210

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE

A stirred static cell, fitted with a glass window, was used. Temperature was measured with a thermocouple and pressure with a Bourdon gauge. After equilibrium was established gas and liquid phases were analysed by gas chromatography. Techniques were similar to those described in refs. (1) & (2).

SOURCE AND PURITY OF MATERIALS

1. from Matheson; purity 99.9 mol%.
2. from Aldrich Chemicals; purity > 99 mol%; no impurites detected by chromatography.

ESTIMATED ERROR

REFERENCES

1. Ng, H-J.; Robinson, D.B. *Fluid Phase Equilibria*, 1979, 2, 283.
2. Ng, H-J., Robinson, D.B. *J. Chem. Eng. Data*, 1980, *25*, 51.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Hydrogen sulphide; H_2S; [7783-06-4] 2. 1,1'-Methylenebisbenzene; (Diphenylmethane); $C_{13}H_{12}$; [101-81-5]	Tremper, K.K.; Prausnitz, J.M. *J. Chem. Engng. Data* 1976, *21*, 295-9
VARIABLES:	PREPARED BY:
Temperature	C.L. Young

EXPERIMENTAL VALUES:

T/K	Henry's Constant[a] /atm	Mole fraction[b] of hydrogen sulfide at 1 atm partial pressure, x_{H_2S}
300	32.9	0.0304
325	43.9	0.0228
350	56.2	0.0178
375	70.1	0.0143
400	86.1	0.0116
425	104.0	0.00962
450	123.0	0.00813
475	132.0	0.00758

a. Authors stated measurements were made at several pressures and values of solubility used were all within the Henry's Law region.

b. Calculated by compiler assuming linear relationship between mole fraction and pressure.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Volumetric apparatus similar to that described by Dymond and Hildebrand (1). Pressure measured with a null detector and precision gauge. Details in ref. (2).

SOURCE AND PURITY OF MATERIALS:

Solvent degassed, no other details given.

ESTIMATED ERROR:

$\delta T/K = \pm 0.1$; $\delta x_{H_2S} = \pm 1\%$

REFERENCES:

1. Dymond, J.; Hildebrand, J.H. *Ind. Chem. Eng. Fundam.* 1967, *6*, 130.
2. Cukor, P.M.; Prausnitz, J.M. *Ind. Chem. Eng. Fundam.* 1971, *10*, 638.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Hydrogen sulfide; H_2S; [7783-06-4] 2. 1-Methylnaphthalene, $C_{11}H_{10}$; [1321-94-4]	Tremper, K.K.; Prausnitz, J.M. *J. Chem. Engng. Data* 1976, *21*, 295-9
VARIABLES:	PREPARED BY:
Temperature	C.L. Young

EXPERIMENTAL VALUES:

T/K	Henry's Constant[a] /atm	Mole fraction[b] of hydrogen sulfide at 1 atm partial pressure, x_{H_2S}
300	31.7	0.0315
325	41.6	0.0240
350	55.8	0.0179
375	72.4	0.0138
400	89.4	0.0112
425	105.0	0.00952
450	117.0	0.00855
475	124.0	0.00806

a. Authors stated measurements were made at several pressures and values of solubility used were all within the Henry's Law region.

b. Calculated by compiler assuming linear relationship between mole fraction and pressure.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Volumetric apparatus similar to that described by Dymond and Hildebrand (1). Pressure measured with a null detector and precision gauge. Details in ref. (2).

SOURCE AND PURITY OF MATERIALS:

Solvent degassed, no other details given.

ESTIMATED ERROR:

$\delta T/K = \pm 0.1$; $\delta x_{H_2S} = \pm 1\%$

REFERENCES:

1. Dymond, J.; Hildebrand, J.H. *Ind.Chem.Eng.Fundam.* 1967, *6*, 130.
2. Cukor, P.M.; Prausnitz, J.M. *Ind.Chem.Eng.Fundam.* 1971, *10*, 638.

COMPONENTS:

1. Hydrogen sulfide; H_2S; [7783-06-4]
2. Hydrogen; H_2; [1333-74-0]
3. 9-Methylanthracene; $C_{15}H_{12}$; [779-02-2]

ORIGINAL MEASUREMENTS:

Kragas, T.K.; Kobayashi, R.

Fluid Phase Equilibria <u>1984</u>, *16*, 215-236.

VARIABLES:

Pressure of hydrogen

PREPARED BY:

P.G.T. Fogg

EXPERIMENTAL VALUES:

T/K	P_{H_2}/MPa	Henry's Constant for H_2S at infinite dilution / MPa
373.2	0	4.72*
	2.785	1.70
	4.288	1.10
	5.833	0.844
398.2	0	6.27*
	1.344	4.68
	2.255	2.79
	3.530	1.80
	5.061	1.31
423.2	0	8.27*
	1.344	6.14
	2.303	3.63
	3.516	2.35
	5.254	1.63

* values extrapolated to zero pressure of hydrogen given by the authors.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

A high pressure chromatographic method described in ref. (1) was used. Hydrogen at various pressures was the carrier gas.

SOURCE AND PURITY OF MATERIALS:

1. from Scientific Gas Products; 99.6% pure.
2. from Linde Division of Union Carbide Corporation.
3. from Aldrich Chem. Co.; purified to > 99.95% by zone refining.

ESTIMATED ERROR:

δ(Henry's law constant) = ± 3.6% (authors)

REFERENCES:

1. Kragas, T.K.; Pollin, J.; Martin, R.J.; Kobayashi, R. *Fluid Phase Equilibria* <u>1984</u>, *16*, 205.