

COMPONENTS: (1) Methane; CH ₄ ; [74-82-8] (2) Hexadecafluoroheptane or perfluoroheptane; C ₇ F ₁₆ ; [335-57-9]		ORIGINAL MEASUREMENTS: Kobatake, Y.; Hildebrand, J. H. <i>J. Phys. Chem.</i> <u>1961</u> , <i>65</i> , 331 - 335.																															
VARIABLES: T/K: 291.07 - 303.16 P/kPa: 101.325 (1 atm)		PREPARED BY: M. E. Derrick H. L. Clever																															
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¹ Possibly a smoothed value of the authors. The Bunsen and Ostwald coefficients were calculated by the compiler. Smoothed Data: For use between 291.07 and 303.16 K. $\ln x_1 = -6.5150 + 5.1234/(T/100K)$ The standard error about the regression line is 3.31 x 10 ⁻⁶ .																																	
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VARIABLES: T/K : 283.20 - 297.97 p_1/kPa : 101.325 (1 atm)	PREPARED BY: H. L. Clever																									
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	REFERENCES: 1. Morrison, T. J.; Billett, F. <i>J. Chem. Soc.</i> <u>1948</u> , 2033. 2. Battino, R.; Evans, F. D.; Danforth, W. F. <i>J. Am. Oil Chem. Soc.</i> <u>1968</u> , <i>45</i> , 830. 3. Battino, R.; Banzhof, M.; Bogan, M.; Wilhelm, E. <i>Anal. Chem.</i> <u>1971</u> , <i>43</i> , 806.																									

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VARIABLES: $T/K = 277.15 - 308.15$ $p_1/kPa = 101.325 (1 \text{ atm})$	PREPARED BY: M. E. Derrick H. L. Clever																																								
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COMPONENTS:

- (1) Methane; CH₄; [74-82-8]
 (2) Tetrachloromethane; CCl₄;
 [56-23-5]

EVALUATOR:

H. Lawrence Clever
 Department of Chemistry
 Emory University
 Atlanta, GA 30322 USA

1985, May

CRITICAL EVALUATION:

Horiuti (ref 1) reports solubility values at five temperatures between 253.35 and 333.15 K. Tomonaga *et al.* (ref 2) report solubility values at temperatures of 282.71, 298.14 and 308.15 K. Their mole fraction solubility values were calculated from Henry's constants corrected for non-ideal behavior at the vapor pressure of the solvent. They report three values at 308.15 K which average $(2.786 \pm 0.020) \times 10^{-3}$ mole fraction at atmospheric pressure. Both laboratories have reputations for reliable work. Both data sets are classed as tentative.

The Tomonaga *et al.* average value at 308.15 K was used twice and all of the other experimental values from both papers used once in a linear regression to obtain the equation for use over the 253 to 333 K interval of

$$\ln x_1 = -9.56027 + 7.08799/(T/100 \text{ K}) + 1.2145 \ln (T/100 \text{ K})$$

with a standard error about the regression line of 2.52×10^{-5} .

All of the Horiuti data were within 0.25 percent of the regression line except the 313.15 K value which was 0.44 % smaller. The Tomonaga *et al.* values were 0.29 % larger, 1.57 % smaller and 1.01 % larger at the temperatures of 282.71, 298.14, and 308.15 K, respectively.

The thermodynamic changes for the transfer of one mole of methane from the gas at 0.101325 MPa to the infinitely dilute solution were calculated from the equation constants to be:

T/K	$\Delta H_1^0/\text{kJ mol}^{-1}$	$\Delta S_1^0/\text{J K}^{-1} \text{ mol}^{-1}$	$\Delta C_{p1}^0/\text{J K}^{-1} \text{ mol}^{-1}$
253.15	-3.34	-60.0	10.1
273.15	-3.13	-59.8	10.1
298.15	-2.88	-58.4	10.1

Smoothed values of the mole fraction solubility are in Table 1.

Table 1. Solubility of methane in tetrachloromethane. Tentative values of the mole fraction solubility as a function of temperature at a methane partial pressure of 0.101325 MPa.

T/K	$10^3 x_1$	T/K	$10^3 x_1$
253.15	3.580	298.15	2.862
263.15	3.374		
273.15	3.199	303.15	2.808
283.15	3.049	313.15	2.711
293.15	2.920	323.15	2.626
		333.15	2.551

REFERENCES:

- Horiuti, J. *Sci. Pap. Inst. Phys. Chem. Res. (Jpn)* 1931/32, 17, 125-256.
- Tominaga, T.; Battino, R.; Gorowara, B.; Dixon, R. D.; Wilhelm, E. *J. Chem. Eng. Data* 1986, 31,

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COMPONENTS: (1) Methane; CH ₄ ; [74-82-8] (2) Tetrachloromethane or carbon tetrachloride; CCl ₄ ; [56-23-5]	ORIGINAL MEASUREMENTS: Tominaga, T.; Battino, R.; Gorowara, B.; Dixon, R. D.; Wilhelm, E. <i>J. Chem. Eng. Data</i> <u>1986</u> , <i>31</i> ,																						
VARIABLES: $T/K = 282.71 - 308.15$ $p_1/kPa = 101.325$	PREPARED BY: H. L. Clever																						
EXPERIMENTAL VALUES: <table border="1" data-bbox="303 553 1018 874"> <thead> <tr> <th>T/K</th> <th>Mol Fraction $10^3 x_1$</th> <th>Ostwald Coefficient $L/cm^3 \text{ cm}^{-3}$</th> <th>Henry's Constant $10^{-6} H/Pa$</th> </tr> </thead> <tbody> <tr> <td>282.71</td> <td>3.064</td> <td>0.7414</td> <td>33.07</td> </tr> <tr> <td>298.14</td> <td>2.818</td> <td>0.7060</td> <td>35.95</td> </tr> <tr> <td rowspan="3">308.15</td> <td>2.762</td> <td>0.7060</td> <td>36.69</td> </tr> <tr> <td>2.786</td> <td>0.7122</td> <td>36.37</td> </tr> <tr> <td>2.810</td> <td>0.7180</td> <td>36.06</td> </tr> </tbody> </table> <p>The mole fraction solubility at 101325 Pa was calculated from the author's Henry's constant by the compiler with no corrections.</p> <p>Henry's constant $H/Pa = (p_1/Pa)/x_1$.</p> <p>101325 Pa \equiv 1 atm</p>		T/K	Mol Fraction $10^3 x_1$	Ostwald Coefficient $L/cm^3 \text{ cm}^{-3}$	Henry's Constant $10^{-6} H/Pa$	282.71	3.064	0.7414	33.07	298.14	2.818	0.7060	35.95	308.15	2.762	0.7060	36.69	2.786	0.7122	36.37	2.810	0.7180	36.06
T/K	Mol Fraction $10^3 x_1$	Ostwald Coefficient $L/cm^3 \text{ cm}^{-3}$	Henry's Constant $10^{-6} H/Pa$																				
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AUXILIARY INFORMATION																							
METHOD/APPARATUS/PROCEDURE: <p>The solubility apparatus is based on the design of Ben-Naim and Baer (ref 1). The degassing apparatus is that described by Battino <i>et al.</i> (ref 2).</p> <p>Degassing. Up to 500 cm³ of solvent is placed in a flask of such size that the liquid is about 4 cm deep. The liquid is rapidly stirred, and a vacuum is intermittently applied through a liquid N₂ trap until the permanent gas residual pressure drops to 5 microns.</p> <p>Solubility Determination. Ben-Naim and Baer's procedure is used. The gas is liquid vapor saturated, dissolution is usually complete within 10-20 minutes. The mixing chamber volume are about 26, 65, 380, and 1650 cm³ calibrated to $\pm 0.01 \text{ cm}^3$. The pressure is maintained constant and the volume changed by a micro-processor controlled stepping motor operating a piston in a precision bore tube.</p>	SOURCE AND PURITY OF MATERIALS: (1) Methane. Matheson Co., Inc. 99.97 minimum mole percent. (2) Tetrachloromethane. Fisher. Certified grade, 99 mol percent. Distilled through a 1.2 m packed column, middle 80 % stored protected from light until use. ESTIMATED ERROR: $\delta x_1/x_1 = \pm 0.008$ REFERENCES: 1. Ben-Naim, A.; Baer, S. <i>Trans. Faraday Soc.</i> <u>1963</u> , <i>59</i> , 2935. 2. Battino, R.; Banzhof, M.; Bogan, M.; Wilhelm, E. <i>Anal. Chem.</i> <u>1971</u> , <i>43</i> , 806.																						

COMPONENTS:				ORIGINAL MEASUREMENTS:			
1. Methane; CH ₄ ; [74-82-8]				Yorizane, M.; Yoshimura, S.;			
2. Dichlorodifluoromethane (Freon 12); CCl ₂ F ₂ ; [75-71-8]				Masuoka, H.; Miyano, Y.;			
				Kakimoto, Y.			
				<i>J. Chem. Eng. Data</i>			
				1985, 30, 174-176.			
VARIABLES:				PREPARED BY:			
				C. L. Young			
EXPERIMENTAL VALUES:							
T/K	P/MPa	Mole fraction of methane		T/K	P/MPa	Mole fraction of methane	
		in vapor, y_{CH_4}	in liquid, x_{CH_4}			in vapor, y_{CH_4}	in liquid, x_{CH_4}
263.2	1.36	0.091	0.773	298.2	1.99	0.104	0.512
	2.79	0.221	0.866		2.96	0.147	0.630
	3.87	0.305	0.893		4.06	0.222	0.723
	5.11	0.371	0.904		4.51	0.246	0.759
	6.28	0.434	0.907		4.90	0.272	0.791
	7.29	0.498	0.899		5.61	0.327	0.801
	8.41	0.577	0.892		6.44	0.365	0.816
	9.14	0.635	0.875		6.99	0.401	0.833
	9.60	0.655	0.872		7.40	0.431	0.829
	9.93	0.753 ^a	critical		7.95	0.465	0.828
					8.51	0.497	0.828
273.2	1.53	0.088	0.785		8.98	0.562	0.825
	1.75	0.107	0.816		9.27	0.547	0.818
	2.12	0.136	0.844		9.79	0.604	0.815
	3.00	0.203	0.877		9.98	0.608	0.811
	3.79	0.256	0.891		10.25	0.647	0.796
	4.43	0.338	0.901		10.67	0.740 ^a	critical
	5.72	0.400	0.914				
	7.49	0.506	0.896				
	8.30	0.541	0.884				
	8.59	0.566	0.887				
	9.33	0.615	0.866				
	11.16	0.778 ^a	critical				
a Estimated values.							
AUXILIARY INFORMATION							
METHOD APPARATUS/PROCEDURE:				SOURCE AND PURITY OF MATERIALS:			
Apparatus consisted of two similar equilibrium cells, one fixed in position, the other could be moved so that liquid and vapor flowed between cells. Samples from cells analysed using gas chromatography. Pressure measured with a Bourdon gauge and temperature with a standard mercury thermometer. Details of apparatus and procedure in source.				1. Purity 99.9 volume per cent.			
				2. Purity 99.95 volume per cent.			
				ESTIMATED ERROR:			
				$\delta T/K = \pm 0.1$; $\delta P/P = \pm 0.005$.			
				REFERENCES:			

COMPONENTS:		ORIGINAL MEASUREMENTS:	
1. Methane; CH ₄ ; [74-82-8] 2. Chlorodifluoromethane; CHClF ₂ ; [75-45-6]		Nohka, J.; Sarashina, E.; Arai, Y.; Saito, S. <i>J. Chem. Eng. Japan</i> , <u>1973</u> , <i>6</i> , 10-17	
VARIABLES:		PREPARED BY:	
Temperature, pressure		C.L. Young	
EXPERIMENTAL VALUES:		Mole fraction of methane	
T/K	p/10 ⁵ Pa	in liquid, x_{CH_4}	in gas, y_{CH_4}
273.15	16.4	0.0536	0.658
	30.0	0.124	0.794
	41.8	0.187	0.831
	63.4	0.307	0.852
	81.1	0.424	0.853
	92.9	0.505	0.838
	98.8	0.546	0.821
	105.4	0.615	0.778
298.15	20.3	0.0429	0.437
	40.5	0.142	0.659
	57.6	0.232	0.730
	81.1	0.358	0.754
	92.0	0.424	0.735
	95.3	0.448	0.727
	101.3	0.517	0.701
323.15	30.4	0.0488	0.305
	40.5	0.0969	0.436
	48.6	0.132	0.502
	62.8	0.207	0.552
	75.3	0.272	0.569
	84.7	0.326	0.567
	92.9	0.400	0.528
348.15	45.8	0.0595	0.202
	55.7	0.107	0.268
	65.6	0.166	0.305
	70.9	0.204	0.322
AUXILIARY INFORMATION			
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:	
Static cell fitted with magnetic stirrer. Temperature measured with liquid in glass thermometer and pressure measured with Bourdon gauge. After equilibrium established vapor and liquid samples analysed by gas chromatography. Details in ref. 1 and 2.		1. No details given.	
		2. Purity better than 99.9 mole %.	
		ESTIMATED ERROR: $\delta T/K = \pm 0.1$; $\delta P/10^5 Pa = \pm 0.1$; $\delta x_{CH_4}, \delta y_{CH_4} = \pm 1\%$ (estimated by compiler).	
		REFERENCES:	
		1. Kaminishi, G.; Arai, Y.; Saito, S.; Maeda, S. <i>J. Chem. Eng. Japan</i> , <u>1968</u> , <i>1</i> , 109. 2. Sarashina, E.; Arai, Y.; Saito, S. <i>J. Chem. Eng. Japan</i> , <u>1971</u> , <i>4</i> , 377.	

COMPONENTS:				ORIGINAL MEASUREMENTS:			
1. Methane; CH ₄ ; [74-82-8] 2. Chlorodifluoromethane (Freon 22); CHClF ₂ ; [75-45-6]				Yorizane, M.; Yoshimura, S.; Masuoka, H.; Miyano, Y.; Kakimoto, Y. <i>J. Chem. Eng. Data</i> 1985, 30, 174-176.			
VARIABLES:				PREPARED BY: C. L. Young			
EXPERIMENTAL VALUES:							
T/K	P/MPa	Mole fraction of methane in vapor, in liquid, y_{CH_4} x_{CH_4}		T/K	P/MPa	Mole fraction of methane in vapor, in liquid, y_{CH_4} x_{CH_4}	
263.2	1.12	0.051	0.617	273.2	8.83	0.458	0.838
	2.03	0.096	0.775		9.82	0.537	0.828
	3.21	0.172	0.843		10.27	0.580	0.818
	3.99	0.195	0.859		11.08	0.711 ^a	critical
	5.02	0.276	0.881	298.2	1.92	0.040	0.401
	8.00	0.434	0.880		2.72	0.072	0.507
	8.86	0.480	0.852		4.24	0.157	0.665
	9.25	0.510	0.850		5.95	0.219	0.716
	9.80	0.540	0.844		7.28	0.296	0.721
	10.21	0.601	0.819		8.20	0.355	0.721
	10.48	0.631	0.760		9.13	0.380	0.701
	10.67	0.712 ^a	critical		10.01	0.461	0.680
273.2	3.18	0.147	0.806		10.36	0.517	0.644
	4.11	0.195	0.830		10.76	0.592 ^a	critical
	4.98	0.239	0.847				
	6.67		0.853				
	8.32	0.445	0.831				
^a Estimated values.							
AUXILIARY INFORMATION							
METHOD APPARATUS/PROCEDURE:				SOURCE AND PURITY OF MATERIALS:			
Apparatus consisted of two similar equilibrium cells, one fixed in position, the other could be moved so that liquid and vapor flowed between cells. Samples from cells analysed using gas chromatography. Pressure measured with a Bourdon gauge and temperature with a standard mercury thermometer. Details of apparatus and procedure in source.				1. Purity 99.9 volume per cent. 2. Purity 99.95 volume per cent.			
				ESTIMATED ERROR: $\delta T/K = \pm 0.1$; $\delta P/P = \pm 0.005$.			
				REFERENCES:			

COMPONENTS: (1) Methane; CH ₄ ; [74-82-8] (2) 1-Chlorohexane; C ₆ H ₁₁ Cl; [544-10-5]	ORIGINAL MEASUREMENTS: Guerry, D. Jr. Ph.D. thesis, 1944 Vanderbilt University Nashville, TN Thesis Director: L. J. Bircher												
VARIABLES: T/K: 293.15, 298.15 P/kPa: 101.325 (1 atm)	PREPARED BY: H. L. Clever												
EXPERIMENTAL VALUES: <table border="1" data-bbox="284 527 1013 686"> <thead> <tr> <th>T/K</th> <th>Mol Fraction $x_1 \times 10^4$</th> <th>Bunsen Coefficient α</th> <th>Ostwald Coefficient L</th> </tr> </thead> <tbody> <tr> <td>293.15</td> <td>31.9</td> <td>0.522</td> <td>0.560</td> </tr> <tr> <td>298.15</td> <td>31.1</td> <td>0.506</td> <td>0.553</td> </tr> </tbody> </table> <p>The Ostwald coefficients were calculated by the compiler.</p>		T/K	Mol Fraction $x_1 \times 10^4$	Bunsen Coefficient α	Ostwald Coefficient L	293.15	31.9	0.522	0.560	298.15	31.1	0.506	0.553
T/K	Mol Fraction $x_1 \times 10^4$	Bunsen Coefficient α	Ostwald Coefficient L										
293.15	31.9	0.522	0.560										
298.15	31.1	0.506	0.553										
AUXILIARY INFORMATION													
METHOD/APPARATUS/PROCEDURE: A Van Slyke-Neill Manometric Apparatus manufactured by the Eimer and Amend Co. was used. The procedure of Van Slyke (1) for pure liquids was modified (2) so that small solvent samples (2 cm ³) could be used with almost complete recovery of the sample. An improved temperature control system was used.													
SOURCE AND PURITY OF MATERIALS: (1) Methane. Prepared by hydrolysis of crystalline methyl Grignard reagent. Passed through conc. H ₂ SO ₄ , solid KOH, and Drierite. (2) 1-Chlorohexane. Eastman Kodak Co. Purified, distilled from P ₂ O ₅ in a N ₂ atm. B.p. (746.6 mmHg) t/°C 134.66 (corr.). Refractive index, density, and vapor pressure data are in the thesis.	ESTIMATED ERROR: $\delta T/K = 0.05$ REFERENCES: 1. Van Slyke, D. D. <i>J. Biol. Chem.</i> 1939, 130, 545. 2. Ijams, C. C. Ph.D. thesis, 1941 Vanderbilt University												

COMPONENTS:

1. Methane; CH_4 ; [74-82-8]
2. Chlorobenzene; $\text{C}_6\text{H}_5\text{Cl}$; [108-90-7]

EVALUATOR:

Colin L. Young
Department of Physical Chemistry,
University of Melbourne,
Parkville, Victoria, 3052
Australia.
February 1986.

EVALUATION:

This system has been studied by three groups of workers and there is good consistency between the three sets of data. The data of Horiuti (1) is the most extensive covering the temperature range 232 K to 373 K. The more recent data of Lopez et al. (2) is in good agreement over the temperature range studied of 263 K to 303 K. The data of Berlin et al. (3) were determined at elevated pressures at 293.2 K. This latter set of data are not of high precision but, when extrapolated assuming Henry's law to be obeyed, yield mole fraction solubilities at 1 atmosphere partial pressure which are consistent with values given by the other two groups. Horiuti (1) data are classified as recommended and thought to be accurate to better than two per cent.

References.

1. Horiuti, J.
Sci. Pap. Inst. Phys. Chem. Res. (Jpn), 1931/32, 17, 125.
2. Lopez, M. C.; Gallardo, M. A.; Urieta, J. S.; Gutierrez Losa, C.;
Int. Conf. Thermodyn. Solns. Nonelectrolytes, 1984, No 127.
3. Berlin, M. A.; Pluzhnikova, M. F.; Stepanova, I. N.; Potapov, V. F.;
Vasil'eva, N. A.; Tsybnlevskii, A. M.;
Zh. Prikl. Khim., 1980, 53, 1661.

COMPONENTS: (1) Methane; CH ₄ ; [74-82-8] (2) Chlorobenzene; C ₆ H ₅ Cl; [108-90-7]	ORIGINAL MEASUREMENTS: Horiuti, J. <i>Sci. Pap. Inst. Phys. Chem. Res.</i> (Jpn) 1931/32, 17, 125 - 256.																																																																
VARIABLES: T/K: 232.35 - 372.75 p ₁ /kPa: 101.325 (1 atm)	PREPARED BY: M. E. Derrick H. L. Clever																																																																
EXPERIMENTAL VALUES: <table border="1" data-bbox="198 500 1056 772"> <thead> <tr> <th>T/K</th> <th>Mol Fraction 10³x₁</th> <th>Bunsen Coefficient α/cm³ (STP) cm⁻³ atm⁻¹</th> <th>Ostwald Coefficient L/cm³ cm⁻³</th> </tr> </thead> <tbody> <tr><td>232.35</td><td>2.864</td><td>0.6704</td><td>0.5703</td></tr> <tr><td>252.65</td><td>2.477</td><td>0.5686</td><td>0.5259</td></tr> <tr><td>273.15</td><td>2.211</td><td>0.4976</td><td>0.4976</td></tr> <tr><td>293.15</td><td>2.029</td><td>0.4480</td><td>0.4808</td></tr> <tr><td>303.15</td><td>1.949</td><td>0.4260</td><td>0.4728</td></tr> <tr><td>333.15</td><td>1.817</td><td>0.3852</td><td>0.4698</td></tr> <tr><td>353.25</td><td>1.748</td><td>0.3631</td><td>0.4696</td></tr> <tr><td>372.75</td><td>1.710</td><td>0.3479</td><td>0.4748</td></tr> </tbody> </table> <p>The mole fraction and Bunsen coefficient values were calculated by the compiler with the assumption the gas is ideal and that Henry's law is obeyed.</p> <p>Smoothed Data: For use between 232.35 and 372.75 K.</p> $\ln x_1 = -11.8817 + 9.6607/(T/100K) + 2.2178 \ln (T/100K)$ <p>The standard error about the regression line is 6.08×10^{-6}.</p> <table border="1" data-bbox="301 950 1042 1160"> <thead> <tr> <th>T/K</th> <th>Mol Fraction 10³x₁</th> <th>T/K</th> <th>Mol Fraction 10³x₁</th> </tr> </thead> <tbody> <tr><td>243.15</td><td>2.637</td><td>318.15</td><td>1.876</td></tr> <tr><td>258.15</td><td>2.391</td><td>328.15</td><td>1.832</td></tr> <tr><td>273.15</td><td>2.206</td><td>343.15</td><td>1.779</td></tr> <tr><td>288.15</td><td>2.066</td><td>358.15</td><td>1.738</td></tr> <tr><td>298.15</td><td>1.992</td><td>373.15</td><td>1.708</td></tr> <tr><td>308.15</td><td>1.929</td><td></td><td></td></tr> </tbody> </table>		T/K	Mol Fraction 10 ³ x ₁	Bunsen Coefficient α/cm ³ (STP) cm ⁻³ atm ⁻¹	Ostwald Coefficient L/cm ³ cm ⁻³	232.35	2.864	0.6704	0.5703	252.65	2.477	0.5686	0.5259	273.15	2.211	0.4976	0.4976	293.15	2.029	0.4480	0.4808	303.15	1.949	0.4260	0.4728	333.15	1.817	0.3852	0.4698	353.25	1.748	0.3631	0.4696	372.75	1.710	0.3479	0.4748	T/K	Mol Fraction 10 ³ x ₁	T/K	Mol Fraction 10 ³ x ₁	243.15	2.637	318.15	1.876	258.15	2.391	328.15	1.832	273.15	2.206	343.15	1.779	288.15	2.066	358.15	1.738	298.15	1.992	373.15	1.708	308.15	1.929		
T/K	Mol Fraction 10 ³ x ₁	Bunsen Coefficient α/cm ³ (STP) cm ⁻³ atm ⁻¹	Ostwald Coefficient L/cm ³ cm ⁻³																																																														
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METHOD/APPARATUS/PROCEDURE: The apparatus consists of a gas buret, a solvent reservoir, and an absorption pipet. The volume of the pipet is determined at various meniscus heights by weighing a quantity of water. The meniscus height is read with a cathetometer. The dry gas is introduced into the degassed solvent. The gas and solvent are mixed with a magnetic stirrer until saturation. Care is taken to prevent solvent vapor from mixing with the solute gas in the gas buret. The volume of gas is determined from the gas buret readings, the volume of solvent is determined from the meniscus height in the absorption pipet.	SOURCE AND PURITY OF MATERIALS: (1) Methane. Aluminum carbide was prepared from aluminum and soot carbon. The aluminum carbide was treated with hot water. The gas evolved was scrubbed to remove impurities, dried and fractionated. Final product had a density, ρ/g dm ⁻³ = 0.7168±0.0003 at normal conditions. (2) Chlorobenzene. Kahlbaum. Dried and distilled. Boiling point (760 mmHg) 131.96°C. ESTIMATED ERROR: $\delta T/K = 0.05$ $\delta x_1/x_1 = 0.01$ REFERENCES:																																																																

COMPONENTS:		ORIGINAL MEASUREMENTS:	
1. Methane; CH ₄ ; [74-82-8]		Berlin, M. A.; Pluzhnikova, M. F.; Stepanova, I. N.; Potapov, V. F.; Vasil'eva, N. A.; Tsybnlevskii, A. M. <i>Zh. Prikl. Khim.</i> <u>1980</u> , 53, 1661-3.	
2. Chlorobenzene; C ₆ H ₅ Cl; [108-90-7]			
VARIABLES:		PREPARED BY:	
		C. L. Young	
EXPERIMENTAL VALUES:			
T/K	P/MPa	α^a	Mole fraction of methane ^b x_{CH_4}
293.2	1.0 6.0	0.00 30.75	- 0.1152
<p>^a volume of methane measured at 293.2 K and 1 atmosphere pressure dissolved by unit volume of liquid.</p> <p>^b calculated by compiler assuming molar volume of methane at 293.2 K and 1 atmosphere is 24.04 L.</p>			
AUXILIARY INFORMATION			
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:	
A gas chromatographic method. No details given except ref. (1) which contains little additional information.		1. Purity about 99.6-99.8 mole per cent.	
		2. Purified, final purity checked by refractive index measurements.	
		ESTIMATED ERROR:	
		REFERENCES:	
		1. Berlin, M. A.; Pluzhnikova, M. F.; Stepanova, I. N.; Tsybnlevskii, A. M. <i>Zh. Fiz. Khim.</i> <u>1977</u> , 51, 767.	

COMPONENTS: (1) Methane; CH ₄ ; [74-82-8] (2) Chlorobenzene; C ₆ H ₅ Cl; [108-90-7]	ORIGINAL MEASUREMENTS: López, M. C.; Gallardo, M. A.; Urieta, J. S.; Gutiérrez Losa, C. Int. Conf. Thermodyn. Solutions of Nonelectrolytes, <u>1984</u> , Paper No. 127.												
VARIABLES: $T/K = 263.15 - 303.15$ $p_1/kPa = 101.3$	PREPARED BY: H. L. Clever												
EXPERIMENTAL VALUES: <table border="1" data-bbox="427 521 795 883" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;"><u>T/K</u></th> <th style="text-align: center;"><u>Mol Fraction</u> <u>10⁴x₁</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">263.15</td> <td style="text-align: center;">23.2</td> </tr> <tr> <td style="text-align: center;">273.15</td> <td style="text-align: center;">22.1</td> </tr> <tr> <td style="text-align: center;">283.15</td> <td style="text-align: center;">21.0</td> </tr> <tr> <td style="text-align: center;">293.15</td> <td style="text-align: center;">20.1</td> </tr> <tr> <td style="text-align: center;">303.15</td> <td style="text-align: center;">19.2</td> </tr> </tbody> </table> <p>The authors fit their data to the equation</p> $-\ln x_1 = -1.44 \ln (T/K) + 1.35$ <p>From which they obtained the thermodynamic changes</p> $\Delta H_1^0/kJ \text{ mol}^{-1} = -3.34 \quad \text{and}$ $\Delta S_1^0/J \text{ K}^{-1} \text{ mol}^{-1} = -63.$		<u>T/K</u>	<u>Mol Fraction</u> <u>10⁴x₁</u>	263.15	23.2	273.15	22.1	283.15	21.0	293.15	20.1	303.15	19.2
<u>T/K</u>	<u>Mol Fraction</u> <u>10⁴x₁</u>												
263.15	23.2												
273.15	22.1												
283.15	21.0												
293.15	20.1												
303.15	19.2												
AUXILIARY INFORMATION													
METHOD/APPARATUS/PROCEDURE: <p>The solubility apparatus was similar to that used by Ben-Naim and Baer (ref 1). It consisted of a gas buret, mercury manometer, and solution vessel. The solvent was degassed in the solution vessel. Measurements were carried out on the vapor saturated gas.</p>	SOURCE AND PURITY OF MATERIALS: (1) Methane. Sociedad Espanol del Oxigeno. Stated to be 99.95 per cent pure. (2) Chlorobenzene. ESTIMATED ERROR: $\delta T/K = \pm 0.1$ $\delta x_1/x_1 = \pm 0.01$ REFERENCES: 1. Ben-Naim, A. Baer, S. <i>Trans. Faraday Soc.</i> <u>1963</u> , 59, 2735.												

COMPONENTS:		ORIGINAL MEASUREMENTS:	
1. Methane; CH ₄ ; [74-82-8]		Berlin, M. A.; Pluzhnikova, M. F.; Stepanova, I. N.; Potapov, V. F.; Vasil'eva, N. A.; Tsybnlevskii, A. M.	
2. (1-chloroethyl)-benzene; C ₇ H ₇ Cl; [106-43-4]		Zh. Prikl. Khim. 1980, 53, 1661-3.	
VARIABLES:		PREPARED BY:	
		C. L. Young	
EXPERIMENTAL VALUES:			
T/K	P/MPa	α^a	Mole fraction of methane ^b x_{CH_4}
293.2	1.0 6.0	0.00 7.40	- 0.039
<p>^a volume of methane measured at 293.2 K and 1 atmosphere pressure dissolved by unit volume of liquid.</p> <p>^b calculated by compiler assuming molar volume of methane at 293.2 K and 1 atmosphere is 24.04 L.</p>			
AUXILIARY INFORMATION			
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:	
A gas chromatographic method. No details given except ref. (1) which contains little additional information.		1. Purity about 99.6-99.8 mole per cent.	
		2. Purified, final purity checked by refractive index measurements.	
		ESTIMATED ERROR:	
		REFERENCES:	
		1. Berlin, M. A.; Pluzhnikova, M. F.; Stepanova, I. N.; Tsybnlevskii, A. M. Zh. Fiz. Khim. 1977, 51, 767.	

COMPONENTS:		ORIGINAL MEASUREMENTS:	
1. Methane; CH ₄ ; [74-82-8] 2. 1-Bromooctane; C ₈ H ₁₇ Br; [111-83-1]		Berlin, M. A.; Pluzhnikova, M. F.; Stepanova, N. I.; Potapov, V. F.; Vasil'eva, N. A.; Tsybnlevskii, A. M. <i>Zh. Prikl. Khim.</i> 1980, 53, 1661-3.	
VARIABLES:		PREPARED BY: C. L. Young	
EXPERIMENTAL VALUES:			
T/K	P/MPa	α^a	Mole fraction of methane ^b x_{CH_4}
293.2	1.0 2.0 3.5 6.0	1.9 2.8 6.9 12.0	0.014 0.020 0.047 0.080
<p>^a volume of methane measured at 293.2 K and 1 atmosphere pressure dissolved by unit volume of liquid.</p> <p>^b calculated by compiler assuming molar volume of methane at 293.2 K and 1 atmosphere is 24.04 L.</p>			
AUXILIARY INFORMATION			
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:	
A gas chromatographic method. No details given except ref. (1) which contains little additional information.		1. Purity about 99.6-99.8 mole per cent. 2. Purified, final purity checked by refractive index measurements.	
		ESTIMATED ERROR:	
		REFERENCES: 1. Berlin, M. A.; Pluzhnikova, M.F.; Stepanova, I. N.; Tsybnlevskii, A. M. <i>Zh. Fiz. Khim.</i> 1977, 51, 767.	

COMPONENTS:		ORIGINAL MEASUREMENTS:	
1. Methane; CH ₄ ; [74-82-8]		Berlin, M. A.; Pluzhnikova, M. F.;	
2. 1-Chlorooctane; C ₈ H ₁₇ Cl; [111-85-3]		Stepanova, I. N.; Potapov, V. F.; Vasil'eva, N. A.; Tsybnlevskii, A. M. <i>Zh. Prikl. Khim.</i> 1980, 53, 1661-3.	
VARIABLES:		PREPARED BY:	
		C. L. Young	
EXPERIMENTAL VALUES:			
T/K	P/MPa	α^a	Mole fraction of methane ^b x_{CH_4}
293.2	1.0	3.4	0.023
	2.0	8.6	0.057
	3.5	10.6	0.070
	6.0	17.3	0.109
<p>^a volume of methane measured at 293.2 K and 1 atmosphere pressure dissolved by unit volume of liquid.</p> <p>^b calculated by compiler assuming molar volume of methane at 293.2 K and 1 atmosphere is 24.04 L.</p>			
AUXILIARY INFORMATION			
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:	
A gas chromatographic method. No details given except ref. (1) which contains little additional information.		1. Purity about 99.6-99.8 mole per cent.	
		2. Purified, final purity checked by refractive index measurements.	
		ESTIMATED ERROR:	
		REFERENCES:	
		1. Berlin, M. A.; Pluzhnikova, M. F.; Stepanova, I. N.; Tsybnlevskii, A. M. <i>Zh. Fiz. Khim.</i> 1977, 51, 767.	

COMPONENTS:		ORIGINAL MEASUREMENTS:	
1. Methane; CH ₄ ; [74-82-8] 2. 1-Iodooctane; C ₈ H ₁₇ I; [629-27-6]		Berlin, M. A.; Pluzhnikova, M. F.; Stepanova, I. N.; Potapov, V. F.; Vasil'eva, N. A.; Tsybnlevskii, A. M. <i>Zh. Prikl. Khim.</i> <u>1980</u> , 53, 1661-3.	
VARIABLES:		PREPARED BY: C. L. Young	
EXPERIMENTAL VALUES:			
T/K	P/MPa	α^a	Mole fraction of methane ^b x_{CH_4}
293.2	1.0	1.1	0.008
	2.0	1.7	0.013
	3.5	6.9	0.049
	6.0	12.0	0.083
<p>^a volume of methane measured at 293.2 K and 1 atmosphere pressure dissolved by unit volume of liquid.</p> <p>^b calculated by compiler assuming molar volume of methane at 293.2 K and 1 atmosphere is 24.04 L.</p>			
AUXILIARY INFORMATION			
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:	
A gas chromatographic method. No details given except ref. (1) which contains little additional information.		1. Purity about 99.6-99.8 mole per cent. 2. Purified, final purity checked by refractive index measurements.	
		ESTIMATED ERROR:	
		REFERENCES:	
		1. Berlin, M. A.; Pluzhnikova, M. F.; Stepanova, I. N.; Tsybnlevskii, A. M. <i>Zh. Fiz. Khim.</i> <u>1977</u> , 51, 767.	

COMPONENTS:		ORIGINAL MEASUREMENTS:	
1. Methane; CH ₄ ; [74-82-8]		Berlin, M. A.; Pluzhnikova, M. F.; Stepanova, I. N.; Potapov, V. F.; Vasil'eva, N. A.; Tsybnlevskii, A.M.	
2. 2-Iodoctane; C ₈ H ₁₇ I; [557-36-8]		Zh. Prikl. Khim. 1980, 53, 1661-3.	
VARIABLES:		PREPARED BY:	
		C. L. Young	
EXPERIMENTAL VALUES:			
T/K	P/MPa	^a α	Mole fraction of methane ^b x _{CH₄}
293.2	1.0	1.5	0.011
	2.0	1.4	0.010
	3.5	5.5	0.040
	6.0	4.2	0.031
<p>^a volume of methane measured at 293.2 K and 1 atmosphere pressure dissolved by unit volume of liquid.</p> <p>^b calculated by compiler assuming molar volume of methane at 293.2 K and 1 atmosphere is 24.04 L.</p>			
AUXILIARY INFORMATION			
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:	
A gas chromatographic method. No details given except ref. (1) which contains little additional information.		1. Purity about 99.6-99.8 mole per cent.	
		2. Purified, final purity checked by refractive index measurements.	
		ESTIMATED ERROR:	
		REFERENCES:	
		1. Berlin, M. A.; Pluzhnikova, M. F.; Stepanova, I. N.; Tsybnlevskii, A. M. Zh. Fiz. Khim. 1977, 51, 767.	

COMPONENTS: 1. Methane; CH ₄ ; [74-82-8] 2. 1-Chloronaphthalene; C ₁₀ H ₇ Cl; [90-13-1]	ORIGINAL MEASUREMENTS: Berlin, M. A.; Pluzhnikova, M. F.; Stepanova, I. N.; Potapov, V. F.; Vasil'eva, N. A.; Tsybnlevskii, A. M. <i>Zh. Prikl. Khim.</i> <u>1980, 53, 1661-3.</u>								
VARIABLES:	PREPARED BY: <p style="text-align: right;">C. L. Young</p>								
EXPERIMENTAL VALUES: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">T/K</th> <th style="text-align: center;">P/MPa</th> <th style="text-align: center;">α^a</th> <th style="text-align: center;">Mole fraction of methane^b x_{CH_4}</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">293.2</td> <td style="text-align: center;">1.0 6.0</td> <td style="text-align: center;">3.95 (?) 2.28 (?)</td> <td style="text-align: center;">0.0219 0.0128</td> </tr> </tbody> </table> <p>^a volume of methane measured at 293.2 K and 1 atmosphere pressure dissolved by unit volume of liquid.</p> <p>^b calculated by compiler assuming molar volume of methane at 293.2 K and 1 atmosphere is 24.04 L.</p>		T/K	P/MPa	α^a	Mole fraction of methane ^b x_{CH_4}	293.2	1.0 6.0	3.95 (?) 2.28 (?)	0.0219 0.0128
T/K	P/MPa	α^a	Mole fraction of methane ^b x_{CH_4}						
293.2	1.0 6.0	3.95 (?) 2.28 (?)	0.0219 0.0128						
AUXILIARY INFORMATION									
METHOD/APPARATUS/PROCEDURE: <p>A gas chromatographic method. No details given except ref. (1) which contains little additional information.</p>	SOURCE AND PURITY OF MATERIALS: <ol style="list-style-type: none"> 1. Purity about 99.6-99.8 mole per cent. 2. Purified, final purity checked by refractive index measurements. ESTIMATED ERROR: REFERENCES: <ol style="list-style-type: none"> 1. Berlin, M. A.; Pluzhnikova, M. F.; Stepanova, I. N.; Tsybnlevskii, A. M. <i>Zh. Fiz. Khim.</i> <u>1977, 51, 767.</u> 								