

COMPONENTS: 1. Methane; CH ₄ ; [74-82-8] 2. 1,3-Dimethylbenzene; C ₈ H ₁₀ ; [108-38-3]	EVALUATOR: C. L. Young Department of Physical Chemistry, Univ. of Melbourne, Parkville, Victoria, 3052 Australia. Jan. 86
CRITICAL EVALUATION: <p>This system has been investigated by four groups (1-4). The data of Stepanova and Velikovskii (1) at 293.15 K and 333.15 K were not available to us but have been presented graphically by Legret et al.(2). The data from ref. (1) and (2) are in moderate agreement, the differences above 30 MPa may be due to the different temperature of the measurements. The data of Ng et al. (3) are in fair agreement in the limited range of overlap of the temperature and pressure range. The data of Simnick et al. (4) at high temperatures is consistent with that of Ng et al. (3) but it is impossible to make a very detailed comparison because of the limited overlap of the two sets of data. For a given partial pressure the mole fraction solubility of methane in the liquid is rather insensitive to the temperature.</p> <p>References.</p> <ol style="list-style-type: none">1. Stepanova, G. S.; Velikovskii, A. S.; <i>Gazov. Delo.</i> <u>1969</u>, <i>12</i>, 10.2. Legret, D.; Richon, D.; Renon, H.; <i>J. Chem. Eng. Data</i>, <u>1982</u>, <i>27</i>, 165.3. Ng, H.-J.; Huang, S. S.-S.; Robinson, D. B.; <i>J. Chem. Eng. Data</i> <u>1982</u>, <i>27</i>, 119.4. Simnick, J. J.; Sebastian, H. M.; Lin, H. M.; Chao, K. C.; <i>Fluid Phase Equil.</i> <u>1979</u>, <i>3</i>, 145.	

COMPONENTS:			ORIGINAL MEASUREMENTS:	
1. Methane; CH ₄ ; [74-82-8]			Simnick, J. J.; Sebastian, H. M.;	
2. 1,3-Dimethylbenzene; C ₈ H ₁₀ ; [108-38-3]			Lin, H. M.; Chao, K. C. <i>Fluid Phase Equilibria</i> , <u>1979</u> , 3, 145-154.	
VARIABLES:			PREPARED BY:	
Temperature, pressure			C. L. Young	
EXPERIMENTAL VALUES:				
T/K	P/MPa	P/atm	Mole fraction of methane in liquid, x_{CH_4}	in gas, y_{CH_4}
460.75	2.07	20.4	0.0386	0.7970
	2.94	29.0	0.0568	0.8478
	5.05	49.8	0.1019	0.8931
	10.04	99.1	0.2037	0.9144
	15.00	148.0	0.2910	0.9141
501.55	20.19	199.3	0.3935	0.8960
	2.02	19.9	0.0317	0.6094
	3.08	30.4	0.0542	0.7107
	5.08	50.1	0.0999	0.7959
	10.09	99.6	0.2088	0.8480
541.85	15.17	149.7	0.3199	0.8444
	20.19	199.3	0.4553	0.8013
	2.12	20.9	0.0219	0.3225
	3.06	30.2	0.0449	0.4730
	5.11	50.4	0.0953	0.6260
582.35	10.08	99.5	0.2195	0.7216
	15.37	151.7	0.3796	0.6894
	16.18	159.7	0.4140	0.6707
	3.05	30.1	0.0238	0.1845
	5.10	50.3	0.0859	0.3700
	10.03	99.1	0.2635	0.4824
	11.46	113.1	0.4346	0.4782
AUXILIARY INFORMATION				
METHOD/APPARATUS/PROCEDURE:			SOURCE AND PURITY OF MATERIALS:	
Flow apparatus with both liquid and gaseous components continually passing into a mixing tube and then into a cell in which phases separated under gravity. Liquid sample removed from bottom of cell and vapor sample from top of cell. Composition of samples found by stripping out gas and estimating amount of solvent gravimetrically. Temperature measured with thermocouple and pressure with Bourdon gauge. Details in ref. (1).			1. Matheson sample, purity better than 99 mole per cent. 2. Aldrich Chemical Co. minimum purity 99 mole per cent. Distilled.	
			ESTIMATED ERROR: $\delta T/K = \pm 0.4$; $\delta P/MPa = \pm 0.02$; $\delta x_{CH_4}, \delta y_{CH_4} = \pm 2\%$.	
			REFERENCES: 1. Simnick, J. J.; Lawson, C. C.; Lin, H. M.; Chao, K. C. <i>Am. Inst. Chem. Engrs. J.</i> <u>1977</u> , 23, 469.	

COMPONENTS: 1. Methane; CH ₄ ; [74-82-8] 2. 1,3-Dimethylbenzene; C ₈ H ₁₀ ; [108-38-3]	ORIGINAL MEASUREMENTS: Legret, D.; Richon, D.; Renon, H. <i>J. Chem. Engng. Data</i> <u>1982</u> , 27, 165-169.																																																									
VARIABLES:	PREPARED BY: C. L. Young																																																									
EXPERIMENTAL VALUES: <p style="text-align: center;">$T/K = 313.2$</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">$10^{-5}p/\text{Pa}$</th> <th style="text-align: center;">Mole fraction of methane in liquid, x_{CH_4}</th> <th style="text-align: center;">in vapor, y_{CH_4}</th> </tr> </thead> <tbody> <tr><td>50.6</td><td style="text-align: center;">-</td><td style="text-align: center;">0.998</td></tr> <tr><td>100.3</td><td style="text-align: center;">0.246</td><td style="text-align: center;">0.998</td></tr> <tr><td></td><td style="text-align: center;">0.253</td><td style="text-align: center;">-</td></tr> <tr><td>150.1</td><td style="text-align: center;">0.345</td><td style="text-align: center;">0.997</td></tr> <tr><td></td><td style="text-align: center;">0.350</td><td style="text-align: center;">-</td></tr> <tr><td></td><td style="text-align: center;">0.348</td><td style="text-align: center;">-</td></tr> <tr><td>199.8</td><td style="text-align: center;">0.413</td><td style="text-align: center;">0.995</td></tr> <tr><td>250.3</td><td style="text-align: center;">0.475</td><td style="text-align: center;">0.990</td></tr> <tr><td></td><td style="text-align: center;">0.477</td><td style="text-align: center;">-</td></tr> <tr><td>299.3</td><td style="text-align: center;">0.535</td><td style="text-align: center;">0.983</td></tr> <tr><td>349.8</td><td style="text-align: center;">0.595</td><td style="text-align: center;">0.975</td></tr> <tr><td>400.6</td><td style="text-align: center;">0.645</td><td style="text-align: center;">0.956</td></tr> <tr><td>440.3</td><td style="text-align: center;">0.710</td><td style="text-align: center;">0.919</td></tr> <tr><td></td><td style="text-align: center;">0.712</td><td style="text-align: center;">-</td></tr> <tr><td>441</td><td style="text-align: center;">0.712</td><td style="text-align: center;">-</td></tr> <tr><td>459.3</td><td style="text-align: center;">0.745</td><td style="text-align: center;">0.870</td></tr> <tr><td>459.6</td><td style="text-align: center;">0.749</td><td style="text-align: center;">0.862</td></tr> <tr><td>465.2</td><td style="text-align: center;">0.783</td><td style="text-align: center;">0.840</td></tr> </tbody> </table>		$10^{-5}p/\text{Pa}$	Mole fraction of methane in liquid, x_{CH_4}	in vapor, y_{CH_4}	50.6	-	0.998	100.3	0.246	0.998		0.253	-	150.1	0.345	0.997		0.350	-		0.348	-	199.8	0.413	0.995	250.3	0.475	0.990		0.477	-	299.3	0.535	0.983	349.8	0.595	0.975	400.6	0.645	0.956	440.3	0.710	0.919		0.712	-	441	0.712	-	459.3	0.745	0.870	459.6	0.749	0.862	465.2	0.783	0.840
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METHOD/APPARATUS/PROCEDURE: High pressure static cell fitted with magnetic stirrer. Pressure measured with transducer calibrated by comparison with Heise gauges which were checked periodically calibrated against a dead weight tester. Temperature measured with K type iron-constantan thermocouples. Sampling microcell used and samples analysed using gas chromatography. Details in ref. (1).	SOURCE AND PURITY OF MATERIALS: 1. Air-Gas sample, purity at least 99.95 volume per cent. 2. Merck sample, stated purity by GC of 98.5 per cent. Major impurities <i>o</i> -xylene (0.5%), <i>p</i> -xylene (0.5%) and ethylbenzene (0.5%). ESTIMATED ERROR: $\delta T/K = \pm 0.25$; $\delta p/\text{MPa} = \pm 0.1$; $\delta x_{\text{CH}_4} = \pm 0.01$; $\delta y_{\text{CH}_4} = \pm 0.005$. REFERENCES: 1. Legret, D.; Richon, D.; Renon, H. <i>Am. Inst. Chem. Eng. J.</i> <u>1981</u> , 27, 203.																																																									

COMPONENTS:		ORIGINAL MEASUREMENTS:	
1. Methane; CH ₄ ; [74-82-8] 2. 1,3-Dimethylbenzene; C ₈ H ₁₀ ; [108-38-3]		Ng, H.-J.; Huang, S. S.-S.; Robinson, D. B. <i>J. Chem. Engng. Data</i> <u>1982</u> , 27, 119-122.	
VARIABLES:		PREPARED BY:	
		C. L. Young	
EXPERIMENTAL VALUES:			
T/K	p/MPa	Mole fraction of methane in liquid, x_{CH_4}	Mole fraction of methane in vapor, y_{CH_4}
310.9	0.407	0.0136	0.9864
	2.13	0.0583	0.9953
	4.69	0.1299	0.9960
	6.92	0.1699	0.9966
	9.12	0.2214	0.9960
	11.58	0.2514	0.9952
	13.74	0.2954	0.9946
394.3	0.517	0.0118	0.8816
	1.83	0.0407	0.9581
	3.86	0.0866	0.9740
	5.98	0.1431	0.9778
	8.36	0.1774	0.9789
	11.2	0.2301	0.9772
	14.48	0.2951	0.9750
477.6	1.06	0.0156	0.526
	2.50	0.0482	0.768
	4.48	0.0930	0.848
	7.02	0.148	0.871
	9.44	0.204	0.886
	11.78	0.252	0.889
	13.91	0.295	0.879
AUXILIARY INFORMATION			
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:	
Static equilibrium cell fitted with windows and magnetic stirrer. Temperature of thermostatic liquid measured with platinum resistance thermometer. Pressure measured using dead weight gauge and differential pressure transducer. Samples of vapor and liquid analysed by gas chromatography. Details in refs. (1) and (2).		1. Matheson Co. Ultrahigh-purity sample containing 99.97+ mole per cent methane.	
		2. Matheson, Coleman and Bell Chromatoquality sample with purity of greater than 99 mole per cent.	
		ESTIMATED ERROR:	
		$\delta T/K = \pm 0.06$; $\delta p/MPa = \pm 0.02$; $\delta x_{CH_4}, \delta y_{CH_4} = \pm 0.002$.	
		REFERENCES:	
		1. Ng, H.-J.; Robinson, D. B. <i>J. Chem. Engng. Data</i> <u>1978</u> , 23, 325.	
		2. Ohgaki, K.; Katayama, T. <i>J. Chem. Engng. Data</i> <u>1975</u> , 20, 264.	

<p>COMPONENTS:</p> <p>1. Methane; CH₄; [74-82-8]</p> <p>2. 1,3,5-Trimethylbenzene (Mesitylene); C₉H₁₂; [108-67-8]</p>	<p>ORIGINAL MEASUREMENTS:</p> <p>Legret, D.; Richon, D.; Renon, H. <i>J. Chem. Engng. Data</i> <u>1982</u>, 27, 165-169.</p>																																																												
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EXPERIMENTAL VALUES:		Mole fraction of methane		Equilibrium constant	
T/K	P/MPa	in liquid, x_{CH_4}	in vapor, y_{CH_4}	k_{CH_4}	$k_{\text{C}_9\text{H}_{12}}$
310.9	0.345	0.0108	0.9951	92.2	0.00495
	1.36	0.0423	0.9979	23.6	0.00219
	2.77	0.0837	0.9983	11.9	0.00185
	5.48	0.1504	0.9987	6.64	0.00159
	8.07	0.2119	0.9985	4.71	0.00190
	11.82	0.2828	0.9981	3.53	0.00265
	14.27	0.3246	0.9973	3.07	0.00400
394.3	0.479	0.0108	0.9389	86.9	0.0618
	1.46	0.0346	0.9759	28.3	0.0250
	3.01	0.0705	0.9850	14.0	0.0161
	5.61	0.1313	0.9887	7.53	0.0130
	8.92	0.1982	0.9888	4.99	0.0140
	11.93	0.2507	0.9882	3.94	0.0158
	14.59	0.2986	0.9864	3.30	0.0194
477.6	0.655	--	0.5648	57.6	0.440
	1.03	0.0193	0.7204	37.3	0.285
	2.52	0.0543	0.8648	15.9	0.143
	4.32	0.0962	0.9089	9.45	0.101
	6.96	0.1553	0.9280	5.98	0.0852
	9.41	0.2086	0.9340	4.48	0.0834
	11.80	0.2588	0.9345	3.61	0.0884
	14.13	0.3058	0.9318	3.05	0.0982

AUXILIARY INFORMATION	
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Stirred static cell fitted with glass window. Temperature measured with Bourdon gauge. After equilibrium established gas and liquid phases sampled and analysed using gas chromatography with a flame ionisation detector. Details in ref. (1) and source.	1. Ultrahigh purity sample obtained from Matheson, purity at least 99.97 mole per cent. 2. Aldrich Chemical Co. sample, purity better than 99 mole per cent.
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.06$; $\delta P/\text{MPa} = \pm 0.007$ (up to 6.9 MPa; ± 0.02 (above 6.9 MPa)).
	REFERENCES:
	1. Ng, H.-J.; Robinson, D. B. <i>J. Chem. Eng. Data</i> <u>1978</u> , <i>23</i> , 325-327.

EXPERIMENTAL VALUES:			Mole fraction of methane, x_{CH_4}	Molar volume of liquid, v /cm ³ mol ⁻¹
T/K	p /atm	p /kPa		
343.2	10	1.0	0.0268	160.08
	20	2.0	0.0529	156.90
	30	3.0	0.0782	154.10
	40	4.1	0.1029	151.51
	50	5.1	0.1262	149.02
	60	6.1	0.1476	146.61
373.2	10	1.0	0.0245	166.06
	20	2.0	0.0491	163.00
	30	3.0	0.0732	160.09
	40	4.1	0.0968	157.48
	50	5.1	0.1196	155.00
	60	6.1	0.1411	152.59

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

A known amount of gas added to a known amount of solvent in a 10 cm³ glass equilibrium cell. Liquid phase composition determined from overall composition and volume of both phases. Details in ref. (1).

SOURCE AND PURITY OF MATERIALS:

1. Phillips Petroleum Co. sample, pure grade, minimum purity 99 mole per cent.
2. Aldrich Chemical Co. sample, purity better than 99 mole per cent.

ESTIMATED ERROR:

$$\delta T/K = \pm 0.2; \quad \delta p/kPa = \pm 7.0;$$

$$\delta x_{CH_4} = \pm 0.003.$$

REFERENCES:

1. Cordeiro, D. J.; Luks, K. D.; Kohn, J. P.
Ind. Eng. Chem. Proc. Des. Develop.
1973, 12, 47.

COMPONENTS:
1. Methane; CH₄; [74-82-8]
2. Butylbenzene; C₁₀H₁₄; [104-51-8]

ORIGINAL MEASUREMENTS:
O'Reilly, W. F.; Blumer, T. E.;
Luks, K. D.; Kohn, J. P.
J. Chem. Engng. Data
1976, 21, 220-222.

VARIABLES:
Temperature, pressure

PREPARED BY:
C. L. Young

COMPONENTS:		ORIGINAL MEASUREMENTS:			
1. Methane; CH ₄ ; [74-82-8] 2. Butylbenzene; C ₁₀ H ₁₄ ; [104-51-8] 3. Dotriacontane; C ₃₂ H ₆₆ ; [544-85-4]		O'Reilly, W. F.; Blumer, T. E.; Luks, K. D.; Kohn, J. P. <i>J. Chem. Engng. Data</i> <u>1976, 21, 220-222.</u>			
VARIABLES:		PREPARED BY:			
Composition, pressure		C. L. Young			
EXPERIMENTAL VALUES:					
T/K	Mole ratio Butylbenzene/ Dotriacontane	p/atm	p/kPa	Mole fraction of methane, x _{CH₄}	Molar volume of liquid, v /cm ³ mol ⁻¹
343.2	0.3053	10	1.0	0.0520	457.3
		20	2.0	0.1012	436.3
		30	3.0	0.1480	416.2
		40	4.1	0.1914	398.0
		50	5.1	0.2288	382.2
		60	6.1	0.2591	369.5
	0.7757	10	1.0	0.0505	364.5
		20	2.0	0.0989	353.6
		30	3.0	0.1441	342.7
		40	4.1	0.1840	331.8
		50	5.1	0.2167	320.9
		60	6.1	0.2419	310.0
AUXILIARY INFORMATION					
METHOD/APPARATUS/PROCEDURE:			SOURCE AND PURITY OF MATERIALS:		
A known amount of gas added to a known amount of solvent in a 10 cm ³ glass equilibrium cell. Liquid phase composition determined from overall composition and volume of both phases. Details in ref. (1).			1. Phillips Petroleum Co. sample, pure grade, minimum purity 99 mole per cent.		
			2. Aldrich Chemical Co. sample, purity better than 99 mole per cent.		
			3. Humphrey Chemical Co. sample, purity at least 97 mole per cent.		
			ESTIMATED ERROR: δT/K = ±0.2; δp/kPa = ±7.0; δx _{CH₄} = ±0.008.		
			REFERENCES: 1. Cordeiro, D. J.; Luks, K. D.; Kohn, J. P. <i>Ind. Eng. Chem. Proc. Des. Develop.</i> <u>1973, 12, 47.</u>		

COMPONENTS:		ORIGINAL MEASUREMENTS:			
1. Methane; CH ₄ ; [74-82-8] 2. <i>Trans</i> -decahydronaphthalene (<i>Trans</i> -decalin); C ₁₀ H ₁₈ ; [493-02-7] 3. Phenanthrene; C ₁₂ H ₁₀ ; [85-01-8]		O'Reilly, W. F.; Blumer, T. E.; Luks, K. D.; Kohn, J. P. <i>J. Chem. Engng. Data</i> <u>1976, 21, 220-222.</u>			
VARIABLES:		PREPARED BY:			
Composition, pressure		C. L. Young			
EXPERIMENTAL VALUES:					
T/K	Mole ratio Decalin/ Phenanthrene	p/atm	p/kPa	Mole fraction of methane, <i>x</i> _{CH₄}	Molar volume of liquid, <i>v</i> /cm ³ mol ⁻¹
373.2	0.2885	10	1.0	0.0118	165.30
		20	2.0	0.0423	163.97
		30	3.0	0.0345	162.63
		40	4.1	0.0454	161.31
		50	5.1	0.0562	159.99
		60	6.1	0.0666	158.67
	0.9123	10	1.0	0.0165	165.96
		20	2.0	0.0317	164.18
		30	3.0	0.0468	162.39
		40	4.1	0.0616	160.60
		50	5.1	0.0762	158.81
		60	6.1	0.0904	157.01
	1.2619	10	1.0	0.0138	166.58
		20	2.0	0.0310	164.55
		30	3.0	0.0477	162.50
		40	4.1	0.0642	160.46
		50	5.1	0.0803	158.43
		60	6.1	0.0963	156.40
AUXILIARY INFORMATION					
METHOD/APPARATUS/PROCEDURE:			SOURCE AND PURITY OF MATERIALS:		
A known amount of gas added to a known amount of solvent in a 10 cm ³ glass equilibrium cell. Liquid phase composition determined from overall composition and volume of both phases. Details in ref. (1).			1. Phillips Petroleum Co. sample, pure grade, minimum purity 99 mole per cent.		
			2. No details given.		
			3. Aldrich Chemical Co. sample, purity better than 98 mole per cent.		
			ESTIMATED ERROR:		
			$\delta T/K = \pm 0.2$; $\delta p/kPa = \pm 7.0$; $\delta x_{CH_4} = \pm 0.001$.		
			REFERENCES:		
			1. Cordeiro, D. J.; Luks, K. D.; Kohn, J. P. <i>Ind. Eng. Chem. Proc. Des. Develop.</i> <u>1973, 12, 47.</u>		

COMPONENTS:			ORIGINAL MEASUREMENTS:		
1. Methane; CH ₄ ; [74-82-8]			O'Reilly, W. F.; Blumer; T. E.;		
2. Butylbenzene; C ₁₀ H ₁₄ ; [104-51-8]			Luks, K. D.; Kohn, J. P.		
3. Phenanthrene; C ₁₂ H ₁₀ ; [85-01-8]			<i>J. Chem. Engng. Data</i> <u>1976</u> , 21, 220-222.		
VARIABLES:			PREPARED BY:		
Composition, pressure			C. L. Young		
EXPERIMENTAL VALUES:					
T/K	Mole ratio Butylbenzene/ Phenanthrene	p/atm	p/kPa	Mole fraction of methane, x_{CH_4}	Molar volume of liquid, v /cm ³ mol ⁻¹
373.2	0.3082	10	1.0	0.0160	164.33
		20	2.0	0.0279	162.84
		30	3.0	0.0410	161.39
		40	4.1	0.0512	159.99
		50	5.1	0.0617	158.70
		60	6.1	0.0720	157.52
	0.9252	10	1.0	0.0177	164.58
		20	2.0	0.0322	162.82
		30	3.0	0.0463	161.13
		40	4.1	0.0600	159.49
		50	5.1	0.0734	157.86
		60	6.1	0.0864	156.26
AUXILIARY INFORMATION					
METHOD/APPARATUS/PROCEDURE:			SOURCE AND PURITY OF MATERIALS:		
A known amount of gas added to a known amount of solvent in a 10 cm ³ glass equilibrium cell. Liquid phase composition determined from overall composition and volume of both phases. Details in ref. (1).			1. Phillips Petroleum Co. sample, pure grade, minimum purity 99 mole per cent.		
			2. Aldrich Chemical Co. sample, purity better than 99 mole per cent.		
			3. No details given.		
			ESTIMATED ERROR:		
			$\delta T/K = \pm 0.2$; $\delta p/kPa = \pm 7.0$;		
			$\delta x_{\text{CH}_4} = \pm 0.003$.		
			REFERENCES:		
			1. Cordeiro, D. J.; Luks, K. D.; Kohn, J. P. <i>Ind. Eng. Chem. Proc. Des. Develop.</i> <u>1973</u> , 12, 47.		

EXPERIMENTAL VALUES:			Mole fraction of methane	
T/K	p/atm	p/MPa	in liquid, x_{CH_4}	in gas, y_{CH_4}
461.9	20.71	2.098	0.0310	0.9634
	30.58	3.099	0.0483	0.9735
	49.63	5.029	0.0772	0.9809
	99.10	10.041	0.1494	0.9841
	149.6	15.16	0.2174	0.9835
	199.3	20.19	0.2822	0.9801
	247.6	25.09	0.3397	0.9761
	542.8	20.03	2.030	0.0293
30.03		3.043	0.0464	0.8628
49.96		5.062	0.0787	0.9064
100.1		10.14	0.1613	0.9303
149.0		15.10	0.2379	0.9335
193.5		20.11	0.3151	0.9304
250.0		25.33	0.3918	0.9183
623.2	30.56	3.096	0.0383	0.5477
	50.09	5.075	0.0806	0.6917
	99.56	10.088	0.1805	0.7757
	149.8	15.18	0.2793	0.7995
	198.5	20.12	0.3915	0.7883
	223.1	22.61	0.4732	0.7415

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Flow apparatus with both liquid and gas components continually passing into a mixing tube and then into a cell in which phases separated under gravity. Liquid sample removed from bottom of cell and vapor sample from top of cell. Composition determined by gas chromatography. Details in source and ref. (1).

SOURCE AND PURITY OF MATERIALS:

1. Matheson sample with purity better than 99 mole per cent.
2. Aldrich Chemical Co. sample purity 99 mole per cent.

ESTIMATED ERROR:

$$\delta T/K = \pm 0.2; \quad \delta p/\text{MPa} \leq \pm 0.03;$$

$$\delta x_{\text{CH}_4}, \delta y_{\text{CH}_4} = \pm 2\%.$$

REFERENCES:

1. Simnick, J.J.; Lawson, C.C.; Lin, H-M.; Chao, K-C. *Am. Inst. Chem. Engrs. J.*, 1977, *23*, 469.

COMPONENTS:
 1. Methane; CH_4 ; [74-82-8]
 2. 1,2,3,4-Tetrahydronaphthalene (Tetralin); $\text{C}_{10}\text{H}_{12}$; [119-64-2]

ORIGINAL MEASUREMENTS:
 Sebastian, H.M.; Simnick, J.J.; Lin, H-M.; Chao, K-C.
J. Chem. Engng. Data, 1979, *24*, 149-152.

VARIABLES:
 Temperature, pressure

PREPARED BY:
 C. L. Young

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH ₄ ; [74-82-8]	Sebastian, H. M.; Simnick, J. J.; Lin, H.-M.; Chao, K.-C.
2. 1,2,3,4-Tetrahydronaphthalene (Tetralin); C ₁₀ H ₁₂ ; [119-64-2]	<i>J. Chem. Engng. Data</i> 1979, 24, 149-152.

T/K	p/atm	p/MPa	Mole fraction of methane	
			in liquid, x_{CH_4}	in gas, y_{CH_4}
664.6	49.84	5.050	0.0741	0.4950
	99.17	10.045	0.1934	0.6128
	148.8	15.08	0.3514	0.5593
	155.8	15.79	0.3615	0.4191

EXPERIMENTAL VALUES:			Mole fraction of methane	
T/K	p/atm.	p/MPa	in liquid, x_{CH_4}	in gas, y_{CH_4}
464.2	20.74	2.101	0.0281	0.9858
	31.02	3.143	0.0411	0.9891
	50.24	5.091	0.0651	0.9915
	99.16	10.047	0.1254	0.9928
	150.9	15.29	0.1803	0.9922
	199.4	20.20	0.2322	0.9906
	247.6	25.09	0.2787	0.9884
543.6	20.38	2.065	0.0275	0.9071
	30.55	3.095	0.0421	0.9317
	50.32	5.099	0.0697	0.9526
	99.99	10.131	0.1360	0.9648
	149.3	15.13	0.1992	0.9664
	200.0	20.27	0.2598	0.9643
	248.0	25.13	0.3184	0.9603
624.5	20.23	2.050	0.0246	0.6463
	30.55	3.095	0.0408	0.7476
	50.66	5.133	0.0746	0.8252
	100.40	10.173	0.1512	0.8784
	149.0	15.10	0.2275	0.8892
	199.2	20.18	0.3045	0.8917
	247.7	25.10	0.3798	0.8777

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Flow apparatus with both liquid and gas components continually passing into a mixing tube and then into a cell in which phases separated under gravity. Liquid sample removed from bottom of cell and vapor sample from top of cell. Composition determined by gas chromatography. Details in source and ref. (1).

SOURCE AND PURITY OF MATERIALS:

1. Matheson sample with purity better than 99 mole per cent.
2. Aldrich Chemical Co. sample purity 97 mole per cent. Fractionally distilled under vacuum.

ESTIMATED ERROR:

$\delta T/K = \pm 0.2$; $\delta p/MPa \leq \pm 0.03$;
 $\delta x_{CH_4}, \delta y_{CH_4} = \pm 2\%$

REFERENCES:

1. Simnick, J.J.; Lawson, C.C.; Lin, H-M.; Chao, K-C., *Am. Inst. Chem. Engrs. J.*, 1977, *23*, 469.

COMPONENTS:

1. Methane; CH₄; [74-82-8]
2. 1-Methylnaphthalene; C₁₁H₁₀; [90-12-0]

ORIGINAL MEASUREMENTS:

Sebastian, H.M.; Simnick, J.J.; Lin, H-M.; Chao, K-C.

J. Chem. Engng. Data, 1979, *24*, 149-152.

VARIABLES:

Temperature, pressure

PREPARED BY:

C. L. Young

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH ₄ ; [74-82-8]	Sebastian, H. M.; Simnick, J. J.; Lin, H.-M.; Chao, K.-C.
2. 1-Methylnaphthalene; C ₁₁ H ₁₀ ; [90-12-0]	<i>J. Chem. Engng. Data</i> 1979, 24, 149-152.

T/K	p/atm.	p/MPa	Mole fraction of methane	
			in liquid, x_{CH_4}	in gas, y_{CH_4}
704.0	30.07	3.047	0.0286	0.3523
	50.24	5.091	0.0716	0.5215
	100.25	10.158	0.1797	0.6603
	148.8	15.08	0.2951	0.6750
	172.9	17.52	0.3724	0.6481
	181.3	18.37	0.4016	0.6429
	185.7	18.82	0.4544	0.6341

<p>COMPONENTS:</p> <p>1. Methane; CH₄; [74-82-8]</p> <p>2. 1-Methylnaphthalene; C₁₁H₁₀; [90-12-0]</p>	<p>ORIGINAL MEASUREMENTS:</p> <p>Henson, B. J.; Tarrer, A. R.; Curtis, C. W.; Guln, J. A. <i>Ind. Eng. Chem. Process Des. Dev.</i> <u>1982</u>, <i>21</i>, 575-579.</p>																				
<p>VARIABLES:</p>	<p>PREPARED BY:</p> <p>C. L. Young</p>																				
<p>EXPERIMENTAL VALUES:</p> <table border="1" data-bbox="107 471 1236 1217"> <thead> <tr> <th>t/°C</th> <th>T/K</th> <th>P/MPa</th> <th>Mole fraction of methane, x_{CH_4}</th> </tr> </thead> <tbody> <tr> <td rowspan="3">102</td> <td rowspan="3">375</td> <td>4.79</td> <td>0.0685</td> </tr> <tr> <td>8.95</td> <td>0.1185</td> </tr> <tr> <td>11.45</td> <td>0.1543</td> </tr> <tr> <td rowspan="3">202</td> <td rowspan="3">475</td> <td>4.95</td> <td>0.0645</td> </tr> <tr> <td>6.95</td> <td>0.0890</td> </tr> <tr> <td>11.21</td> <td>0.1411</td> </tr> </tbody> </table>		t/°C	T/K	P/MPa	Mole fraction of methane, x_{CH_4}	102	375	4.79	0.0685	8.95	0.1185	11.45	0.1543	202	475	4.95	0.0645	6.95	0.0890	11.21	0.1411
t/°C	T/K	P/MPa	Mole fraction of methane, x_{CH_4}																		
102	375	4.79	0.0685																		
		8.95	0.1185																		
		11.45	0.1543																		
202	475	4.95	0.0645																		
		6.95	0.0890																		
		11.21	0.1411																		
<p>AUXILIARY INFORMATION</p>																					
<p>METHOD/APPARATUS/PROCEDURE:</p> <p>One gallon static equilibrium cell fitted with magnetic agitator. Samples taken from small volume sample loops through which equilibrium liquid was circulated. Gas in liquid sample as estimated by volumetric technique using a Toffel pump.</p>	<p>SOURCE AND PURITY OF MATERIALS:</p> <p>1. Matheson sample, purity 99 mole per cent.</p> <p>2. Aldrich Chemical Co. sample, purity 97 mole per cent.</p> <p>ESTIMATED ERROR:</p> <p>$\delta T/K = \pm 1$; $\delta x_{CH_4} = \pm 4\%$ (estimated by compiler).</p> <p>REFERENCES:</p>																				

EXPERIMENTAL VALUES:			Mole fraction of methane	
T/K	p/atm	p/MPa	in liquid, x_{CH_4}	in gas, y_{CH_4}
462.5	19.89	2.015	0.0335	0.9893
	30.10	3.050	0.0493	0.9933
	49.83	5.049	0.0792	0.9949
	99.23	10.05	0.1508	0.9953
	149.3	15.13	0.2139	0.9947
	200.0	20.27	0.2731	0.9938
	249.7	25.30	0.3235	0.9918
542.2	19.83	2.009	0.0339	0.9350
	30.24	3.064	0.0516	0.9533
	49.97	5.063	0.0848	0.9661
	98.83	10.01	0.1636	0.9753
	149.9	15.19	0.2339	0.9759
	196.8	19.94	0.2992	0.9738
	248.7	25.20	0.3618	0.9700
623.7	19.83	2.009	0.0320	0.7290
	30.04	3.044	0.0519	0.8029
	49.84	5.050	0.0912	0.8673
	99.65	10.097	0.1845	0.9059
	149.2	15.12	0.2679	0.9156
	199.5	20.21	0.3535	0.9127
	249.7	25.30	0.4388	0.9001

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Flow apparatus with both liquid and gas components continually passing into a mixing tube and then into a cell in which phases separated under gravity. Liquid sample removed from bottom of cell and vapor sample from top of cell. Composition determined by gas chromatography. Details in source and ref. (1).

SOURCE AND PURITY OF MATERIALS:

1. Matheson sample with purity better than 99 mole per cent.
2. Aldrich Chemical Co. sample purity 99 mole per cent.

ESTIMATED ERROR:

$$\delta T/K = \pm 0.2; \quad \delta p/MPa \leq \pm 0.03;$$

$$\delta x_{CH_4}, \delta y_{CH_4} = \pm 2\%.$$

REFERENCES:

1. Simnick, J.J.; Lawson, C.C.; Lin, H-M; Chao, K-C. *Am. Inst. Chem. Engrs. J.*, 1977, *23*, 469.

COMPONENTS:
 1. Methane; CH₄; [74-82-8]
 2. 1,1'-Methylenebisbenzene, (Diphenylmethane); C₁₃H₁₂; [101-81-5]

ORIGINAL MEASUREMENTS:
 Sebastian, H.M.; Simnick, J.J.; Lin, H-M.; Chao, K-C.
J. Chem. Engng. Data, 1979, *24*, 149-152.

VARIABLES:

Temperature, pressure

PREPARED BY:

C. L. Young

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH ₄ ; [74-82-8]	Sebastian, H. M.; Simnick, J. J.; Lin, H.-M.; Chao, K.-C.
2. 1,1'-Methylenebisbenzene (Diphenylmethane); C ₁₃ H ₁₂ ; [101-81-5]	<i>J. Chem. Engng. Data</i> 1979, 24, 149-152.

T/K	p/atm	p/MPa	Mole fraction of methane	
			in liquid, x_{CH_4}	in gas, y_{CH_4}
702.9	30.51	3.091	0.0448	0.4407
	49.83	5.049	0.0961	0.5982
	100.3	10.16	0.2228	0.7132
	150.4	15.24	0.3576	0.7230

COMPONENTS:			ORIGINAL MEASUREMENTS:	
1. Methane; CH ₄ ; [74-82-8] 2. 9,10-Dihydrophenanthrene C ₁₄ H ₁₂ ; [776-35-2]			Sebastian, H.M.; Lin, H-M.; Chao, K-C. <i>J. Chem. Engng. Data.</i> <u>1980</u> , <i>25</i> , 379-381.	
VARIABLES:			PREPARED BY:	
Temperature, pressure			C.L. Young	
EXPERIMENTAL VALUES:				
T/K	p/atm	p/MPa	Mole fraction of methane in liquid, x _{CH₄}	in gas x _{CH₄}
546.3	20.09	2.036	0.0255	0.99760
	30.22	3.062	0.0371	0.99834
	50.5	5.12	0.0600	0.99884
	99.6	10.09	0.1132	0.99871
	150.3	15.23	0.1628	0.99849
	200.3	20.30	0.2058	0.99806
	250.0	25.33	0.2445	0.99757
542.85	20.04	2.031	0.0268	0.9781
	30.18	3.058	0.0396	0.9481
	50.2	5.087	0.0642	0.9886
	99.8	10.11	0.1227	0.9912
	150.1	15.21	0.1768	0.9914
	199.9	20.25	0.2278	0.9908
	249.7	25.30	0.2744	0.9893
622.5	20.45	2.072	0.0284	0.8925
	30.19	3.059	0.0421	0.9224
	49.9	5.06	0.0693	0.9461
	100.0	10.13	0.1353	0.9629
	150.7	15.27	0.1972	0.9665
	200.1	20.28	0.2576	0.9666
	249.2	25.25	0.3115	0.9643
703.15	20.04	2.031	0.0252	0.6623
	30.01	3.041	0.0429	0.7477
	50.5	5.117	0.0763	0.8301
	99.7	10.10	0.1537	0.8889
	150.7	15.27	0.2246	0.9105
AUXILIARY INFORMATION				
METHOD/APPARATUS/PROCEDURE:			SOURCE AND PURITY OF MATERIALS:	
Flow apparatus with both liquid and gas components continually passing into a mixing tube and then into a cell in which phases separated under gravity. Liquid sample removed from bottom of cell and vapor sample from top of cell. Composition determined by gas chromatography. Details in source and ref. (1). Some decomposition to phenanthrene occurred at the highest temperature (up to ~5% at the highest pressure)			1. Matheson sample, minimum purity 99 mole per cent. 2. Aldrich Chemical Co. sample purified by zone refining, final purity better than 99 mole per cent as determined using GC.	
			ESTIMATED ERROR:	
			$\delta T/K = \pm 0.2$; $\delta p/MPa < \pm 0.03$; $\delta x_{CH_4}, \delta y_{CH_4} = \pm 2\%$	
			REFERENCES:	
			1. Simnick, J.J.; Lawson, C.C.; Lin, H-M. Chao, K-C. <i>Am. Inst. Chem. Engrs. J.</i> <u>1977</u> <i>23</i> , 469.	

COMPONENTS: 1. Methane; CH ₄ ; [74-82-8] 2. Nonane; C ₉ H ₂₀ ; [111-84-2] 3. 2,2,3-Trimethylbutane; C ₇ H ₁₆ ; [464-06-2]		ORIGINAL MEASUREMENTS: Savvina, Ya. D.; Velikovskii, A. S. <i>Tr. Vses. Nauchno-Issled. Inst. Prirod. Gaz.</i> , 1962, 17 197-202.					
VARIABLES: Pressure, solvent composition		PREPARED BY: C. L. Young					
EXPERIMENTAL VALUES: T/K = 333.2							
P/kgcm ⁻²	solvent comp ^h _a	Mole fraction					
		in liquid		in vapour			
		C ₇ H ₁₆	C ₉ H ₂₀	CH ₄	C ₇ H ₁₆	C ₉ H ₂₀	CH ₄
200	100		0.417	0.583		0.010	0.990
	25	0.318	0.080	0.602	0.033	0.015	0.952
	0	0.388		0.612	0.073		0.927
220	50	0.194	0.153	0.653	0.025	0.014	0.961
	0	0.286		0.714	0.145		0.855
	100		0.318	0.682		0.014	0.986
250	75	0.083	0.209	0.708	0.018	0.017	0.965
	50	0.138	0.106	0.756	0.030	0.019	0.951
	25	0.125	0.033	0.842	0.092	0.032	0.876
280	75	0.061	0.152	0.787	0.025	0.025	0.950
	50	0.066	0.059	0.875	0.064	0.047	0.889
	100		0.232	0.768		0.030	0.970
300	75	0.045	0.105	0.850	0.048	0.069	0.883
^a volume fraction of nonane in original cell charge							
AUXILIARY INFORMATION							
METHOD/APPARATUS/PROCEDURE: Values appear to be determined using apparatus described in ref. (1). Composition of liquid phase determined from refractive index measurements.				SOURCE AND PURITY OF MATERIALS: No details given except purity of methane 99 mole per cent.			
				ESTIMATED ERROR:			
				REFERENCES: 1. Savvina, Ya. D.; Velikovskii, A. S.; <i>Tr. Vses. Nauchno-Issled. Inst. Prirodn. Gazov.</i> , 1962, 17/25, 163.			

COMPONENTS:		ORIGINAL MEASUREMENTS:					
1. Methane; CH ₄ ; [74-82-8] 2. Benzene; C ₆ H ₆ ; [71-43-2] 3. 2,2,3-Trimethylbutane; C ₇ H ₁₆ ; [464-06-2]		Savvina, Ya. D.; Velikovskii, A. S. <i>Tr. Vses. Nauchno-Issled. Inst. Prirod. Gaz.</i> , 1962, 17, 197-202.					
VARIABLES:		PREPARED BY:					
Pressure, solvent composition		C. L. Young					
EXPERIMENTAL VALUES:							
T/K = 333.2							
P/kgcm ⁻²	solvent comp ^a	Mole fraction					
		in liquid		CH ₄	in vapour		
		C ₇ H ₁₆	C ₆ H ₆		C ₇ H ₁₆	C ₆ H ₆	CH ₄
200	100		0.634	0.366		0.028	0.972
	75	0.149	0.426	0.425	0.012	0.029	0.951
	50	0.305	0.214	0.481	0.025	0.033	0.942
	25	0.348	0.105	0.547	0.033	0.035	0.932
	0	0.388		0.612	0.073		0.927
210	100		0.621	0.379		0.029	0.971
	75	0.132	0.422	0.446	0.018	0.032	0.950
	50	0.266	0.236	0.498	0.031	0.034	0.935
	25	0.332	0.094	0.575	0.043	0.038	0.919
	0	0.342		0.658	0.093		0.907
220	100		0.609	0.391		0.031	0.969
	75	0.152	0.391	0.457	0.025	0.034	0.941
	50	0.272	0.205	0.523	0.042	0.036	0.922
	25	0.292	0.109	0.599	0.053	0.042	0.905
	0	0.281		0.719	0.145		0.855
230	100		0.596	0.404		0.032	0.968
	75	0.137	0.393	0.470	0.033	0.040	0.927
	50	0.245	0.393	0.546	0.053	0.042	0.905
	25	0.273	0.091	0.636	0.061	0.044	0.855
^a volume fraction of benzene in original cell charge							
AUXILIARY INFORMATION							
METHOD APPARATUS/PROCEDURE:				SOURCE AND PURITY OF MATERIALS:			
Values appear to be determined using apparatus described in ref. (1). Composition of liquid phase determined from refractive index measurements.				No details given except purity of methane 99 mole per cent.			
ESTIMATED ERROR:							
REFERENCES:							
1. Savvina, Ya. D.; Velikovskii, A. S.; <i>Tr. Vses. Nauchno-Issled. Inst. Prirodn. Gazov.</i> , 1962, 17/25, 163.							