COMPONENTS:	EVALUATOR:
(1) Methane; CH_4; [74-82-8] (2) 2-Propanone or acetone; C_3H_6O; [67-64-1]	H. Lawrence Clever Department of Chemistry Emory University Atlanta, GA 30322 USA 1985, April

CRITICAL EVALUATION:

Horiuti (ref 1) measured seven values of the solubility of methane in 2-propanone between 196.55 and 303.15 K. Lannung and Gjaldbaek (ref 2) measured six values between 291.15 and 310.15 K. Both laboratories have the reputation of carrying out reliable measurements. The Lannung and Gjaldbaek mole fraction solubilities run about two percent larger than the Horiuti values over the common 291 -310 K temperature interval.

Both sets of data are classed as tentative. All data in both papers were combined in a linear regression to obtain the equation for the 193 - 313 K temperature interval of

$$\ln x_1 = - 13.6388 + 11.385/(T/100\ \text{K}) + 3.2398 \ln (T/100\ \text{K})$$

with a standard error about the regression line of 2.32×10^{-5}.

The equation gives temperature dependent values of the enthalpy and entropy changes for the transfer of one mole of methane from the gas at 0.101325 MPa to the infinitely dilute solution of:

T/K	ΔH_1^0/kJ mol^{-1}	ΔS_1^0/J K^{-1} mol^{-1}	$\Delta C_{p_1}^0$/J K^{-1} mol^{-1}
213.15	-3.72	-66.1	26.9
243.15	-2.92	-62.5	26.9
273.15	-2.11	-59.4	26.9
298.15	-1.43	-57.0	26.9

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

Table 1. The solubility of methane in 2-propanone. 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	$10^3 x_1$
193.15	3.655	283.15	1.938
203.15	3.221	288.15	1.913
213.15	2.893	293.15	1.891
223.15	2.642	298.15	1.872
233.15	2.447	303.15	1.855
243.15	2.293	308.15	1.840
253.15	2.172	313.15	1.827
263.15	2.075		
273.15	1.999		

A three constant smoothing equation for the Horiuti data only appears on the Horiuti data sheet. The two equations give negligably different solubility values between 193 and 253 K. From 283 to 313 K the equation above gives mole fraction solubility values that range from 0.94 to 1.73 percent larger than the equation based on only the Horiuti data.

REFERENCES:

1. Horiuti, J. *Sci. Pap. Inst. Phys. Chem. Res. (Jpn)* 1931/32, *17*, 125 - 256.

2. Lannung, A.; Gjaldbaek, J. C. *Acta Chem. Scand.* 1960, *14*, 1124 - 8.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Methane; CH_4; [74-82-8] (2) 2-Propanone or acetone; C_3H_6O; [67-64-1]	Horiuti, J. *Sci. Pap. Inst. Phys. Chem. Res. (Jpn)* 1931/32, *17*, 125 - 256.
VARIABLES: T/K: 196.55 - 303.15 p_1/kPa: 101.325 (1 atm)	PREPARED BY: M. E. Derrick H. L. Clever

EXPERIMENTAL VALUES:

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}
196.55	3.496	1.213	0.8726
212.55	2.909	0.9894	0.7699
232.15	2.463	0.8169	0.6943
251.35	2.187	0.7078	0.6513
273.15	1.982	0.6232	0.6232
293.15	1.877	0.5744	0.6165
303.15	1.822	0.5497	0.6101

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.

Smoothed Data: For use between 196.55 and 303.15 K.

$$\ln x_1 = -13.1623 + 10.8092/(T/100\text{K}) + 2.9683 \ln (T/100\text{K})$$

The standard error about the regression line is 5.85×10^{-6}.

T/K	Mol Fraction $10^3 x_1$	T/K	Mol Fraction $10^3 x_1$
198.15	3.423	273.15	1.985
213.15	2.895	288.15	1.893
228.15	2.538	298.15	1.847
243.15	2.289	308.15	1.811
258.15	2.112		

AUXILIARY INFORMATION

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 alumnium 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) Acetone. Nippon Pure Chemical Co. or Merck. Extra pure grade. Recrystallized with sodium sulfite and stored over calcium chloride. Fractionated, boiling point (760 mmHg) 56.09°C.

ESTIMATED ERROR: δT/K = 0.05
$\delta x_1/x_1$ = 0.01

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Methane; CH_4; [74-82-8] (2) 2-Propanone or acetone; C_3H_6O;[67-64-1]	Lannung, A.; Gjaldbaek, J. C. *Acta Chem. Scand.* 1960, *14*, 1124 - 1128.
VARIABLES: T/K = 291.15 - 310.15 p_1/kPa = 101.325 (1 atm)	PREPARED BY: J. Chr. Gjaldbaek

EXPERIMENTAL VALUES:

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}
291.15	1.94	0.593	0.632
291.15	1.94	0.594	0.633
298.15	1.87	0.566	0.618
298.15	1.85	0.562	0.613
310.15	1.84	0.548	0.622
310.15	1.84	0.546	0.620

Smoothed Data: For use between 291.15 and 310.15 K.

$$\ln x_1 = -7.0633 + 2.3565/(T/100\ \text{K})$$

The standard error about the regression line is 2.46×10^{-5}.

T/K	Mol Fraction $10^3 x_1$
298.15	1.89
308.15	1.84

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

A calibrated all-glass combined manometer and bulb containing degassed solvent and the gas was placed in an air thermostat and shaken until equilibrium (1).

The absorbed volume of gas is calculated from the initial and final amounts, both saturated with solvent vapor. The amount of solvent is determined by the weight of displaced mercury.

The values are at 101.325 kPa (1 atm) pressure assuming Henry's law is obeyed.

SOURCE AND PURITY OF MATERIALS:

(1) Methane. Generated from magnesium methyl iodidie. Purified by fractional distillation. Specific gravity corresponds with mol wt 16.08.

(2) 2-Propanone. Kahlbaum. "Zur analyse". Contained no water, aldehyde or acid.

ESTIMATED ERROR:

δT/K = ± 0.05
$\delta x_1/x_1$ = ± 0.015

REFERENCES:

1. Lannung, A.
J. Am. Chem. Soc. 1930, *52*, 68.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Methane; CH_4; [74-82-8] (2) 2-Propanone or acetone; C_3H_6O; [67-64-1]	Hronec, M.; Hagara, A.; Ilavský, J. *Petrochemia* 1983, *23* (2/3), 111-5.
VARIABLES: T/K = 238 - 278 p_t/kPa = 199 - 401	**PREPARED BY:** H. L. Clever

EXPERIMENTAL VALUES:

Temperature t/°C	Temperature T/K	Total Pressure p_t/kPa	Mol Fraction $10^3 x_1$	Kuenen Coefficient S/cm³(STP) g⁻¹
-35	238	199	1.6	0.6
			2.1	0.8
		300	3.4	1.3
		401	8.0	3.1
			8.8	3.4
-15	258	199	0.21	0.08
		300	1.8	0.7
		401	5.2	2.0
			3.6	1.4
5	278	401	2.6	1.0

The mole fraction solubility values were calculated by the compiler assuming ideal behavior.

Acetone vapor pressures given in the paper are:

t/°C	-35	-15	5
p_2/kPa	1.075	3.823	12.107

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

A volumetric method described in the paper.

SOURCE AND PURITY OF MATERIALS:

(1) Methane. Analyzed by GLC. Contained 2 % impurity which was mostly nitrogen.

(2) Acetone. Contained 0.5 % water.

ESTIMATED ERROR:

δp_t/kPa = ± 5
$\delta x_1/x_1$ = ± 0.20 (compiler)

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Methane; CH_4; [74-82-8] (2) 2-Propanone or acetone; C_3H_6O; [67-64-1]	Yokoyama, C.; Masuoka, H.; Aral, K.; Saito, S. *J. Chem. Eng. Data* 1985, *30*, 177-9.
VARIABLES: T/K = 298.2, 323,2 p_t/MPa = 1.06 - 11.75	PREPARED BY: H. L. Clever

EXPERIMENTAL VALUES:

Temperature		Total Pressure	Mol Fraction	
			Liquid	Vapor
t/°C	T/K	p_t/MPa	x_1	y_1
25.0	298.2	1.71	0.0367	0.9753
		2.28	0.0434	0.9789
		3.55	0.0670	0.9866
		4.51	0.0911	0.9871
		5.49	0.1116	0.9880
		7.08	0.1443	0.9873
		8.19	0.1598	0.9872
		9.16	0.1866	0.9870
		10.10	0.1997	0.9868
		11.68	0.2287	0.9853
50.0	323.2	1.06	0.0153	0.9124
		1.50	0.0223	0.9363
		2.07	0.0341	0.9523
		3.07	0.0509	0.9627
		4.28	0.0725	0.9698
		5.00	0.0822	0.9707
		5.98	0.0994	0.9713
		7.05	0.1200	0.9718
		8.25	0.1360	0.9729
		9.59	0.1647	0.9729
		10.73	0.1782	0.9715
		11.75	0.1950	0.9711

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

The equipment consists of an equilibration system and an analysis system. The procedures are essentially the same as those used by King *et al.* (ref 1) and Kubota *et al.* (ref 2). The equilibration system is in a thermostated water bath. The analysis system is in an air bath at 100 °C to avoid condensation problems.

Details of degassing, equilibration and sampling procedures were not given. The composition analysis was made by gas chromatograph and digital integrator. Calibration curves were obtained from mixtures of known composition.

SOURCE AND PURITY OF MATERIALS:

(1) Methane. Takachiho Kagaku Co., Ltd. Used as received.

(2) 2-Propanone. Dojin Yakugaku Ltd. Used as received.

A trace analysis of the components found no measurable impurities. The samples were used without further purification.

ESTIMATED ERROR:

δT/K = ± 0.05
δp_t/MPa = ± 0.01
$\delta x_1/x_1$ = ± 0.015

REFERENCES:

1. King,M.B.;Alderson,D.A.;Fallah,F.;Kassim,D.M.;Sheldon,J.R.;Mahmud,R. *Chemical Engineering at Supercritical Conditions*;Paulatis,M.E. *et al.*,Editors, Ann Arbor Science, 1983, p. 31.
2. Kubota,H.;Inatome,H.;Tanaka,Y.;Makita,T. *J.Chem.Eng.Jpn.* 1983,*16*,99.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Methane; CH_4; [74-82-8] (2) Cyclopentanone; C_5H_8O; [120-92-3]	Gallardo, M. A.; López, M. C. Urieta, J. S.; Gutierrez Losa, C. IUPAC Conference of Chemical Thermodynamics, 1984, Paper No. 47.
VARIABLES: $T/K = 273.15 - 303.15$ $p_1/kPa = 101.3$	PREPARED BY: H. L. Clever

EXPERIMENTAL VALUES:

T/K	Mol Fraction $10^4 x_1$
273.15	15.7
283.15	15.2
293.15	14.7
298.15	14.5
303.15	14.3

The authors fit their data to the equation

$$- \ln x_1 = 0.887 \ln (T/K) + 1.481$$

from which they obtained the thermodynamic ch ges

$\Delta H_1^0/kJ\ mol^{-1} = - 2.20$ and

$\Delta S_1^0/J\ K^{-1}\ mol^{-1} = -62.$

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

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.

SOURCE AND PURITY OF MATERIALS:

(1) Methane.Sociedad Espanol del Oxigeno. Stated to be 99.95 percent pure.
(2) Cyclopentanone.

ESTIMATED ERROR:

$\delta T/K = \pm 0.1$
$\delta x_1/x_1 = \pm 0.01$

REFERENCES:

1. Ben-Naim, A.; Baer, S. *Trans. Faraday Soc.* 1963, *59*,2735.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Methane; CH_4; [74-82-8] (2) Cyclohexanone; $C_6H_{10}O$; [108-94-1]	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:

T/K	Mol Fraction $x_1 \times 10^4$	Bunsen Coefficient α	Ostwald Coefficient L
293.15	16.1	0.349	0.375
298.15	16.1	0.347	0.379

The Ostwald coefficients were calculated by the compiler.

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 crystaline methyl Grignard reagent. Passed through conc. H_2SO_4, solid KOH, and Dririte.

(2) Cyclohexanone. Eastman Kodak Co. Purified, distilled, b.p. (754.5 mmHg) t/°C 155.19. Refractive index, density, and vapor pressure data are in the thesis.

ESTIMATED ERROR:

$\delta T/K = 0.05$

REFERENCES:

1. Van Slyke, D. D.
J. Biol. Chem. 1939, *130*, 545.

2. Ijams, C. C.
Ph.D. thesis, 1941
Vanderbilt University

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Methane; CH_4; [74-82-8] (2) Acetic acid, methyl ester or methyl acetate; $C_3H_6O_2$; [79-20-9]	Horiuti, J. *Sci. Pap. Inst. Phys. Chem. Res. (Jpn)* 1931/32, *17*, 125 - 256.
VARIABLES: T/K: 196.55 - 303.15 p_1/kPa: 101.325 (1 atm)	**PREPARED BY:** M. E. Derrick H. L. Clever

EXPERIMENTAL VALUES:

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}
196.55	3.284	1.052	0.7571
212.55	2.834	0.8901	0.6926
231.55	2.482	0.7614	0.6454
252.75	2.245	0.6704	0.6203
273.15	2.087	0.6068	0.6068
293.15	1.985	0.5620	0.6032
303.15	1.932	0.5395	0.5987

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.

Smoothed Data: For use between 196.55 and 303.15 K.

The 293.15 K value was omitted from the linear regression.

$\ln x_1 = -11.2954 + 8.1182/(T/100\text{K}) + 2.1375 \ln (T/100\text{K})$

The standard error about the regression line is 9.46×10^{-6}.

T/K	Mol Fraction $10^3 x_1$	T/K	Mol Fraction $10^3 x_1$
198.15	3.226	273.15	2.080
213.15	2.826	288.15	1.997
228.15	2.544	298.15	1.955
243.15	2.340	303.15	1.937
258.15	2.191		

AUXILIARY INFORMATION

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) Methyl acetate. Merck. Extra pure grade. Dried with P_2O_5. Distilled several times. Boiling point (760 mmHg) 57.12°C.

ESTIMATED ERROR:

δT/K = 0.05

$\delta x_1/x_1$ = 0.01

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8] 2. Carbon dioxide; CO_2; [124-38-9] 3. Hydrogen; H_2; [1333-74-0] 4. Nitrogen; N_2; [7727-37-9] 5. 4-Methyl-1,3-dioxolan-2-one, (Propylene carbonate); $C_4H_6O_3$; [108-32-7]	Rusz, L. *Veszpremi. Vegyip. Egy. Kozl.* 1968, *11*, 169-180.
VARIABLES:	PREPARED BY:
Temperature, pressure	C. L. Young

EXPERIMENTAL VALUES:

T/K	Total pressure p/atm	p/Mpa	Gas	Partial pressure p/atm	p/MPa	α	Mole fraction in liquid
283.2	10.6	1.07	CO_2	2.3	0.23	8.7	0.038
			N_2	2.1	0.21	0.22	0.0010
			H_2	6.0	0.61	1.68	0.0076
			CH_4	0.2	0.02	0.13	0.0006
	18.6	1.88	CO_2	4.1	0.42	14.5	0.0620
			N_2	3.5	0.35	0.73	0.0033
			H_2	10.6	1.07	2.10	0.0095
			CH_4	0.4	0.04	0.24	0.0011
	25.4	2.57	CO_2	6.2	0.63	19.8	0.0828
			N_2	4.7	0.48	1.05	0.0048
			H_2	13.9	1.41	3.85	0.0172
			CH_4	0.6	0.06	0.10	0.0005
	31.3	3.17	CO_2	11.3	1.14	41.2	0.158
			N_2	6.2	0.63	1.61	0.0073
			H_2	12.9	1.31	2.74	0.0123
			CH_4	0.9	0.09	0.61	0.0028
	38.6	3.91	CO_2	14.2	1.44	56.5	0.205
			N_2	13.4	1.36	2.52	0.0114
			H_2	10.1	1.02	2.83	0.0127
			CH_4	0.9	0.09	0.32	0.0015
293.2	9.6	9.7	CO_2	1.4	0.14	4.9	0.022
			N_2	2.8	0.28	0.45	0.0020
			H_2	5.1	0.52	1.16	0.0053
			CH_4	0.3	0.03	0.11	0.0005

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. Exact procedure for calculating solubility not clear.	ESTIMATED ERROR: REFERENCES:

COMPONENTS:

1. Methane; CH_4; [74-82-8]
2. Carbon dioxide; CO_2; [124-38-9]
3. Hydrogen; H_2; [1333-74-0]
4. Nitrogen; N_2; [7727-37-9]
5. 4-Methyl-1,3-dioxolan-2-one, (Propylene carbonate); $C_4H_6O_3$; [108-32-7]

ORIGINAL MEASUREMENTS:

Rusz, L.
Veszpremi. Vegyip. Egy. Kozl. 1968, *11*, 169-180.

EXPERIMENTAL VALUES:

T/K	Total pressure p/atm	Total pressure p/Mpa	Gas	Partial pressure p/atm	Partial pressure p/MPa	α	Mole fract. in liquid
293.2	15.5	15.7	CO_2	1.3	0.13	4.7	0.0210
			N_2	4.9	0.50	0.96	0.0044
			H_2	9.0	0.91	1.94	0.0088
			CH_4	0.3	0.03	0.18	0.0008
	26.2	2.65	CO_2	3.3	0.33	7.7	0.0339
			N_2	5.3	0.54	1.25	0.0057
			H_2	17.1	1.73	4.45	0.0199
			CH_4	0.5	0.05	0.24	0.0011
	34.9	3.54	CO_2	6.8	0.69	16.6	0.0703
			N_2	11.2	1.13	1.75	0.0079
			H_2	16.2	1.64	3.05	0.0137
			CH_4	0.7	0.07	0.32	0.0015
	42.1	4.27	CO_2	13.2	1.34	36.3	0.142
			N_2	15.4	1.56	3.32	0.0149
			H_2	12.5	1.27	3.15	0.0142
			CH_4	1.0	0.10	0.12	0.0005
303.2	8.8	0.88	CO_2	1.2	0.12	3.4	0.0153
			N_2	3.1	0.31	0.81	0.0037
			H_2	4.4	0.45	1.22	0.0055
			CH_4	0.1	0.01	0.16	0.0007
	21.2	2.15	CO_2	2.8	0.28	5.6	0.0249
			N_2	4.2	0.43	0.72	0.0033
			H_2	15.0	1.52	3.55	0.0159
			CH_4	0.2	0.02	0.19	0.00087
	30.4	3.08	CO_2	7.4	0.75	14.8	0.0632
			N_2	7.1	0.72	2.20	0.0099
			H_2	15.6	1.58	4.70	0.0210
			CH_4	0.3	0.03	0.20	0.0009
	39.6	4.01	CO_2	8.9	0.90	16.9	0.0715
			N_2	9.3	0.94	1.92	0.0087
			H_2	20.9	2.12	5.16	0.0230
			CH_4	0.5	0.05	0.14	0.0006
	43.7	4.43	CO_2	14.6	1.48	30.8	0.1231
			N_2	14.2	1.44	3.15	0.0142
			H_2	14.1	1.43	3.05	0.0137
			CH_4	0.8	0.08	0.25	0.0011
313.2	10.7	1.08	CO_2	1.5	0.15	2.5	0.0113
			N_2	2.6	0.26	0.28	0.0013
			H_2	6.4	0.65	1.55	0.0070
			CH_4	0.2	0.02	0.09	0.0004
	21.2	2.15	CO_2	5.4	0.55	6.9	0.0305
			N_2	4.8	0.49	0.84	0.0038
			H_2	10.6	1.07	2.23	0.0101
			CH_4	0.4	0.04	0.31	0.0014
	29.1	2.95	CO_2	7.4	0.75	9.6	0.0419
			N_2	7.3	0.74	1.13	0.0051
			H_2	13.9	1.41	3.65	0.0164
			CH_4	0.5	0.05	0.23	0.0010

cont.

COMPONENTS:

1. Methane; CH_4; [74-82-8]
2. Carbon dioxide; CO_2; [124-38-9]
3. Hydrogen; H_2; [1333-74-0]
4. Nitrogen; N_2; [7727-37-9]
5. 4-Methyl-1,3-dioxolan-2-one, (Propylene carbonate); $C_4H_6O_3$; [108-32-7]

ORIGINAL MEASUREMENTS:

Rusz, L.
Veszpremi. Vegyip. Egy. Kozl., 1968, *11*, 169-180.

EXPERIMENTAL VALUES:

T/K	Total pressure p/atm	p/Mpa	Gas	Partial pressure p/atm	p/MPa	α	Mole fraction in liquid
313.2	3.43	3.48	CO_2	9.3	0.94	15.4	0.0656
			N_2	10.2	1.03	15.1	0.0068
			H_2	14.1	1.43	2.74	0.0123
			CH_4	0.7	0.07	0.12	0.0005
	43.4	4.40	CO_2	15.2	1.54	23.4	0.0964
			N_2	14.8	1.50	2.74	0.0123
			H_2	12.5	1.27	3.38	0.0152
			CH_4	0.9	0.09	0.15	0.0007

[a] mL of gas absorbed (reduced to 0 °C and 1 atmosphere) per g of solvent.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8] 2. 4-Methyl-1,3-dioxolan-2-one, (propylene carbonate); $C_4H_6O_3$; [108-32-7]	Rusz, L. *Veszpremi. Vegyip. Egy. Kozl.*, 1968, *11*, 169-180.
VARIABLES:	**PREPARED BY:**
Temperature, pressure	C. L. Young

EXPERIMENTAL VALUES:

T/K	Total pressure p/atm	p/Mpa	a α	Mole fraction of methane,
283.2	11.8	1.20	3.9	0.017
	15.1	1.78	4.5	0.020
	20.6	2.43	5.9	0.026
	25.0	2.53	5.7	0.025
293.2	10.8	1.09	2.9	0.013
	15.6	1.58	3.7	0.017
	21.6	2.19	6.7	0.030
	25.6	2.59	7.5	0.033
303.2	11.4	1.16	3.3	0.015
	15.8	1.60	4.7	0.021
	21.8	2.21	5.1	0.023
	25.9	2.62	5.4	0.024
313.2	13.7	1.39	2.8	0.013
	20.0	2.03	4.5	0.020
	24.8	2.51	6.4	0.028
	28.0	2.84	6.3	0.028

[a] mL of gas absorbed (reduced to 0°C and 1 atmosphere) per g 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. Exact procedure for calculating solubility not clear.	ESTIMATED ERROR:
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8] 2. Carbon dioxide; CO_2; [124-38-9] 3. Nitrogen; N_2; [7727-37-9] 4. 1,2,3-Propanetriol,triacetate, (glycerol triacetate); $C_9H_{14}O_6$; [102-76-1]	Makranczy, J.; Maleczkine, S. M.; Rusz, L. *Veszpremi. Vegyip. Egy. Kozl.* 1965, *9*, 95-105.
VARIABLES: Temperature, pressure	PREPARED BY: C. L. Young

EXPERIMENTAL VALUES:

T/K = 293.2

Total pressure /Mpa	Partial pressure p_{CO_2}/MPa	p_{CH_4}/Mpa	p_{N_2}/Mpa	α_{CO_2}	α_{CH_4}	Mole fractions x_{CO_2}	x_{CH_4}
10.6	6.3	3.1	1.0	24.7	1.3	0.194	0.012
16.4	10.2	4.6	1.6	34.6	3.1	0.252	0.029
24.2	12.7	8.2	3.3	51.0	12.6	0.332	0.109
29.0	17.4	7.5	4.1	76.0	9.1	0.425	0.081
41.8	19.8	16.0	6.0	92.5	14.6	0.474	0.124

α= mL of gas absorbed (reduced to 0^0C and 1 atmosphere) per g 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. Exact procedure for calculating solubility not clear.	ESTIMATED ERROR: REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8] 2. Carbon dioxide; CO_2; [124-38-9] 3. Nitrogen; N_2; [7727-37-9] 4. 2-[2-(methoxyethoxy)-ethoxy]-ethanol acetate, (methoxytriethylene gylcol acetate); $C_9H_{18}O_5$; [3610-27-3]	Makranczy, J.; Maleczkine, S. M.; Rusz, L. *Veszpremi. Vegyip. Egy. Kozl.* 1965, *9*, 95-105.
VARIABLES:	PREPARED BY:
Temperature, pressure	C. L. Young

EXPERIMENTAL VALUES:

T/K = 293.2

Total pressure /MPa	Partial pressure p_{CO_2}/MPa	p_{CH_4}/Mpa	p_{N_2}/Mpa	α_{CO_2}	α_{CH_4}	Mole fractions x_{CO_2}	x_{CH_4}
10.6	6.5	2.8	1.3	26.8	2.4	0.198	0.022
16.3	9.7	4.8	1.8	38.5	4.8	0.261	0.042
23.9	13.4	7.7	2.8	61.5	6.2	0.361	0.054
31.1	18.9	8.3	3.9	95.5	9.0	0.467	0.064
41.8	22.5	15.2	4.1	116.0	13.1	0.516	0.107

α = mL of gas absorbed (reduced to 0 °C and 1 atmosphere) per g 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. Exact procedure for calculating solubility not clear.	ESTIMATED ERROR: REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8] 2. Carbon dioxide; CO_2; [124-38-9] 3. Nitrogen; N_2; [7727-37-9] 4. 2,2´-{1,2-ethanediylbis-(oxy)]bis-ethanol, (triethylene glycol); $C_6H_{14}O_4$; [112-27-6]	Makranczy, J.; Maleczkine, S. M.; Rusz, L. *Veszpremi. Vegyip. Egy. Kozl.* 1965, *9*, 95-105.
VARIABLES:	PREPARED BY:
Temperature, pressure	C. L. Young

EXPERIMENTAL VALUES:

T/K = 293.2

Total pressure /MPa	Partial pressure p_{CO_2}/MPa	p_{CH_4}/Mpa	p_{N_2}/Mpa	α_{CO_2}	α_{CH_4}	Mole fractions x_{CO_2}	x_{CH_4}
12.2	7.8	3.2	1.2	11.8	2.7	0.0732	0.0177
18.4	11.8	4.4	2.2	18.5	2.9	0.1102	0.0190
27.2	17.3	7.6	2.3	26.2	3.4	0.1492	0.0222
36.2	24.1	9.1	2.9	37.6	6.9	0.2010	0.0441
41.7	26.7	11.4	3.6	44.2	8.1	0.2283	0.0514

α=mL of gas absorbed (reduced to 0°C and 1 atmosphere) per g 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. Exact procedure for calculating solubility not clear.	ESTIMATED ERROR:
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8] 2. Carbon dioxide; CO_2; [124-38-9] 3. Nitrogen; N_2; [7727-37-9] 4. 4-Methyl-1,3-dioxolan-2-one, (propylene carbonate); $C_4H_6O_3$; [108-32-7]	Makranczy, J.; Maleczkine, S. M.; Rusz, L. *Veszpremi. Vegyip. Egy. Kozl.* 1965, *9*, 95-105.
VARIABLES: Temperature, pressure	PREPARED BY: C. L. Young

EXPERIMENTAL VALUES:

T/K = 293.2

Total pressure /MPa	Partial pressure p_{CO_2}/MPa	p_{CH_4}/Mpa	p_{N_2}/Mpa	α_{CO_2}	α_{CH_4}	Mole fractions x_{CO_2}	x_{CH_4}
8.7	4.4	3.6	0.7	14.3	1.3	0.060	0.0059
16.6	8.2	7.1	1.3	27.6	5.1	0.116	0.023
25.4	12.3	11.1	2.0	41.9	9.2	0.160	0.040
30.9	14.4	13.7	2.8	53.9	10.4	0.197	0.045
35.7	15.7	14.8	5.2	64.2	12.3	0.226	0.053

α= mL of gas absorbed (reduced to 0^0C and 1 atmosphere) per g 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. Exact procedure for calculating solubility not clear.	ESTIMATED ERROR: REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8] 2. Carbon dioxide; CO_2; [124-38-9] 3. Nitrogen; N_2; [7727-37-9] 4. 2-[2-(Butoxyethoxy)-ethoxy]-ethanol acetate, (butoxytriethylene gylcol acetate); $C_{12}H_{24}O_5$;	Makranczy, J.; Maleczkine, S. M.; Rusz, L. *Veszpremi. Vegyip. Egy. Kozl.* 1965, *9*, 95-105.
VARIABLES: Temperature, pressure	PREPARED BY: C. L. Young

EXPERIMENTAL VALUES:

T/K = 293.2

Total pressure /MPa	Partial pressure p_{CO_2}/MPa	p_{CH_4}/Mpa	p_{N_2}/Mpa	α_{CO_2}	α_{CH_4}	Mole fractions x_{CO_2}	x_{CH_4}
10.8	6.7	3.1	1.0	26.3	2.9	0.225	0.031
16.7	10.5	4.3	1.9	38.2	5.6	0.297	0.058
24.6	15.0	6.6	3.0	60.7	8.1	0.402	0.082
29.8	18.9	8.4	2.5	82.4	10.4	0.477	0.103
40.8	22.8	12.1	5.9	100.0	14.3	0.525	0.137

α = mL of gas absorbed (reduced to 0°C and 1 atmosphere) per g 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. Exact procedure for calculating solubility not clear.	ESTIMATED ERROR: REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8] 2. 4-Methyl-1,3-dioxolan-2-one; (Propylene carbonate); $C_4H_6O_3$; [108-32-7]	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_{CH_4}/atm	Mole fraction at 1 atm* x_{CH_4}
298.2	1140	0.000877
323.2	1340	0.000746
343.2	1430	0.000699

* Calculated by compiler assuming a linear function of P_{CH_4} vs x_{CH_4}, i.e., x_{CH_4} (1 atm) = $1/H_{CH_4}$.

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

ESTIMATED ERROR:
$\delta T/K = \pm 0.1$; $\delta H/atm = \pm 6\%$ (estimated by compiler).

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8] 2. 4-Methyl-1,3-dioxolan-2-one, (Propylene carbonate); $C_4H_6O_3$; [108-32-7]	Parcher, J. F.; Bell, M. L.; Lin, P. J. *Adv. Chromat.* 1984, *24*, 227-246.
VARIABLES:	PREPARED BY: C. L. Young

EXPERIMENTAL VALUES:

T/K (t/°C)	Henry's law constant, H/atm	Mole fraction [a] extrapolated to 1 atm, x_{CH_4}
283.2 (10)	1500	0.00067
293.2 (20)	1400	0.00071
303.2 (30)	1300	0.00077
313.2 (40)	1400	0.00071

$R\ d \ln H/d(1/T) = +0.5$ kcal mol^{-1} = 2 kJ mol^{-1}.

[a] Calculated by compiler assuming $x = 1/H$.

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:

Henry's law constant determined from retention volume of gas on a chromatographic column. Helium was used as a carrier gas and a mass spectrometer used as a detector. The measured Henry's law constants were independent of sample size, flow rate and composition of injected sample. Details given in ref. 1.

SOURCE AND PURITY OF MATERIALS:

No details given.

ESTIMATED ERROR:

δH/atm = ±200.

REFERENCES:

1. Lin, P. J. and Parcher, J. F. *J. Chromat. Sci.* 1982, *20*, 33.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8] 2. Hexadecane; $C_{16}H_{34}$; [544-76-3] 3. 4-Methyl-1,3-dioxolan-2-one, (Propylene carbonate); $C_4H_6O_3$; [108-32-7]	Parcher, J. F.; Bell, M. L.; Lin, P. J. *Adv. Chromat.* 1984, *24*, 227-246.
VARIABLES:	PREPARED BY: C. L. Young

EXPERIMENTAL VALUES:

T/K (t/°C)	Mole fraction of Component 2	Henry's law constant, H/atm	Mole fraction [a] extrapolated to 1 atm, x_{CH_4}
293.2 (20)	0.30	460	0.00217
303.2 (30)		480	0.00208
313.2 (40)		470	0.00213
293.2 (20)	0.62	250	0.00400
303.2 (30)		257	0.00389
313.2 (40)		270	0.00370

[a] Calculated by compiler assuming $x = 1/H$.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Henry's law constant determined from retention volume of gas on a chromatographic column. Helium was used as a carrier gas and a mass spectrometer used as a detector. The measured Henry's law constants were independent of sample size, flow rate and composition of injected sample. Details given in ref. 1.

SOURCE AND PURITY OF MATERIALS:

No details given.

ESTIMATED ERROR:

δx_{CH_4} = ±10% (estimated by compiler).

REFERENCES:

1. Lin, P. J. and Parcher, J. F. *J. Chromat. Sci.* 1982, *20*, 33.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8] 2. 4-Methyl-1,3-dioxolan-2-one, (Propylene carbonate); $C_4H_6O_3$; [108-32-7]	Shakhova, S.F.; Zubchenko, Yu.P. *Khim. Prom.* 1973, *49*, 595-6.
VARIABLES: Temperature, pressure	PREPARED BY: C.L. Young

EXPERIMENTAL VALUES:

T/K	$P/10^5$Pa	Mole fraction of methane in liquid, x_{CH_4}	α^+ vol/vol
298.15	43.67	0.0256	6.9
	63.22	0.0363	9.9
	84.81	0.0482	13.3
	113.28	0.0584	16.3
323.15	47.93	0.0270	7.3
	73.56	0.0405	11.1
	79.44	0.0430	11.8
	88.76	0.0457	12.6
	112.77	0.0567	15.8
	146.11	0.0691	19.5
	147.63	0.0691	19.5

+ quoted in original, appears to be volume of gas at T/K = 273.15 and P = 1 atmosphere absorbed by unit volume of liquid at room temperature.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Rocking autoclave. Mixture stirred by ball in rocking autoclave. Samples of liquid analysed by a volumetric method. Details in ref. (1).

SOURCE AND PURITY OF MATERIALS:

1. Purity 97.8 mole per cent.
2. No details given.

ESTIMATED ERROR:

$\delta T/K = \pm 0.1$; $\delta P/10^5$Pa = ±0.1; $\delta x_{CH_4} = \pm 5\%$.

(estimated by compiler).

REFERENCES:

1. Shakhova, S.F.; Zubchenko, Yu.P.; Kaplan, L.K.

Khim. Prom. 1973, *5*, 108.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8] 2. Oxybispropanol, (Dipropylene glycol); $C_6H_{14}O_3$; [25265-71-8]	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_{CH_4}/atm	Mole fraction at 1 atm* x_{CH_4}
298.2	1450	0.000690
323.2	1800	0.000556
343.2	2230	0.000448

* Calculated by compiler assuming a linear function of P_{CH_4} vs x_{CH_4}, i.e., x_{CH_4}(1 atm) = $1/H_{CH_4}$.

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:

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

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8] 2. Benzenemethanol; (Benzyl alcohol); C_7H_8O; [100-51-6]	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_{CH_4}/atm	Mole fraction at 1 atm* x_{CH_4}
298.2	1030	0.000971

* Calculated by compiler assuming a linear function of P_{CH_4} vs x_{CH_4}, i.e., x_{CH_4}(1 atm) = $1/H_{CH_4}$.

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:

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

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8] 2. Phenol; C_6H_6O; [108-95-2]	Lenoir, J-Y.; Renault, P.; Renon, H. *J. Chem. Eng. Data*, 1971, *16*, 340-3.
VARIABLES:	PREPARED BY: C. L. Young

EXPERIMENTAL VALUES:

T/K	Henry's constant H_{CH_4}/atm	Mole fraction at 1 atm* x_{CH_4}
323.2	1990	0.000503

* Calculated by compiler assuming a linear function of P_{CH_4} vs x_{CH_4}, i.e., $x_{CH_4}(1\ atm) = 1/H_{CH_4}$.

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:

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

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8] 2. 1,2,3-Propanetriol, triacetate, (Glycerol triacetate); $C_9H_{14}O_6$; [102-76-1]	Shakhova, S.F.; and Zubchenko, Yu.P. *Khim. Prom.* 1973, *49*, 595-6.
VARIABLES:	PREPARED BY:
Temperature, pressure	C.L. Young

EXPERIMENTAL VALUES:

T/K	$P/10^5$Pa	Mole fraction of methane in liquid, x_{CH_4}	α^+ vol/vol
298.15	35.87	0.0640	8.1
	40.73	0.0706	9.0
	50.97	0.0828	10.7
	70.42	0.1070	14.2
	75.59	0.1144	15.3
	90.08	0.1306	17.8
	104.56	0.1512	21.1
343.15	62.31	0.0941	12.3
	85.32	0.3970	78.0
	95.14	0.4220	86.0
	113.28	0.4614	101.5
	114.80	0.4639	102.5
	127.47	0.4882	113.0

+ quoted in original, appears to be volume of gas at T/K = 273.15 and P = 1 atmosphere absorbed by unit volume of liquid at room temperature.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Rocking autoclave. Mixture stirred by ball in rocking autoclave. Samples of liquid analysed by a volumetric method. Details in ref. (1).

SOURCE AND PURITY OF MATERIALS:

1. Purity 97.8 mole per cent.
2. No details given.

ESTIMATED ERROR:

$\delta T/K = \pm 0.1$; $\delta P/10^5$Pa = ±0.1; $\delta x_{CH_4} = \pm 5\%$.
(estimated by compiler)

REFERENCES:

1. Shakhova, S.F.; Zubchenko, Yu.P. Kaplan, L.K.
Khim. Prom. 1973, *5*, 108.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8] 2. 3-Methylphenol, (*m*-cresol); C_7H_8O; [108-39-4]	Simnick, J. J.; Sebastian, H. M.; Lin, H. M.; Chao, K. C. *Fluid Phase Equilibria* 1979, *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}
462.25	2.08	20.5	0.0198	0.9579
	3.05	30.1	0.0288	0.9695
	5.11	50.4	0.0489	0.9785
	10.05	99.2	0.0930	0.9836
	15.28	150.8	0.1382	0.9840
	20.17	199.1	0.1768	0.9825
	25.27	249.4	0.2166	0.9806
542.65	2.00	19.7	0.0181	0.7435
	3.03	29.9	0.0301	0.8158
	5.06	49.9	0.0533	0.8764
	10.13	100.0	0.1111	0.9172
	15.15	149.5	0.1684	0.9262
	20.23	199.7	0.2199	0.9261
	25.20	248.7	0.2746	0.9214
623.25	3.07	30.3	0.0224	0.3912
	5.08	50.1	0.0538	0.5699
	10.18	100.5	0.1330	0.7057
	15.16	149.6	0.2136	0.7385
	20.35	200.8	0.3019	0.7333
	22.72	224.2	0.3579	0.7171
	25.33	250.0	0.4888	0.6857
663.35	5.12	50.5	0.0465	0.3265
	10.08	99.5	0.1477	0.4968
	12.91	127.4	0.2135	0.5198
	15.25	150.5	0.3207	0.4809

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

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).

SOURCE AND PURITY OF MATERIALS:

1. Matheson sample, purity better than 99 mole per cent.
2. Aldrich Chemical Co., minimum purity 99 mole per cent. Distilled.

ESTIMATED ERROR:

δT/K = ±0.2; δP/MPa = ±0.02;

δx_{CH_4}, δy_{CH_4} = ±2%.

REFERENCES:

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

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8] 2. 2,5,8,11,14 - Pentaoxapentadecane, (Tetramethylene glycol dimethyl ether) $C_{10}H_{22}O_5$; [143-24-8]	Zubchenko, Yu.P.; Shakhova, S.F. *Tr.N.-i.i Proekt. In-ta Azot Prom-sti i Produktov Organ. Sinteza* 1975, (33), 13-15.
VARIABLES:	PREPARED BY:
Pressure	C.L. Young

EXPERIMENTAL VALUES:

T/K	P/atm	P/MPa	α+ vol/vol	Mole fraction of methane in liquid, x_{CH_4}
313.15	24.2	2.45	6.18	0.0502
	37.2	3.77	9.17	0.0727
	54.3	5.50	13.2	0.101
	69.9	7.08	17.1	0.127
	83.3	8.44	20.1	0.147
	84.0	8.51	20.4	0.148
	85.7	8.68	20.7	0.150

\+ quoted in original paper, appears to be volume of gas at T/K = 273/15 and P = 1 atmosphere absorbed by unit volume of liquid at room temperature.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Mixture stirred by ball in rocking autoclave. Sample of liquid analysed by a volumetric method. Details in ref. (1).

SOURCE AND PURITY OF MATERIALS:

1. Purity 97.8 mole per cent.
2. No details given.

ESTIMATED ERROR:

$\delta T/K = \pm 0.1$; $\delta P/atm = \pm 0.1$
$\delta x_{CH_4} = \pm 5\%$.
(estimated by compiler).

REFERENCES:

1. Shakhova, S.F.; Zubchenko, Yu.P.; Kaplan, L.K. *Khim. Prom.* 1973, *6*, 108.