COMPONENTS:	EVALUATOR:

(1) Propane; C_3H_8; [74-98-6]
    Butane; C_4H_{10}; [106-97-8]
    2-Methylpropane; C_4H_{10}; [75-28-5]
 	
(2) Electrolyte
 	
(3) Water; H_2O; [7732-18-5]
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	1984, January

CRITICAL EVALUATION:

An Evaluation of the Solubility of Propane, Butane, and

2-Methylpropane in Aqueous Electrolyte Solutions

This section contains an evaluation of the solubility of propane, butane, and 2-methylpropane in aqueous solutions of electrolytes including synthetic sea salt and several micelle forming electrolytes. One solution of a nonelectrolyte, urea, is included. Solubility data are reported by more than one laboratory for only two propane (aqueous NaCl and urea) and two butane (aqueous NaCl and $(C_2H_5)_4NBr$) containing systems. There are not enough data available from independent sources on the solubility of the gases in any one electrolyte system over common ranges of electrolyte concentration and temperature to recommend solubility values. For many of the systems, the data are meager and sometimes of poor quality. Most of the available data are classed as tentative.

For most of the systems the solubility data have been converted to a form of the Sechenov (Setchenow) salt effect parameter at a gas partial pressure of 101.325 kPa in order to have a common basis of comparing the systems. Most of the available solubility data on these gases can be put in the form of the Sechenov constant as

$$k_{smm}/\text{kg mol}^{-1} = (1/(m_2/\text{mol kg}^{-1}))\log ((m_1{}^\circ,sat/\text{mol kg}^{-1})/(m_1,sat/\text{mol kg}^{-1}))$$

where m_2 represents the electrolyte molality and $m_1{}^\circ{}_{,sat}$ and $m_{1,sat}$ represent the molal gas solubility in pure water and electrolyte solution, respectively.

Other forms of the Sechenov salt effect parameter will be used as well. They include

$$k_{scc}/\text{dm}^3\text{mol}^{-1} = (1/(c_2/\text{mol dm}^{-3}))\log (c^\circ_{1,sat}/c_{1,sat})$$

$$k_{smx}/\text{kg mol}^{-1} = (1/(m_2/\text{mol kg}^{-1}))\log(x^\circ_{1,sat}/x_{1,sat})$$

A complete discussion of the conversions among these and other forms of the salt effect parameter can be found in volume 10 of the *Solubility Data Series* (12a,b).

There are other modifications of the salt effect parameter in use. The use of a natural logarithm instead of the base ten logarithm is becoming popular. The use of electrolyte ionic strength instead of a molal or molar concentration allows a direct comparison of the salt effect among electrolytes of different charge type (1-1, 1-2, etc). Both of these modifications have their advantages, but we have not chosen to use them here.

The systems evaluated are given in the order of the standard arrangement for inorganic compounds used by the U. S. National Bureau of Standards publications. The number is the standard order number for the electrolyte cation.

The general policy in evaluating salt effects on gas solubility has been to convert all salt effect data into Sechenov salt effect parameters of the form of k_{scc}/dm^3 mol^{-1} or k_{smm}/kg mol^{-1} for purposes of comparison. Most of the data on the propane, butane, and 2-methylpropane gases is already in the k_{smm} form. Thus that is the form used in this evaluation for most of the systems. When available, the author's solubility value in pure water is used in the $m_1°/m_1$ ratio in the belief that some of the author's systematic errors may cancel in the ratio. In general one can place more confidence in the salt effect parameter determined at electrolyte concentrations of one molal or more than values determined in dilute electrolyte solutions where small error in solubility may result in large errors in the salt effect parameter.

2(1)   Propane + Hydrochloric acid [7647-01-0] + Water

      Butane + Hydrochloric acid [7647-01-0] + Water

Yano, Suetaka, Umehara, and Horiuchi (8) report the solubility of propane at HCl concentrations of 0, 0.250, 0.500, and 1.000 mol dm^{-3} at 298.2 K. Morrison and Billett (1) report salt effect parameters at four temperatures based on the molal solubility of butane in water and one molal HCl solution.

The salt effect parameters are given below.

T/K	Gas	HCl m_2 or c_2	k_{scc}/dm^{3}mol^{-1}	k_{smm}/kg mol^{-1}	k_{smx}/kg mol^{-1}	Ref.
285.75	Butane	1(m_2)		0.080	0.095	1
298.2	Propane	0.25(c_2)	0.164			8
		0.50(c_2)	0.123			
		1 (c_2)	0.125	0.114	0.129	
303.15	Butane	1(m_2)		0.049	0.064	1
322.55	Butane	1(m_2)		0.031	0.046	1
344.85	Butane	1(m_2)		0.028	0.043	1

The propane salt effect parameter in 0.25 M HCl is doubtful, and implies the solubility value is in error by being too small. The other values are classed as tentative, but it is worth noting that the salt effect parameters for the propane system are larger than normally observed for other gases in hydrochloric acid solution.

2(2)   Propane + Sulfuric acid [7664-93-9] + Water

      Butane + Sulfuric acid [7664-93-9] + Water

      2-methylpropane + Sulfuric acid [7664-93-9] + Water

Rudakov and Lutsyk (11) report solubility data on these systems at 298.15 and 363.15 K in solutions up to 98.3 weight percent acid. Rudakov has provided some supplementary data not in the original publication. The evaluator has calculated k_{smc}/kg mol^{-1} and k_{smx}/kg mol^{-1} salt effect parameter values from the solubility values on the data sheets. The k_{smm} value can be approximated by subtracting 0.015 from the k_{smx} values. Unfortunately no value is given for the solubility of propane in water at 363 K so no salt effect parameters were calculated for the propane system at that temperature. The results follow the trend noted for other gases in aqueous sulfuric acid of salting-out at small acid concentration and

COMPONENTS:	EVALUATOR:
(1) Propane; C_3H_8; [74-98-6] Butane; C_4H_{10}; [106-97-8] 2-Methylpropane; C_4H_{10}; [75-28-5] (2) Electrolyte (3) Water; H_2O; [7732-18-5]	H. Lawrence Clever Chemistry Department Emory University Atlanta, GA 30322 USA 1984, January

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salting in at large acid concentrations. It would be desirable to have additional data at small and intermediate acid concentrations. The values are classed as tentative. Salt effect parameters are not normally calculated for solutions as concentrated as these, but the results do indicate a similar behavior for the three gases in sulfuric acid solution.

T/K	H_2SO_4	Propane		Butane		2-Methylpropane	
	m_2/mol kg^{-1}	k_{smc}	k_{smx}	k_{smc}	k_{smx}	k_{smc}	k_{smx}
298.15	15.5	0.020	0.013	0.020	0.013	0.016	0.008
	40.8	0.011	0.006	0.008	0.002	0.007	0.002
	64.8	-	-	-	-	0.000	-0.004
	136	-0.002	-0.005	-0.003	-0.006	-0.004	-0.006
	182	-	-	-	-	-0.004	-0.006
	212	-	-	-	-	-0.003	-0.005
	590	-	-	-	-	-0.002	-0.003
363.15	91.8	-[a]	-[a]	-0.008	-0.011	No Data	
	136	-[a]	-[a]	-0.007	-0.009	at this	
	190	-[a]	-[a]			temperature	
	433	-[a]	-[a]				

[a] No solubility value in water to use in the calculation.

    18   Propane + Ammonium bromide [12124-97-9] + Water

    Wen and Hung (5) report the solubility of propane in aqueous ammonium bromide at five concentrations at four temperatures. Propane is salted out at all concentrations and temperatures studied. The evaluator has calculated k_{smm}/kg mol^{-1} salt effect parameters which are presented below.

NH_4Br	k_{smm}/kg mol^{-1}			
m_2/mol kg^{-1}	278.15 K	288.15 K	298.15 K	308.15 K
0.1 (authors)	0.095	0.086	0.076	0.066
0.105-0.107[a]	0.089	0.104	0.089	0.072
0.210-9.224[a]	0.071	0.087	0.067	0.053
0.407-0.428[a]	0.093	0.088	0.084	0.053
0.631-0.707[a]	0.089	0.088	0.075	0.063
0.850-0.942[a]	0.144	0.083	0.078	0.063
Av.	0.097	0.090	0.079	0.059

[a] The exact concentration at each temperature is given on the data sheets.

    The authors give salt effect parameter values stated to be for 0.10m NH_4Br solution. They are compared with the individual values at the five concentrations and the average of the individual values. The averages parallel, but do not agree exactly with the authors values. Neither do linear regressions of the values to 0.1 m value agree. However, considering the uncertainty in the solubility values the k_{smm} values are all within the expected uncertainty. A similar range of values will be seen in the authors values for the gases in other electrolyte solutions.

23(1)   Propane + 1-Dodecanamine hydrochloride [929-73-7] + Water

Lin and Metzer (6) measured the solubility of propane at 298.15 K in 1×10^{-8} to 1×10^{-3} mol dm^{-3} solutions of 1-dodecanamine hydrochloride. They do not report a solubility value in water but they quote water solubility values from the literature including the value of Wen and Hung (5). The solubility values show salting in at 1×10^{-8} M, salting out from about 1×10^{-7} to 5×10^{-5} M and salting in again at all larger salt concentrations. The electrolyte forms micelles, but all solubility measurements were made below the critical micelle concentration (cmc) of about 1.3×10^{-2} M in air. The cmc is 7.5×10^{-3} M when saturated with propane. Salt effect parameters are not appropriate for the system and were not calculated. The salting-in at 1×10^{-8} M 1-dodecanamine hydrochloride followed by a region of salting out has not been reported before. Confirmation of the observation is needed.

23(2)   Propane + Guanidine hydrochloride [50-01-1] + Water

Butane + Guanidine hydrochloride [50-01-1] + Water

2-Methylpropane + Guanidine hydrochloride [50-01-1] + Water

Wetlaufer, Malik, Stoller and Coffin (4) measured the solubilities of the three gases in water and in 4.87 molar guanidine hydrochloride at temperatures of 278.2, 293.2, and 318.2 K. The salt effect parameters calculated from their data are below. The data are classed as tentative.

T/K	Guanidine Hydrochloride	k_{scc}/dm^3 mol^{-1}		
	c_2/mol dm^{-3}	Propane	Butane	2-Methylpropane
278.2	4.87	0.019	-0.001	0.0
293.2	4.87	-0.004	-0.025	-0.022
318.2	4.87	-0.013	-0.038	-0.031

23(3)   Propane + Tetramethylammonium bromide [64-20-0] + Water

Butane + Tetramethylammonium bromide [64-20-0] + Water

Wen and Hung (5) report the solubility of propane in aqueous tetramethylammonium bromide at two concentrations and four temperatures and the solubility of butane at one concentration and four temperatures. The two gases are salted-in at all concentrations and temperatures studied. The salt effect parameters are summarized below.

(CH$_3$)$_4$NBr m_2/mol kg^{-1}	k_{smm}/kg mol^{-1}			
	278.15 K	288.15 K	298.15 K	308.15 K
Propane				
0.10 (authors)	-0.029	-0.039	-0.059	-0.091
0.165	-0.033	-0.033		-0.083
0.325-01328^a			-0.051	-0.084
0.885			-0.051	
Butane				
0.10 (authors)	-0.049	-0.064	-0.074	-0.100
0.850	-0.056	-0.061	-0.071	-0.093

^{a} The exact concentration at each temperature is given on the data sheet.

COMPONENTS:	EVALUATOR:

(1) Propane; C_3H_8; [74-98-6]
     Butane; C_4H_{10}; [106-97-8]
     2-Methylpropane; C_4H_{10}; [75-28-5]
 	
 (2) Electrolyte
 	
 (3) Water; H_2O; [7732-18-5]
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The author's values stated to be for 0.10 m electrolyte were apparently smoothed in some way not explained in the paper. The values are within experimental error of the values calculated from the solubility data in the paper by the evaluator. The data are classed as tentative.

23(4)   Propane + Tetraethylammonium bromide [71-91-0] + Water

Butane + Tetraethylammonium bromide [71-91-0] + Water

Wen and Hung (5) report the solubility of propane in water and at two aqueous solution concentrations of tetraethylammonium bromide at four temperatures and the solubility of butane in water and at one concentration of the electrolyte of four temperatures. Morrison and Johnstone (2) report a salt effect parameter for butane based on solubility measurements in water and one molal electrolyte at 298.15 K. Both gases salt-in under all conditions studied.

The authors' smoothed salt effect parameter values for 0.1 m solution and values calculated from data in their paper are given below. The Morrison and Johnstone value is in brackets, [ ].

$(C_2H_3)_4NBr$	k_{smm}/kg mol^{-1}			
m_2/mol kg^{-1}	278.15 K	288.15 K	298.15 K	308.15 K
Propane				
0.10 (authors)	-0.096	-0.125	-0.158	-0.207
0.154-0.171[a]	-0.111	-0.130	-0.115	-0.203
0.425	-0.098	-0.128	-0.132	-0.179
Butane				
0.10 (authors)	-0.149	-0.152	-0.168	-0.226
0.405	-0.142	-0.145	-0.159	-0.210
1.0			[-0.122][b]	

[a] The exact concentration at each temperature is given on the data sheet.

[b] Morrison and Johnstone (2), all other values from Wen and Hung (5).

The salt effect parameter values for butane + tetraethylammonium bromide + water from the two papers agree poorly. Both values are classed as tentative with a preference for the Wen and Hung value because their work represents a more extensive study.

23(5)   Propane + Tetrapropylammonium bromide [1941-30-6] + Water

Butane + Tetrapropylammonium bromide [1941-30-6] + Water

Wen and Hung (5) report the solubility of propane in water and in up to eight concentrations of aqueous tetrapropylammonium bromide solution at four temperatures. They report the solubility of butane at only one electrolyte concentration at the four temperatures. The authors smoothed values of the salt effect parameter and the values calculated by the evaluator from the solubility data in the paper are given in the following table.

$(C_3H_8)_4NBr$	k_{smm}/mol kg^{-1}			
m_2/mol kg^{-1}	278.15 K	288.15 K	298.15 K	308.15 K
Propane				
0.10 (authors)	-0.080	-0.130	-0.187	-0.273
0.102-0.110[a]	-0.085	-0.126	-0.188	-0.279
0.210	-0.092	-0.124	-	-
0.267-0.271[a]	-0.085	-0.129	-0.160	-0.237
0.410-0.420[a]	-0.071	-0.125	-0.151	-
0.436	-0.070	-	-	-
0.457-0.465[a]	-	-0.116	-	-0.237
0.492	-0.053	-	-	-
0.609-0.784[a]	-0.033	-0.094	-0.152	-0.208
0.963	-0.023			
1.050-1.070[a]	-	-0.073	-0.126	-
Butane				
0.10 (authors)	-0.120	-0.165	-0.227	-0.307
0.405	-0.116	-0.157	-0.212	-0.281

[a] The exact concentration at each temperature is given on the data sheet.

Wen and Hung state that the salt effect parameters decrease in magnitude as the electrolyte concentration increases. This is most clearly seen in the data of the propane + tetrapropylNbromide + water system. We believe this system was used by them as a model system to extrapolate salt effect parameters to obtain the 0.10 molal values they give in the paper. The exact nature of their smoothing procedure is not given in the paper.

23(6)   Propane + Tetrabutylammonium bromide [1643-19-2] + Water

Butane + Tetrabutylammonium bromide [1643-19-2] + Water

Wen and Hung (5) report the solubility of propane in water and in aqueous solutions at two concentrations of tetrabutylammonium bromide at four temperatures. They report the solubility of butane in water and at only one electrolyte solution. The salt effect parameters given by them for 0.10 m solution and those calculated by the compiler from solubility data in the paper are given below. All systems salt-in under the conditions studied. All values are classed as tentative.

COMPONENTS:	EVALUATOR:
(1) Propane; C_3H_8; [74-98-6] Butane; C_4H_{10}; [106-97-8] 2-Methylpropane; C_4H_{10}; [75-28-5] (2) Electrolyte (3) Water; H_2O; [7732-18-5]	H. Lawrence Clever Chemistry Department Emory University Atlanta, GA 30322 USA 1984, January

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$(C_4H_9)_4NBr$	k_{smm}/mol kg^{-1}			
m_2/mol kg^{-1}	278.15 K	288.15 K	298.15 K	308.15 K
Propane				
0.10 (authors)	-0.066	-0.146	-0.248	-0.386
0.165-0.193[a]	-0.082	-0.150	-	-0.360
0.300-0.310[a]	-0.064	-0.139	-0.203	-0.336
0.624	-	-	-0.203	-
Butane				
0.10 (authors)	-0.104	-0.180	-0.286	-0.435
0.310	-0.101	-0.173	-0.269	-0.395

[a] The exact concentration at each temperature is given on the data sheet.

     25(7) Propane + Tetraethanol amine bromide [4328-04-5] + Water

     Wen and Hung (5) report the solubility of propane in water and in
aqueous solutions of tetraethanolammonium bromide at one or two concentra-
tions at four temperatures.

     The salt effect parameters for the system are given below. The
authors smoothed values for use with 0.10 m solutions are included. The
gas is slightly salted-in. The values are classed as tentative.

$(C_2H_4OH)_4NBr$	k_{smm}/mol kg^{-1}			
m_2/mol kg^{-1}	278.15 K	288.15 K	298.15 K	308.15 K
0.10 (authors)	0.0	-0.025	-0.061	-0.113
0.153-0.160[a]	-0.014	-0.023	-0.028	-0.101
0.508	-	-	-0.042	-

[a] The exact concentration at each temperature is given on the data sheet.

     76 Butane + Lanthanam chloride [10099-58-8] + Water

     Morrison and Billett (1) report the solubility of butane in water and
a salt effect parameter value based on an unreported solubility measurement
in a one equivalent per kg electrolyte solution. Lanthanum chloride salts
out. The salt effect parameters on a molal basis are given below. They
are classed as tentative.

T/K	$k_{smm}/\text{kg mol}^{-1\,a}$	$k_{smx}/\text{kg mol}^{-1}$
285.75	0.546	0.576
303.15	0.462	0.492
322.55	0.462	0.492
344.85	0.420	0.450

[a] These are the values from the paper multiplied by 3 to convert from kg eq^{-1} to kg mol^{-1}.

96 Butane + Barium chloride [10361-37-2] + Water

Morrison and Billett (1) report the solubility of butane in water and a salt effect parameter value based on an unreported solubility measurement in a one equivalent per kg electrolyte solution. Barium chloride salts out. The salt effect parameter on a molal basis at four temperatures is given below. The values are classed as tentative.

T/K	$k_{smm}/\text{kg mol}^{-1\,a}$	$k_{smx}/\text{kg mol}^{-1}$
285.75	0.500	0.523
303.15	0.420	0.443
322.55	0.360	0.383
344.85	0.330	0.353

[a] These are values from the paper multiplied by 2 to convert from kg eq^{-1} to kg mol^{-1}.

98 Propane + Lithium chloride [7447-41-8] + Water

Butane + Lithium chloride [7447-41-8] + Water

Morrison and Billett (1) report the solubility of the gases in water and a salt effect parameter based on an unreported solubility measurement in the one molal electrolyte solution. The gases are salted out. The salt effect parameters at four temperatures are given below. The values a are classed as tentative.

T/K	Propane		Butane	
	$k_{smm}/\text{mol kg}^{-1}$	$k_{smx}/\text{mol kg}^{-1}$	$k_{smm}/\text{mol kg}^{-1}$	$k_{smx}/\text{mol kg}^{-1}$
285.75	0.175	0.190	0.198	0.213
303.15	0.152	0.167	0.171	0.186
322.55	0.138	0.153	0.155	0.170
344.85	0.138	0.153	0.150	0.165

99(1) Propane + Sodium chloride [7647-14-5] + Water

Butane + Sodium chloride [7647-14-5] + Water

The solubility of propane in aqueous sodium chloride solutions was measured by Morrison and Billett (1), Umano and Nakano (3), and Yano, Suetaka, Umehara and Horiuchi (8). The Morrison and Billett measurements were made in water and one molal solution at four temperatures between 285.75 and 344.85 K. The measurements of Umano and Nakano were made as a

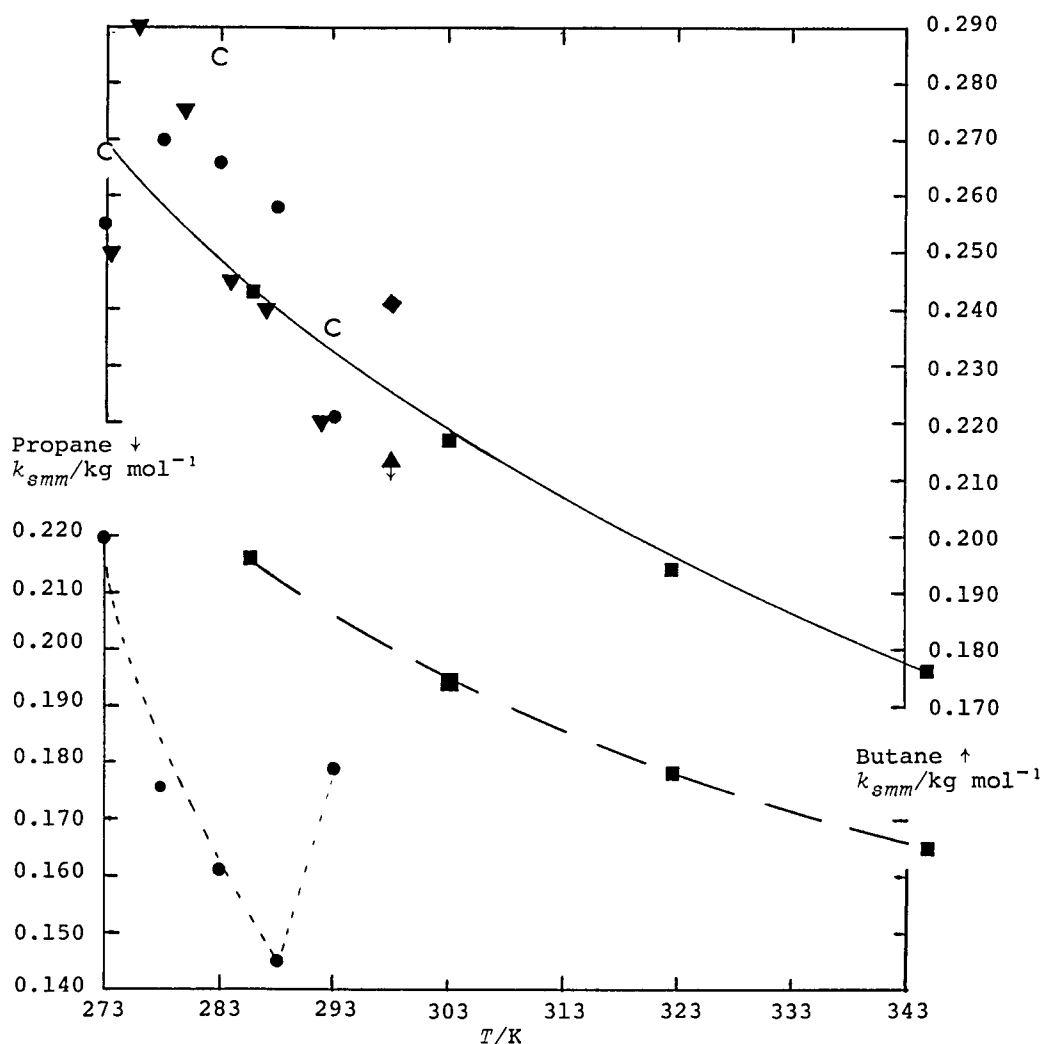| COMPONENTS:	EVALUATOR:

(1) Propane; C_3H_8; [74-98-6]
    Butane; C_4H_{10}; [106-97-8]
    2-Methylpropane; C_4H_{10}; [75-28-5]
 	
(2) Electrolyte
 	
(3) Water; H_2O; [7732-18-5]
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Fig 1. Salt effect parameter in one molal aqueous sodium chloride.

●   Umano; Nakano (3)

■   Morrison; Billett (1)

▲   Yano; Suetaka; Umehara; Horiuchi (8)

▼   Rice; Gale; Barduhn (9)

◆   Denton; Smith; Klaschka; Forgan (7)

C   From solubility values calculated from
    equation of Rice *et al.* (9)

T/K	Sodium Chloride		Propane		Butane		Ref
	$m_2/$ mol kg^{-1}	$c_2/$ mol dm^{-3}	$k_{smm}/$ kg mol^{-1}	$k_{scc}/$ dm^3 mol^{-1}	$k_{smm}/$ kg mol^{-1}	$k_{scc}/$ dm^3 mol^{-1}	
273.2	0.522		0.233		–		3
	0.861		–		0.272		
	1.048		0.220		–		
	1.903		–		0.238		
	2.213		0.192		–		
	3.347		0.199		–		
	3.371		–		0.224		
	4.224		–		0.201		
	5.315		0.186		–		
273.45	1.288		–		0.23		9
273.65	0.621		–		0.27		9
276.15	0.621		–		0.31		9
	1.288		–		0.25		
278.2	0.522		0.176		–		3
	0.861		–		0.293		
	1.048		0.176		–		
	1.903		–		0.246		
	2.213		0.174		–		
	3.347		0.190		–		
	3.371		–		0.217		
	4.224		–		0.201		
	5.315		0.192		–		
280.15	0.621		–		0.30		9
	1.288		–		0.25		
283.2	0.522		0.121		–		3
	0.861		–		0.289		
	1.048		0.161		–		
	1.903		–		0.242		
	2.213		0.162		–		
	3.347		0.171		–		
	3.371		–		0.201		
	4.224		–		0.193		
	5.315		0.182		–		
284.15	0.621		–		0.24		9
	1.288		–		0.25		
285.75	1.00		0.216		0.243		1
287.15	1.288		–		0.24		9
288.15	0.621		–		0.22		9
288.2	0.522		0.110		–		3
	0.861		–		0.272		
	1.048		0.145		–		
	1.903		–		0.243		
	2.213		0.168		–		
	3.347		0.166		–		
	3.371		–		0.203		
	4.224		–		0.192		
	5.315		0.175		–		
292.15	0.621		–		0.23		9
	1.288		–		0.21		
293.2	0.522		0.184		–		3
	0.861		–		0.242		
	1.048		0.179		–		
	1.903		–		0.200		
	2.213		0.143		–		
	3.347		0.161		–		
	3.371		–		0.191		
	4.224		–		0.175		
	5.315		0.171		–		
298.15		0.250	0.116	0.125	–		8
		0.60	–	–	0.187	0.197	7
		0.750	0.234	0.246	–	–	8
		1.00	0.233	0.248	–	–	
		1.20	–	–	0.284	0.299	7
		1.50	0.229	0.244	–	–	8
		1.88	–	–	0.249	0.267	7
303.15	1.00		0.194		0.217		1
322.55	1.00		0.178		0.194		1
344.85	1.00		0.165		0.176		1

COMPONENTS:
(1) Propane; C_3H_8; [74-98-6]
       Butane; C_4H_{10}; [106-97-8]
       2-Methylpropane; C_4H_{10}; [75-28-5]
 	
(2) Electrolyte
 	
(3) Water; H_2O; [7732-18-5]
	EVALUATOR:
	H. Lawrence Clever
	Chemistry Department
	Emory University
	Atlanta, GA 30322 USA
	
	1984, January

CRITICAL EVALUATION:

function of propane partial pressure up to near 101 kPa (1 atm) at five
sodium chloride concentrations between 0.522 and 5.315 molal at five
degree intervals from 268.2 to 298.2 K. The evaluator has calculated salt
effect parameter values from the 101 kPa propane partial pressure data only
at temperatures of 273.2 to 293.2 K. There was no water solubility value
at 268.2 and 298.2 K. Yano *et al.* measured the solubility of propane at
four sodium chloride concentrations between 0.250 and 1.500 molar at
298.2 K.

The salt effect parameters as k_{smm}/kg mol^{-1} from these references are
given in the preceeding table. The agreement in the salt effect parameters
from the three laboratories is poor (see Fig. 1). Although all of the data
are classed as tentative, we have a preference for the data of Morrison and
Billett partly because they are a self-consistent set of values over a
60 degree temperature interval.

The solubility of butane in aqueous sodium chloride solutions was
measured by Morrison and Billett (1), Umano and Nakano (3), Denton, Smith,
Klaschka and Forgan (7), and Rice, Gale and Barduhn (9). The Morrison and
Billett measurements were made in water and one molal solution at four
temperatures between 285.75 and 344.85 K. The measurements of Umano and
Nakano were made as a function of sodium chloride concentration and
temperature. Denton *et al.* measured the butane solubility in water and
three sodium chloride solutions ranging from 0.50 to 1.88 molar at 298.15 K.
Rice *et al.* measured the butane solubility in water and 0.621 and 1.288
molal sodium chloride at eight temperatures between 273.45 and 292.15 K.

The salt effect parameters are given in the table and in Fig. 1.
The agreement of values from the four references is only fair at best.
The figure shows values estimated for 1 *m* sodium chloride solutions. The
values from Umano and Nakano are the average of values for 0.861 and 1.903
molal solutions. The values from Rice *et al.* are the average of values at
0.621 and 1.288 molal solutions and the value from Denton *et al.* is the
average of the three values. All of the values are classed as tentative,
however, as with the propane + aqueous sodium chloride, we suggest use of
the values from the work of Morrison and Billett for a self-consistent set
of data over a 60 degree temperature interval.

Rice, Gale and Barduhn (9) give an equation for Henry's constant
(parts per million by weight butane/butane partial pressure, atm) as a
function of weight percent NaCl and temperature over the 273 to 293 K
interval which correlates their data and the data of Umano and Nakano (3).
Salt effect parameters calculated from the results of their equation are
shown on Fig. 1 at 273, 283 and 293 K. They show a maximum in k_{smm} as
does the salt effect parameters calculated from the data in the two papers.
This behavior seems unlikely to the evaluator. It is suspected there may
be errors in the solubility data near 273.2 because the temperature is so
near to the normal boiling point of butane of 272.7 K, which could make
control of the butane partial pressure difficult.

99(2) Propane + Sodium bromide [7647-15-6] + Water

Yano, Suetaka, Umehara and Horiuchi (8) measured the solubility of
propane in water and in 0.50 and 1.00 molar sodium bromide solutions at
298.2 K. Both solutions give a salt effect parameter k_{scc}/dm^3 mol^{-1}=0.218.
In comparison with salt effect parameters of propane with other 1-1
electrolytes the value appears to be larger than expected. It is classed
as tentative but the value should be used with caution.

99(3)   Propane + Sodium carbonate [497-19-8] + Water

Yano, Suetaka, Umehara and Horiuchi (8) measured the solubility of
propane in water and in 0.50 and 1.00 molar sodium carbonate solutions at
298.2 K. The salt effect parameters (k_{scc}/dm^3 mol^{-1}) calculated from the
data are 0.721 and 0.680 for the 0.5 and 1.0 mol dm^{-3} solutions,
respectively. The values are classed as tentative.

99(4)   Butane + Sodium oleate [143-19-1] + Water

Zimmels and Metzer (10) measured the solubility of butane in aqueous
sodium oleate solutions of 5 x 10^{-5} to 80 x 10^{-5} mol dm^{-3} at 299.2 K at
several butane partial pressures up to 98 kPa (733 mmHg). They do not
report a solubility of butane in water. A salting-out effect is indicated
by the data. The data are classed as tentative. No salt effect para-
meters were calculated. The solubility of propane and butane at 319.2 K
as a function of sodium oleate concentration from 10^{-6} to 10^{-3} M is
shown on a small graph. The solubility shows maximums and minimums as
the sodium oleate concentration increases with a particularly pronounced
minimum at 5 x 10^{-5} M sodium oleate. Lin and Metzer (6) observed a
similar minimum in the propane + 1-dodecanamine + water system discussed
earlier in the evaluation. Studies to confirm these effects would be
desirable.

100(1)   Propane + Potassium chloride [7447-40-7] + Water

Butane + Potassium chloride [7447-40-7] + Water

Yano, Suetaka, Umehara and Horiuchi (8) measured the solubility of
propane in water and in four concentrations of aqueous potassium chloride
up to 1.50 molar at 298.2 K. Morrison and Billett (1) measured the
solubility of butane in water and 1.0 molal potassium chloride solution at
four temperatures between 285.75 and 344.85 K. The salt effect parameters
are given in the following table. They are classed as tentative except
the value in 0.250 M KCl which is doubtful.

T/K	Potassium Chloride		Propane		Butane
	m_2/mol kg^{-1}	c_2/mol dm^{-3}	k_{scc}/dm^3 mol^{-1}	k_{smm}/kg mol^{-3}	k_{smm}/kg mol^{-1}
285.75	1.0				0.200
298.2		0.250	0.112	0.099	
		0.500	0.203	0.187	
		1.000	0.207	0.187	
		1.500	0.222	0.199	
303.15	1.0				0.182
322.55	1.0				0.164
344.85	1.0				0.144

Values of k_{smx}/kg mol^{-1} can be obtained by adding 0.015 to the k_{smm} values.

100(2)   Propane + Potassium bromide [7758-02-3] + Water

Butane + Potassium bromide [7758-02-3] + Water

Yano, Suetaka, Umehara and Horiuchi (8) measured the solubility of
propane in water and in 0.500 molar potassium bromide solution at 298.2 K.
Morrison and Johnstone (2) measured the solubility of butane in water and
1.0 molal potassium bromide solution. The salt effect parameters from
both sets of data are classed as tentative, however, it should be noted
that the salt effect parameter is usually larger for butane than for
propane for a given electrolyte. That is not true here, thus the data
should be used with caution.

COMPONENTS:	EVALUATOR:

(1) Propane; C_3H_8; [74-98-6]
    Butane; C_4H_{10}; [106-97-8]
    2-Methylpropane; C_4H_{10}; [75-28-5]
 	
(2) Electrolyte
 	
(3) Water; H_2O; [7732-18-5]
	H. Lawrence Clever
	Chemistry Department
	Emory University
	Atlanta, GA 30322 USA
	
	1984, January

CRITICAL EVALUATION:

T/K	Potassium Bromide				Propane	Butane
	m_2/mol kg^{-1}	c_2/mol dm^{-3}	k_{scc}/dm^3 mol^{-1}		k_{smm}/kg mol^{-1}	k_{smm}/kg mol^{-1}
298.2		0.500	0.226		0.205	
	1.0					0.174

   100(3)   Propane + Potassium iodide [7681-11-0] + Water

        Butane + Potassium iodide [7681-11-0] + Water

Morrison and Billett (1) measured the solubility of both gases in water and in 1.0 molal potassium iodide solutions at four temperatures between 285.75 and 344.85 K. The salt effect parameters are in the following table. They are classed as tentative. Again, note that the propane salt effect parameters are larger than those for butane.

T/K	Potassium Iodide	k_{smm}/mol kg^{-1}	
	m_2/mol kg^{-1}	Propane	Butane
285.75	1.0	0.121	0.109
303.15	1.0	0.103	0.098
322.55	1.0	0.085	0.080
344.85	1.0	0.067	0.059

The k_{smx}/kg mol^{-1} value may be obtained by adding 0.015 to the k_{smm}/kg mol^{-1} values.

   Butane + sea salt (synthetic) + Water

Rice, Gale and Barduhn (9) measured the solubility of butane in water and in a synthetic sea salt containing 24,067 ppm NaCl, 5,107 ppm $MgCl_2$, 4.016 ppm Na_2SO_4, 1,130 ppm $CaCl_2$, and 680 ppm KCl (ppm = parts per million by weight). Salt effect parameters were not calculated. The results differ negligibly from results in 3.5 weight percent sodium chloride solution according to the authors. The data are classed as tentative.

   Propane + Urea [57-13-6] + Water

   Butane + Urea [57-13-6] + Water

   2-Methylpropane + Urea [57-13-6] + Water

Urea is not an electrolyte, but the Sechenov equation is often used with nonelectrolyte solutions as well as electrolyte solution so it seems appropriate to include the gas aqueous urea systems here.

Wetlaufer, Malik, Stoller, and Coffin (4) measured the solubility of all three gases in water and in 6.96 molar aqueous urea solutions at temperatures of 278.2, 293.2, and 318.2 K. Wen and Hung (5) measured the solubility of propane in water and in 0.495 molal aqueous urea solution at 10 degree intervals between 278.15 and 308.15 K.

The propane Sechenov parameters are compared below. Included are the values Wen and Hung recommended for 0.1 molal solutions and the values calculated by the evaluator from the solubility data in their paper. Both the results of Wen and Hung and of Wetlaufer *et al.* show salting out at 278 K and salting in at the higher temperatures. Wen and Hung worked with molal concentrations and Wetlaufer *et al.*

T/K	Urea		Propane	
	m_2/mol kg^{-1}	c_2/mol dm^{-3}	k_{smm}/kg mol^{-1}	k_{scc}/dm^3 mol^{-1}
278.15	0.10 (authors)		0.005	
	0.495		0.006	
278.2		6.96	(-0.006)	0.014
288.15	0.10 (authors)		-0.009	
	0.495		-0.002	
293.2		6.96	(-0.017)	-0.001
298.15	0.10 (authors)		-0.020	
	0.495		-0.009	
308.15	0.10 (authors)		-0.030	
	0.495		-0.029	
318.2	(10.1)	6.96	(-0.023)	-0.010

worked with molar concentrations of urea. At 0.495 m (0.482 M) k_{scc} = 1.03 k_{smm} + 0.019 and at 6.96 M (10.10 m) k_{scc} = 1.45 k_{smm} + 0.023.

The salt effect parameters values of Wetlaufer, Malik, Stoller and Coffin (4) for butane and 2-methylpropane in aqueous 6.96 molar urea are given below. The propane values are repeated for comparison.

T/K	Urea	k_{scc}/dm^3 mol^{-1}		
	c_2/mol dm^{-3}	Propane	Butane	2-Methylpropane
278.2	6.96	+0.014	+0.005	+0.002
293.2	6.96	-0.001	-0.013	-0.011
318.2	6.96	-0.010	-0.022	-0.020

REFERENCES

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

2. Morrison, T. J.; Johnstone, N. B. B. *J. Chem. Soc.* 1955, 3655.

3. Umano, S.; Nakano, Y. *Kogyo Kagaku Zasshi* 1958, *61*, 536.

4. Wetlaufer, D. B.; Malik, S. K.; Stoller, L.; Coffin, R. L. *J. Am. Chem. Soc.* 1964, *86*, 508.

5. Wen, W.-Y.; Hung, J. H. *J. Phys. Chem.* 1970, *74*, 170.

6. Lin, I. J.; Metzer, A. *J. Phys. Chem.* 1971, *75*, 3000.

7. Denton, W. H.; Smith, M. J. S.; Klaschka, J. T.; Forgan, R. *et al.* *Fourth Int. Symp. Fresh Water Sea* 1973, *3*, 291.

8. Yano, T.; Suetaka, T.; Umehara, T.; Horiuchi, A. *Kagaku Kogaku* 1974, *38*, 320.

COMPONENTS:	EVALUATOR:
(1) Propane; C_3H_8; [74-98-6] Butane; C_4H_{10}; [106-97-8] 2-Methylpropane; C_4H_{10}; [75-28-5] (2) Electrolyte (3) Water; H_2O; [7732-18-5]	H. Lawrence Clever Chemistry Department Emory University Atlanta, GA 30322 USA 1984, January

CRITICAL EVALUATION:

 9. Rice, P. A.; Gale, R. P.; Barduhn, A. J. *J. Chem. Eng. Data*
     1976, *21*, 204.

10. Zimmels, Y.; Metzer, A. *J. Coll. Interface Sci.* 1976, *57*, 75.

11. Rudakov, E. S.; Lutsyk, A. I. *Zh. Fiz, Khim.*, 1979, *53*, 1298;
     Russ. J. Phys. Chem., 1979, *53*, 731.   ·

12. Clever, H. L. (a) *Nitrogen and Air,* Solubility Series, Volume 10,
     R. Battino, Editor, Pergamon Press Ltd., Oxford and New York, 1982,
     pp xxix-xliii and 45-56; (b) *J. Chem. Eng. Data* 1983, *28*, 340.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) Hydrochloric acid; HCl; [7647-01-0] (3) Water; H_2O; [7732-18-5]	Yano, T.; Suetaka, T.; Umehara, T.; Horiuchi, A. *Kagaku Kogaku* <u>1974</u>, *38*, 320-323.

VARIABLES: T/K: 298.2 c_2/mol L^{-1}: 0-1.0 P/kPa: 101.325	PREPARED BY: C. L. Young

EXPERIMENTAL VALUES: T/K = 298.2

Concentration of electrolyte c_2/mol L^{-1}	Solubility[a] of propane /mmol L^{-1}
0.000 0.250 0.500 1.000	1.44 1.31 1.25 1.08

[a] At 1 atmosphere pressure.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Volumetric apparatus. Salt solution allowed to enter stirred absorption chamber. Pressure within absorption chamber adjusted to be as near atmospheric pressure as possible. Details in source and ref. 1.	1. High purity sample, purity better than 99.5 mole per cent. 2. Special grade. 3. Distilled.
	ESTIMATED ERROR: $\delta s/s$= 0.01 (compiler)
	REFERENCES: 1. Yano, T.; Suetaka, T.; Umehara, T. *Nippon Kagaku Kaishi* <u>1972</u>, *11*, 2194.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Butane; C_4H_{10}; [106-97-8] (2) Hydrochloric Acid; HCl; [7647-01-0] (3) Water; H_2O; [7732-18-5]	Morrison, T. J.; Billett, F. J. Chem. Soc. 1952, 3819 - 3822.

VARIABLES:
    T/K: 285.75 - 344.85
    p/kPa: 101.325 (1 atm)
	PREPARED BY:
	
	        H. L. Clever

EXPERIMENTAL VALUES:

	Temperature			Salt Effect Parameters	
t/°C	T/K	$1/(T$/K)	$(1/m_2)\log(S°/S)$[1]	$(1/m_2)\log(x°/x)$
12.6	285.75	0.0035	0.080	0.095
30.0	303.15	0.0033	0.049	0.064
49.4	322.55	0.0031	0.031	0.046
71.7	344.85	0.0029	0.028	0.043

[1] The authors used $(1/c)\log(S°/S)$ with c defined as g eq. salt per kg of
    water. For the 1-1 electrolyte the compiler changed the c to an m for
    m_2/mol kg^{-1}. The butane solubility S is cm^3(STP) kg^{-1}.

The salt effect parameters were calculated from two measurements , the
solubility of butane in water, S°, and in the one molal salt solution, S.
Only the solubility of the butane in water, and the value of the salt
effect parameter are given in the paper. The solubility values in the
salt solution are not given.

The compiler calculated the values of the salt effect parameter using the
mole fraction gas solubility ratio.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The degassed solvent flows in a thin film down an absorption helix containing the butane gas plus solvent vapor at a total pressure of one atmosphere. The volume of gas absorbed is measured in an attached buret system (1).	(1) Butane. Prepared from Grignard reagent. A second sample, Anglo-Iranian Oil Co. stated to be 99 per cent pure, gave the same result. (2) Hydrochloric Acid. "AnalaR" material. (3) Water. No information given.
	ESTIMATED ERROR: $\delta k/kg^{-1}$ mol = 0.010
	REFERENCES: 1. Morrison, T. J.; Billett, F. J. Chem. Soc. 1948, 2033.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) Sulfuric acid; H_2SO_4; [7664-93-9] (3) Water; H_2O; [7732-18-5]	Rudakov, E.S.; Lutsyk, A.I. *Zh. Fiz. Khim.*, <u>1979</u>, *53*, 1298-1300. *Russ. J. Phys. Chem.*, <u>1979</u>, *53*, 731-733.

VARIABLES:	PREPARED BY:
T/K: 298.15, 363.15 H_2SO_4/wt.%: 0 - 97.7	E.S. Rudakov, W. Hayduk

EXPERIMENTAL VALUES:

T/K	Solvent wt. % H_2SO_4[1]	Partition Coefficient[1] k/cm^{3}cm^{-3}[1]	Ostwald Coefficient[2] L/cm^{3}cm^{-3}	Bunsen Coefficient[2] α/cm^3(STP)cm^{-3}atm^{-1}	Mole Fraction[2] $10^5 x_1$
298.15	0	29	0.0345	0.0314	2.58
	(60.3)[3]	(60)	(0.0167)	(0.0152)	(1.64)
	80.0	80	0.0125	0.0114	1.57
	(80.0)	(82)	(0.0122)	(0.0111)	(1.52)
	93.0	14.3	0.0699	0.0637	11.9
	(93.0)	(20)	(0.0500)	(0.0456)	(8.52)
363.15	(90.0)	(45)	(0.0222)	(0.0165)	(2.92)
	93.0	28	0.0357	0.0265	5.16
	(93.0)	(27)	(0.0370)	(0.0275)	(5.34)
	94.9	22	0.0455	0.0338	6.96
	(94.9)	(30)	(0.0333)	(0.0247)	(5.10)
	97.7	13	0.0769	0.0571	13.1

[1]Original data.

[2]Ostwald and Bunsen coefficients and mole fraction calculated by compilers on basis that partition coefficient is equivalent to the inverse of the Ostwald coefficient and assuming that Henry's law applies.

[3]Revised data shown in brackets supplied by authors, May, 1983.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Gas chromatographic method used to evaluate partition coefficients. Reactor containing gas and acid solution mechanically shaken. After phase separation a measured volume of gas introduced into carrier gas for analysis. An equal volume of solution placed into a gas stripping cell for complete stripping of the propane by the carrier gas. The ratio of areas under the propane peaks used to determine the solubility. Actual equilibrium pressure not specified.	Sources and purities not specified.
	ESTIMATED ERROR: $\delta k/k = 0.10$ (authors)
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Butane; C_4H_{10}; [106-97-8]	Rudakov, E.S.; Lutsyk, A.I.
(2) Sulfuric acid; H_2SO_4; [7664-93-9]	*Zh. Fiz. Khim.*, <u>1979</u>, *53*, 1298-1300.
(3) Water; H_2O; [7732-18-5]	*Russ. J. Phys. Chem.* <u>1979</u>, *53*, 731-733.

VARIABLES: T/K: 298.15, 363.15 H_2SO_4/wt.%: 0 - 93.0	PREPARED BY: E.S. Rudakov; W. Hayduk

EXPERIMENTAL VALUES:

T/K	Solvent wt.% H_2SO_4[1]	Partition coefficient[1] k/cm^{3}cm^{-3}	Ostwald coefficient[2] L/cm^{3}cm^{-3}	Bunsen coefficient[2] α/cm^3(STP)cm^{-3}atm^{-1}	Mole fraction[2] $10^5 x_1$
298.15	0	37	0.0270	0.0244	2.05
	(60.3)[3]	(76)	(0.0132)	(0.0119)	(1.31)
	(80.0)	(77)	(0.0130)	(0.0118)	(1.65)
	(93.0)	(15)	(0.0667)	(0.0604)	(11.5)
363.15	0	223	0.00448	0.00328	0.29
	(90.0)	(45)	(0.0222)	(0.0163)	(2.95)
	(93.0)	(27)	(0.0385)	(0.0282)	(5.60)

[1]From original data.

[2]Ostwald coefficient, Bunsen coefficient and mole fraction calculated by compilers on basis that partition coefficient is equivalent to the inverse of the Ostwald coefficient and assuming that Henry's law applies.

[3]Revised data shown in brackets supplied by authors, May, 1983.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Gas chromatographic method used to evaluate partition coefficients. Reactor containing gas and acid solution mechanically shaken. After phase separation a measured volume of gas introduced into carrier gas for analysis. An equal volume of solution placed into a gas stripping cell for complete stripping of the butane by the carrier gas. The ratio of areas under the butane peaks used to determine the solubility. Actual equilibrium pressure not specified.	Sources and purities not specified.
	ESTIMATED ERROR: $\delta k/k$ = 0.10 (authors)
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) 2-Methyl propane (isobutane); C_4H_{10}; [75-28-5] (2) Sulfuric acid; H_2SO_4; [7664-93-9] (3) Water; H_2O; [7732-18-5]	Rudakov, E.S.; Lutsyk, A.I. *Zh. Fiz. Khim.*, 1979, *53*, 1298-1300. *Russ. J. Phys. Chem.*, 1979, *53*, 731-733.

VARIABLES:	PREPARED BY:
T/K: 298.15 H_2SO_4/wt.%: 0 - 98.3	E.S. Rudakov, W. Hayduk

EXPERIMENTAL VALUES:

T/K	Solvent wt.% $H_2SO_4^1$	Partition coefficient[1] k/cm^3 cm_1^{-3}	Ostwald coefficient[2] L/cm^3 cm^{-3}	Bunsen coefficient[2] α/cm^3(STP)$cm^{-3}atm^{-1}$	Mole fraction[2] $10^5 x_1$
298.15	0	47	0.0213	0.0193	1.62
	(60.3)[3]	(82)	(0.0122)	(0.0110)	(1.21)
	(80.0)	(95)	(0.0105)	(0.0105)	(1.33)
	86.4	50	0.0200	0.0181	2.89
	93.0	14	0.0714	0.0647	12.3
	(94.7)	(9.6)	(0.104)	(0.0944)	(19.1)
	95.4	9.1	0.110	0.0997	20.6
	98.3	3.9	0.256	0.232	53.7

[1] From original data

[2] Ostwald coefficient, Bunsen coefficient and mole fraction calculated by compilers on basis that partition coefficient is equivalent to the inverse of the Ostwald coefficient and assuming that Henry's law applies.

[3] Revised data shown in brackets supplied by authors, May, 1983.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Gas chromatographic method used to evaluate partition coefficients. Reactor containing gas and acid solution mechanically shaken. After phase separation a measured volume of gas introduced into carrier gas for analysis. An equal volume of solution placed into a gas stripping cell for complete stripping of the isobutane by the carrier gas. The ratio of areas under the isobutane peaks used to determine the solubility. Actual equilibrium pressure not specified.	Sources and purities not specified.
	ESTIMATED ERROR: $\delta k/k$ = 0.10 (authors)
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) Ammonium bromide; NH_4Br; [12124-97-9] (3) Water; H_2O; [7732-18-5]	Wen, W.-Y.; Hung, J.H. *J. Phys. Chem.* 1970, *74*, 170-180.

| VARIABLES: T/K: 278.15-308.15
P/kPa: 101.325 (1 atm)
$m_3/mol\ kg^{-1}$: 0-0.942 | PREPARED BY:

H.L. Clever |

EXPERIMENTAL VALUES:

T/K	Salt Molality $m_3/mol\ kg^{-1}$	Propane Solubility S_1/cm^3 (STP) kg^{-1}	Setchenow Constant[1] $k/kg\ mol^{-1}$
278.15	0	69.57 ± 0.11	0.095
	0.107	68.06	
	0.224	67.08	
	0.428	63.47	
	0.707	60.23	
	0.942	50.86	
288.15	0	45.75 ± 0.06	0.086
	0.106	44.60	
	0.220	43.78	
	0.418	42.02	
	0.672	39.90	
	0.905	38.47	
298.15	0	32.31 ± 0.08	0.076
	0.107	31.61	
	0.210	31.28	continued...

[1] Setchenow constant, $k/kg\ mol^{-1} = (1/(m_3/mol\ kg^{-1}))\ \log\ (S_1^\circ/S_1)$.

The authors specify the value of the constant for $m_3/mol\ kg^{-1} = 0.1$.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

The apparatus was similar to that described by Ben-Naim and Baer (1). Teflon needle valves were used in place of stopcocks.

The apparatus consists of three main parts, a dissolution cell of 300 to 600 cm^3 capacity, a gas volume measuring column, and a manometer.

The solvent is degassed in the dissolution cell, the gas is introduced and dissolved while the liquid is kept stirred by a magnetic stirrer immersed in the water bath. Dissolution of the gas results in the change in the height of a column of mercury which is measured by a cathetometer.

SOURCE AND PURITY OF MATERIALS:

1. Propane. Matheson Co. Stated to be better than 99.9 per cent pure.

2. Ammonium bromide. Baker Chemical Co. Analyzed reagent grade. Used as received.

3. Water. Distilled from an all Pyrex apparatus. Specific conductivity 1.5 x 10^{-6} (ohm cm)$^{-1}$.

ESTIMATED ERROR:

$\delta T/K = \pm 0.005$

$\delta S_1/S_1 = \pm 0.003$

REFERENCES:

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

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) Ammonium bromide; NH_4Br; [12124-97-9] (3) Water; H_2O; [7732-18-5]	Wen, W.-Y.; Hung, J.H. *J. Phys. Chem.* 1970, *74*, 170-180.

VARIABLES:	PREPARED BY:
T/K: 278.15-308.15 P/kPa: 101.325 (1 atm) $m_3/mol\ kg^{-1}$: 0-0.942	H.L. Clever

EXPERIMENTAL VALUES: concluded

T/K	Salt Molality $m_3/mol\ kg^{-1}$	Propane Solubility $S_1/cm^3(STP)\ kg^{-1}$	Setchenow Constant[1] $k/kg\ mol^{-1}$
298.15	0.407	29.87	
	0.631	28.99	
	0.850	27.76	
308.15	0	23.91 ± 0.07	0.066
	0.105	23.50	
	0.224	23.26	
	0.427	22.88	
	0.667	21.69	
	0.885	21.03	

[1] Setchenow constant, $k/kg\ mol^{-1} = (1/(m_3/mol\ kg^{-1}))\ log\ (S_1^o/S_1)$

The authors specify the value of the constant for $m_3/mol\ kg^{-1} = 0.1$.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

The apparatus was similar to that described by Ben-Naim and Baer (1). Teflon needle valves were used in place of stopcocks.

The apparatus consists of three main parts, a dissolution cell of 300 to 600 cm^3 capacity, a gas volume measuring column, and a manometer.

The solvent is degassed in the dissolution cell, the gas is introduced and dissolved while the liquid is kept stirred by a magnetic stirrer immersed in the water bath. Dissolution of the gas results in the change in the height of a column of mercury which is measured by a cathetometer.

SOURCE AND PURITY OF MATERIALS:

1. Propane. Matheson Co. Stated to be better than 99.9 per cent pure.

2. Ammonium bromide. Baker Chemical Co. Analyzed reagent grade. Used as received.

3. Water. Distilled from an all Pyrex apparatus. Specific conductivity 1.5 x 10^{-6} (ohm cm)$^{-1}$.

ESTIMATED ERROR:

$\delta T/K = \pm 0.005$

$\delta S_1/S_1 = \pm 0.003$

REFERENCES:

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

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) 1-Dodecanamine, hydrochloride or dodecylamine hydrochloride or DACl; $C_{12}H_{27}N \cdot HCl$; [929-73-7] (3) Water; H_2O; [7732-18-5]	Lin, I. J.; Metzer, A. *J. Phys. Chem.* <u>1971</u>, *75*, 3000-4.

VARIABLES:	PREPARED BY:
$T/K = 298.2$ $p_1/kPa = 100.0$ $c_2/mol\ dm^{-3} = 1 \times 10^{-8} - 1 \times 10^{-3}$	H. L. Clever

EXPERIMENTAL VALUES:

Temperature		Dodecylamine Hydrochloride	Solubility/ cm³(25 °C, 750 mmHg)
$t/^0C$	T/K	$c_2/mol\ dm^{-3}$	per dm³ solution.
25.0	298.2	1×10^{-8}	35.40
		1×10^{-6}	31.75
		5×10^{-6}	31.95
		1×10^{-5}	32.20
		5×10^{-5}	33.05
		1×10^{-4}	33.50
		5×10^{-4}	34.65
		1×10^{-3}	35.10

The values of the dodecyamine hydrochloride concentration and the propane solubility were read by the compiler from a large scale graph in the paper.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The solubilities were determined with the apparatus developed by Ben Naim and Baer (1). The solutions of dodecylamine hydrochloride were prepared with twice distilled, deaerated water, and introduced into the apparatus under vacuum.	(1) Propane. No information. (2) Dodecylamine hydrochloride. No information. (3) Water. Double distilled.

ESTIMATED ERROR:
        $\delta T/K = \pm 0.1$

        The method is accurate to 0.2 percent (authors).

REFERENCES:
    1. Ben Naim, A.; Baer, S.
       Trans. Faraday Soc. <u>1963</u>, *59*, 2735.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) Guanidine monohydrochloride; CH_6ClN_3; [50-01-1] (3) Water; H_2O; [7732-18-5]	Wetlaufer, D.B.; Malik, S.K.; Stoller, L.; Coffin, R.L. *J. Am. Chem. Soc.* <u>1964</u>, *86*, 508-514.

VARIABLES:	PREPARED BY:
T/K: 278.15-318.15 $c_2/\text{mol dm}^{-3}$: 4.87 P/kPa: 101.325	W. Hayduk, C.L. Young

EXPERIMENTAL VALUES:

T/K	Salt Conc.[1] $c_2/$ mol dm^{-3}	Solution molar volume[1] /cm^{3}mol^{-1}	Solubility[1] s_1/mmol dm^{-3}	Mole Fraction[2] /$10^5 x_1$	Ostwald Coeff.[2] L/cm^{3}cm^{-3}	Bunsen Coeff.[2] α
278.15	4.87	(41.25)[3]	2.53	6.13	0.0566	0.0555
298.15	4.87	41.04	1.53	3.73	0.0368	0.0336
318.15	4.87	(40.76)	1.10	2.70	0.0283	0.0241

[1]Original data.

[2]Calculated by compilers using real gas molar volumes.

[3]Molar volumes of solvent shown in brackets were estimated.

[4]No correction was made for the amount of gas retained by the solvent during extraction, estimated by the authors to be 1-1.5 per cent; hence the results are expected to be too low by this amount.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
A modified Van Slyke-Neill manometric blood gas apparatus, fitted with a magnetic stirrer was used. The solvent was saturated with gas; then a sample was transferred to the Van Slyke extraction chamber for gas desorption and volume measurement.	1. Matheson Co. Instrument grade; minimum specified purity 99.5 per cent. 2. Reaction of reagent grade hydrochloric acid on recrystallized guanidinium carbonate. 3. Distilled.

ESTIMATED ERROR:

$\delta T/K$ = 0.05

$\delta s_1/s_1$ = 0.02   (authors)[4]

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Butane; C_4H_{10}; [106-97-8] (2) Guanidine monohydrochloride; CH_6ClN_3; [50-01-1] (3) Water; H_2O; [7732-18-5]	Wetlaufer, D.B.; Malik, S.K.; Stoller, L.; Coffin, R.L. *J. Am. Chem. Soc.* <u>1964</u>, *86*, 508-514.

| VARIABLES:
    T/K: 278.15-318.15
c_2/mol dm^{-3}:   4.87
    P/kPa: 101.325 | PREPARED BY:

W. Hayduk, C.L. Young |

EXPERIMENTAL VALUES:

T/K	Salt conc.[1] c_2/mol dm^{-3}	Solution molar volume[1] /cm^{3}mol^{-1}	Solubility[1] s_1/mmol dm^{-3}	Mole Fraction[2] /$10^5 x_1$	Ostwald Coeff.[2] L/cm^{3}cm^{-3}	Bunsen Coeff.[2] α
278.15	4.87	(41.25)[3]	2.89	7.01	0.0633	0.0620
298.15	4.87	41.04	1.54	3.75	0.0365	0.0330
318.15	4.87	(40.76)	1.06	2.60	0.0273	0.0227

[1]Original data.

[2]Calculated by compilers using real gas molar volumes.

[3]Molar volumes of solvent shown in brackets were estimated.

[4]No correction was made for the amount of gas retained by the solvent during extraction, estimated by the authors to be 1-1.5 per cent; hence the results are expected to be too low by this amount.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
A modified Van Slyke-Neill manometric blood gas apparatus, fitted with a magnetic stirrer was used. The solvent was saturated with gas; then a sample was transferred to the Van Slyke extraction chamber for gas desorption and volume measurement.	1. Matheson Co. C.P. grade; minimum specified purity 99.5 per cent. 2. Reaction of reagent grade hydrochloric acid on recrystallized guanidinium carbonate. 3. Distilled.

ESTIMATED ERROR:
$$\delta T/K = 0.05$$
$$\delta s_1/s_1 = 0.02 \quad \text{(authors)}[4]$$

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) 2-Methylpropane; C_4H_{10}; [75-28-5] (2) Guanidine monohydrochloride; CH_6ClN_3; [50-01-1] (3) Water; H_2O; [7732-18-5]	Wetlaufer, D.B.; Malik, S.K.; Stoller, L.; Coffin, R.L. *J. Am. Chem. Soc.* 1964, *86*, 508-514.

VARIABLES:	PREPARED BY:
T/k: 278.15-318.15 $c_2/mol\ dm^{-3}$: 4.87 P/kPa: 101.325	W. Hayduk, C.L. Young

EXPERIMENTAL VALUES:

T/K	Salt conc.[1] $c_2/mol\ dm^{-3}$	Solution molar volume[1] $/cm^3mol^{-1}$	Solubility[1] $s_1/mmol\ dm^{-3}$	Mole Fraction[2] $/10^5x_1$	Ostwald Coeff.[2] L/cm^3cm^{-3}	Bunsen Coeff.[2] α
278.15	4.87	(41.25)[3]	1.99	4.82	0.0436	0.0427
298.15	4.87	41.04	1.20	2.92	0.0285	0.0258
318.15	4.87	(40.76)	0.82	2.01	0.0209	0.0176

[1]Original data.

[2]Calculated by compilers using real gas molar volumes.

[3]Molar volumes of solvent shown in brackets were estimated.

[4]No correction was made for the amount of gas retained by the solvent during extraction, estimated by the authors to be 1-1.5 per cent; hence the results are expected to be too low by this amount.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
A modified Van Slyke-Neill manometric blood gas apparatus, fitted with a magnetic stirrer was used. The solvent was saturated with gas; then a sample was transferred to the Van Slyke extraction chamber for gas desorption and volume measurement.	1. Matheson Co. Instrument grade; minimum specified purity 99.5 per cent. 2. Reaction of reagent grade hydrochloric acid on recrystallized guanidinium carbonate. 3. Distilled.

	ESTIMATED ERROR:
	$\delta T/K = 0.05$ $\delta s_1/s_1 = 0.02$ (authors)[4]

	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) N,N,N-Trimethylmethanaminium bromide or tetramethylammonium bromide; $C_4H_{12}NBr$; [64-20-0] (3) Water; H_2O; [7732-18-5]	Wen, W.-Y.; Hung, J.H. *J. Phys. Chem.* 1970, *74*, 170-180.

VARIABLES:	PREPARED BY:
T/K: 278.15-308.15 P/kPa: 101.325 (1 atm) $m_3/mol\ kg^{-1}$: 0-0.885	H.L. Clever

EXPERIMENTAL VALUES:

T/K	Salt Molality $m_3/mol\ kg^{-1}$	Propane Solubility $S_1/cm^3(STP)\ kg^{-1}$	Setchenow Constant[1] $k/kg\ mol^{-1}$
278.15	0 0.165 0.325	69.57 ± 0.11 70.44 71.52	-0.029
288.15	0 0.165 0.325	45.75 ± 0.06 46.32 47.03	-0.039
298.15	0 0.328 0.885	32.31 ± 0.08 33.59 35.84	-0.059
308.15	0 0.165 0.325	23.91 ± 0.07 24.68 25.46	-0.091

[1] Setchenow constant, $k/kg\ mol^{-1} = (1/(m_3/mol\ kg^{-1}))\ log\ (S_1^o/S_1)$.

The authors specify the value of the constant for $m_3/mol\ kg^{-1} = 0.1$.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus was similar to that described by Ben-Naim and Baer (1). Teflon needle valves were used in place of stopcocks. The apparatus consists of three main parts, a dissolution cell of 300 to 600 cm^3 capacity, a gas volume measuring column, and a manometer. The solvent is degassed in the dissolution cell, the gas is introduced and dissolved while the liquid is kept stirred by a magnetic stirrer immersed in the water bath. Dissolution of the gas results in the change in the height of a column of mercury which is measured by a cathetometer.	1. Propane. Matheson Co. Stated to be better than 99.9 per cent pure. 2. Tetramethylammonium bromide. Eastman Kodak Co. Recrystallized and analyzed. Better than 99.9 per cent pure. 3. Water. Distilled from an all Pyrex apparatus. Specific conductivity 1.5 x 10^{-6} (ohm cm)$^{-1}$.
	ESTIMATED ERROR: $\delta T/K$ = ±0.005 $\delta S_1/S_1$ = ±0.003
	REFERENCES: 1. Ben-Naim, A.; Baer, S. *Trans. Faraday Soc.* <u>1963</u>, *59*, 2735.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Butane; C_4H_{10}; [106-97-8] (2) N,N,N-Trimethylmethanaminium bromide or tetramethylammonium bromide; $C_4H_{12}NBr$; [64-20-0] (3) Water; H_2O; [7732-18-5]	Wen, W.-Y.; Hung, J.H. *J. Phys. Chem.* <u>1970</u>, *74*, 170-180.

VARIABLES:	PREPARED BY:
T/K: 278.15-308.15 P/kPa: 101.325 (1 atm) $m_3/mol\ kg^{-1}$: 0-0.850	H.L. Clever

EXPERIMENTAL VALUES:

T/K	Salt Molality $m_3/mol\ kg^{-1}$	Butane Solubility $S_1/cm^3(STP)\ kg^{-1}$	Setchenow Constant[1] $k/kg\ mol^{-1}$
278.15	0 0.850	62.00 ± 0.10 69.23	-0.049
288.15	0 0.850	39.20 ± 0.05 44.13	-0.064
298.15	0 0.850	26.34 ± 0.06 30.25	-0.074
308.15	0 0.850	19.27 ± 0.06 23.10	-0.100

[1] Setchenow constant, $k/kg\ mol^{-1} = (1/(m_3/mol\ kg^{-1}))\ \log\ (S_1^\circ/S_1)$.

The authors specify the value of the constant for $m_3/mol\ kg^{-1} = 0.1$.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus was similar to that described by Ben-Naim and Baer (1). Teflon needle valves were used in place of stopcocks. The apparatus consists of three main parts, a dissolution cell of 300 to 600 cm^3 capacity, a gas volume measuring column, and a manometer. The solvent is degassed in the dissolution cell, the gas is introduced and dissolved while the liquid is kept stirred by a magnetic stirrer immersed in the water bath. Dissolution of the gas results in the change in the height of a column of mercury which is measured by a cathetometer.	1. Butane. Matheson Co. Stated to be better than 99.9 per cent pure. 2. Tetramethylammonium bromide. Eastman Kodak Co. Recrystallized and analyzed. Better than 99.9 per cent pure. 3. Water. Distilled from an all Pyrex apparatus. Specific conductivity 1.5 x 10^{-6} (ohm cm)$^{-1}$.
	ESTIMATED ERROR: $\delta T/K = \pm 0.005$ $\delta S_1/S_1 = \pm 0.003$
	REFERENCES: 1. Ben-Naim, A.; Baer, S. *Trans. Faraday Soc.* 1963, *59*, 2735.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) N,N,N-Triethylethanaminium bromide or tetraethylammonium bromide; $C_8H_{20}NBr$; [71-91-0] (3) Water; H_2O; [7732-18-5]	Wen, W.-Y.; Hung, J.H. *J. Phys. Chem.* 1970, *74*, 170-180.

VARIABLES:	PREPARED BY:
T/K: 278.15-308.15 P/kPa: 101.325 (1 atm) m_3/mol kg^{-1}: 0-0.425	H.L. Clever

EXPERIMENTAL VALUES:

T/K	Salt Molality m_3/mol kg^{-1}	Propane Solubility S_1/cm^3 (STP) kg^{-1}	Setchenow Constant[1] k/kg mol^{-1}
278.15	0 0.161 0.425	69.57 ± 0.11 72.50 76.60	-0.096
288.15	0 0.158 0.425	45.74 ± 0.06 47.95 51.82	-0.125
298.15	0 0.154 0.425	32.31 ± 0.08 33.65 36.75	-0.158
308.15	0 0.174 0.425	23.91 ± 0.06 25.94 28.50	-0.207

[1] Setchenow constant, k/kg mol^{-1} = $(1/(m_3$/mol kg$^{-1}))$ log (S_1^o/S_1).

The authors specify the value of the constant for m_3/mol kg^{-1} = 0.1.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus was similar to that described by Ben-Naim and Baer (1). Teflon needle valves were used in place of stopcocks. The apparatus consists of three main parts, a dissolution cell of 300 to 600 cm^3 capacity, a gas volume measuring column, and a manometer. The solvent is degassed in the dissolution cell, the gas is introduced and dissolved while the liquid is kept stirred by a magnetic stirrer immersed in the water bath. Dissolution of the gas results in the change in the height of a column of mercury which is measured by a cathetometer.	1. Propane. Matheson Co. Stated to be better than 99.9 per cent pure. 2. Tetraethylammonium bromide. Eastman Kodak Co. Recrystallized and analyzed. Better than 99.9 per cent pure. 3. Water. Distilled from an all Pyrex apparatus. Specific conductivity 1.5 x 10^{-6} (ohm cm)$^{-1}$.
	ESTIMATED ERROR: δT/K = ±0.005 $\delta S_1/S_1$ = ±0.003
	REFERENCES: 1. Ben-Naim, A.; Baer, S. *Trans. Faraday Soc.* 1963, *59*, 2735.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Butane; C_4H_{10}; [106-97-8] (2) N,N,N-Triethylethanaminium bromide or tetraethylammonium bromide; $C_8H_{20}NBr$; [71-91-0] (3) Water; H_2O; [7732-18-5]	Wen, W.-Y.; Hung, J.H. *J. Phys. Chem.* <u>1970</u>, *74*, 170-180.

VARIABLES:	PREPARED BY:
T/K: 278.15-308.15 P/kPa: 101.325 (1 atm) m_3/mol kg^{-1}: 0-0.405	H.L. Clever

EXPERIMENTAL VALUES:

T/K	Salt Molality m_3/mol kg^{-1}	Butane Solubility S_1/cm^3(STP) kg^{-1}	Setchenow Constant[1] k/kg mol^{-1}
278.15	0 0.405	62.00 ± 0.10 70.79	-0.149
288.15	0 0.405	39.20 ± 0.05 44.87	-0.152
298.15	0 0.405	26.34 ± 0.06 30.55	-0.168
308.15	0 0.405	19.27 ± 0.06 23.44	-0.226

[1] Setchenow constant, k/kg mol^{-1} = (1/(m_3/mol kg^{-1})) log (S_1°/S_1)

The authors specify the value of the constant for m_3/mol kg^{-1} = 0.1.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus was similar to that described by Ben-Naim and Baer (1). Teflon needle valves were used in place of stopcocks. The apparatus consists of three main parts, a dissolution cell of 300 to 600 cm^3 capacity, a gas volume measuring column, and a manometer. The solvent is degassed in the dissolution cell, the gas is introduced and dissolved while the liquid is kept stirred by a magnetic stirrer immersed in the water bath. Dissolution of the gas results in the change in the height of a column of mercury which is measured by a cathetometer.	1. Butane. Matheson Co. Stated to be better than 99.9 per cent pure. 2. Tetraethylammonium bormide. Eastman Kodak Co. Recrystallized and analyzed. Better than 99.9 per cent pure. 3. Water. Distilled from an all Pyrex apparatus. Specific conductivity 1.5 x 10^{-6} (ohm cm)$^{-1}$.
	ESTIMATED ERROR: δT/K = ±0.005 $\delta S_1/S_1$ = ±0.003
	REFERENCES: 1. Ben-Naim, A.; Baer, S. *Trans. Faraday Soc.* <u>1963</u>, *59*, 2735.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Butane; C_4H_{10}; [106-97-8]	Morrison, T. J.; Johnstone, N. B. B.
(2) N,N,N-Triethylethanaminium bromide or tetraethyl ammonium bromide; $(C_2H_5)_4NBr$; [71-91-0]	J. Chem. Soc. 1955, 3655-9.
(3) Water; H_2O; [7732-18-5]	

VARIABLES: $T/K = 298.15$ $p/kPa = 101.325$ $m_2/mol\ kg^{-1} = 0, 1.0$	PREPARED BY: H. L. Clever

EXPERIMENTAL VALUES:

Temperature		Tetraethyl ammonium bromide	Salt Effect Parameter	
$t/°C$	T/K	$m_2/mol\ kg^{-1}$	$k_{smm}/kg\ mol^{-1}$	$k_{smx}/kg\ mol^{-1}$
25	298.15	1.0	-0.122	-0.107

The k_{smx} value was calculated by the compiler.

The salt effect parameter is based on two measurements, the solubility of butane in water and in 1.0 molal salt solution. The actual solubilities were not reported in the paper.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The method of Morrison and Billett (1) was used. The previously degassed solvent flows through a glass helix in a thin film through the vapor saturated gas at a total pressure of one atmosphere. Volume changes in the gas are measured in attached calibrated burets.	(1) Butane. British Oxygen Co. Purest sample available. (2) Tetraethyl ammonium bromide. No information. (3) Water. No information.
	ESTIMATED ERROR: $\delta k_{smm}/kg\ mol^{-1} = \pm 0.010$
	REFERENCES: 1. Morrison, T. J.; Billett, F. J. Chem. Soc. 1952, 3819.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) N,N,N-Tripropylpropanaminium bromide or tetrapropylammonium bromide; $C_{12}H_{28}NBr$; [1941-30-6] (3) Water; H_2O; [7732-18-5]	Wen, W.-Y.; Hung, J.H. *J. Phys. Chem.* <u>1970</u>, *74*, 170-180.

VARIABLES:	PREPARED BY:
T/K: 278.15-308.15 P/kPa: 101.325 (1 atm) m_3/mol kg^{-1}: 0-1.07	H.L. Clever

EXPERIMENTAL VALUES:

T/K	Salt Molality m_3/mol kg^{-1}	Butane Solubility S_1/cm^3(STP) kg^{-1}	Setchenow Constant[1] k/kg mol^{-1}
278.15	0	69.57 ± 0.11	-0.080
	0.103	70.99	
	0.210	72.73	
	0.271	73.35	
	0.410	74.41	
	0.436	74.61	
	0.492	73.85	
	0.784	73.82	
	0.963	73.28	
288.15	0	45.75 ± 0.06	-0.130
	0.110	47.24	
	0.210	48.58	
	0.267	49.51	
	0.415	51.54	continued...

[1] Setchenow constant, k/kg mol^{-1} = $(1/m_3/\text{mol kg}^{-1}))$ log (S_1^o/S_1)

The authors specify the value of the constant for m_3/mol kg^{-1} = 0.1.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus was similar to that described by Ben-Naim and Baer (1) Teflon needle valves were used in place of stopcocks. The apparatus consists of three main parts, a dissolution cell of 300 to 600 cm^3 capacity, a gas volume measuring column, and a manometer. The solvent is degassed in the dissolution cell, the gas is introduced and dissolved while the liquid is kept stirred by a magnetic stirrer immersed in the water bath. Dissolution of the gas results in the change in the height of a column of mercury which is measured by a cathetometer.	1. Propane. Matheson Co. Stated to be better than 99.9 per cent pure. 2. Tetrapropylammonium bromide. Eastman Kodak Co. Recrystallized and analyzed. Better than 99.9 per cent pure. 3. Water. Distilled from an all Pyrex apparatus. Specific conductivity 1.5 x 10^{-6} (ohm cm)$^{-1}$.
	ESTIMATED ERROR: δT/K = ±0.005 $\delta S_1/S_1$ = ±0.003
	REFERENCES: 1. Ben-Naim, A.; Baer, S. *Trans. Faraday Soc.* <u>1963</u>, *59*, 2735.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) N,N,N-Tripropylpropanaminium bromide or tetrapropylammonium bromide; $C_{12}H_{28}NBr$; [1941-30-6] (3) Water; H_2O; [7732-18-5]	Wen, W.-Y.; Hung, J.H. *J. Phys. Chem.* <u>1970</u>, *74*, 170-180.

VARIABLES:	PREPARED BY:
T/K: 278.15-308.15 P/kPa: 101.325 (1 atm) m_3/mol kg^{-1}: 0-1.07	H.L. Clever

EXPERIMENTAL VALUES: concluded

T/K	Salt Molality m_3/mol kg^{-1}	Propane Solubility S_1/cm^3(STP) kg^{-1}	Setchenow Constant[1] k/kg mol^{-1}
288.15	0.465	51.78	
	0.689	53.14	
	1.070	54.78	
298.15	0	32.31 ± 0.08	-0.187
	0.102	33.77	
	0.267	35.65	
	0.420	37.38	
	0.609	39.96	
	1.050	43.80	
308.15	0	23.91 ± 0.07	-0.273
	0.107	25.61	
	0.271	27.72	
	0.457	30.66	
	0.656	32.73	

[1] Setchenow constant, k/kg mol^{-1} = $(1/(m_3$/mol kg$^{-1}))$ log $(S_1^o/S_1$.

The authors specify the value of the constant for m_3/mol kg^{-1} = 0.1.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus was similar to that described by Ben-Naim and Baer (1) Teflon needle valves were used in place of stopcocks. The apparatus consists of three main parts, a dissolution cell of 300 to 600 cm^3 capacity, a gas volume measuring column, and a manometer. The solvent is degassed in the dissolution cell, the gas is introduced and dissolved while the liquid is kept stirred by a magnetic stirrer immersed in the water bath. Dissolution of the gas results in the change in the height of a column of mercury which is measured by a cathetometer.	1. Propane. Matheson Co. Stated to be better than 99.9 per cent pure. 2. Tetrapropylammonium bromide. Eastman Kodak Co. Recrystallized and analyzed. Better than 99.9 per cent pure. 3. Water. Distilled from an all Pyrex apparatus. Specific conductivity 1.5 x 10^{-6} (ohm cm)$^{-1}$.
	ESTIMATED ERROR: δT/K = ±0.005 $\delta S_1/S_1$ = ±0.003
	REFERENCES: 1. Ben-Naim, A.; Baer, S. *Trans. Faraday Soc.* <u>1963</u>,*59*, 2735.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Butane; C_4H_{10}; [106-97-8] (2) N,N,N-Tripropylpropanaminium bromide or tetrapropylammonium bromide; $C_{12}H_{28}NBr$; [1941-30-6] (3) Water; H_2O; [7732-18-5]	Wen, W.-Y.; Hung, J.H. *J. Phys. Chem.* 1970, *74*, 170-180.

VARIABLES:	PREPARED BY:
T/K: 278.15-308.15 P/kPa: 101.325 (1 atm) m_3/mol kg^{-1}: 0-0.405	H.L. Clever

EXPERIMENTAL VALUES:

T/K	Salt Molality m_3/mol kg^{-1}	Butane Solubility S_1/cm^3(STP) kg^{-1}	Setchenow Constant[1] k/kg mol^{-1}
278.15	0 0.405	62.00 ± 0.10 69.09	-0.120
288.15	0 0.405	39.20 ± 0.05 45.36	-0.165
298.15	0 0.405	26.34 ± 0.06 32.09	-0.227
308.15	0 0.405	19.27 ± 0.06 25.02	-0.307

[1] Setchenow constant, k/kg mol^{-1} = $(1/(m_3/\text{mol kg}^{-1}))$ log (S_1^o/S_1).

The authors specify the value of the constant for m_3/mol kg^{-1} = 0.1.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

The apparatus was similar to that described by Ben-Naim and Baer (1) Teflon needle valves were used in place of stopcocks.

The apparatus consists of three main parts, a dissolution cell of 300 to 600 cm^3 capacity, a gas volume measuring column, and a manometer.

The solvent is degassed in the dissolution cell, the gas is introduced and dissolved while the liquid is kept stirred by a magnetic stirrer immersed in the water bath. Dissolution of the gas results in the change in the height of a column of mercury which is measured by a cathetometer.

SOURCE AND PURITY OF MATERIALS:

1. Butane. Matheson Co. Stated to be better than 99.9 per cent pure.

2. Tetrapropylammonium bromide. Eastman Kodak Co. Recrystallized and analyzed. Better than 99.9 per cent pure.

3. Water. Distilled from an all Pyrex apparatus. Specific conductivity 1.5 x 10^{-6} (ohm cm)$^{-1}$.

ESTIMATED ERROR:

δT/K = ±0.005

$\delta S_1/S_1$ = ±0.003

REFERENCES:

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

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) N,N,N-Tributylbutanaminium bromide or tetrabutylammonium bromide; $C_{16}H_{36}NBr$; [1643-19-2] (3) Water; H_2O; [7732-18-5]	Wen, W.-Y.; Hung, J.H. *J. Phys. Chem.* <u>1970</u>, *74*, 170-180.

VARIABLES:	PREPARED BY:
T/K: 278.15-308.15 P/kPa: 101.325 (1 atm) m_3/mol kg^{-1}: 0-0.624	H.L. Clever

EXPERIMENTAL VALUES:

T/K	Salt Molality m_3/mol kg^{-1}	Propane Solubility S_1/cm^3(STP) kg^{-1}	Setchenow Constant[1] k/kg mol^{-1}
278.15	0 0.165 0.300	69.57 ± 0.11 71.78 72.70	-0.066
288.15	0 0.180 0.300	45.75 ± 0.06 48.68 50.35	-0.146
298.15	0 0.305 0.624	32.31 ± 0.08 37.26 43.25	-0.248
308.15	0 0.193 0.304	23.91 ± 0.07 28.06 30.24	-0.386

[1] Setchenow constant, k/kg mol^{-1} = $(1/m_3$/mol kg^{-1})) log (S_1^o/S_1).

The authors specify the value of the constant for m_3/mol kg^{-1} = 0.1.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus was similar to that described by Ben-Naim and Baer (1). Teflon needle valves were used in place of stopcocks. The apparatus consists of three main parts, a dissolution cell of 300 to 600 cm^3 capacity, a gas volume measuring column, and a manometer. The solvent is degassed in the dissolution cell, the gas is introduced and dissolved while the liquid is kept stirred by a magnetic stirrer immersed in the water bath. Dissolution of the gas results in the change in the height of a column of mercury which is measured by a cathetometer.	1. Propane. Matheson Co. Stated to be better than 99.9 per cent pure. 2. Tetrabutylammonium bromide. Eastman Kodak Co. Recrystallized and analyzed. Better than 99.9 per cent pure. 3. Water. Distilled from an all Pyrex apparatus. Specific conductivity 1.5 x 10^{-6} (ohm cm)$^{-1}$.

ESTIMATED ERROR:

δT/K =   ±0.005

$\delta S_1/S_1$ =   ±0.003

REFERENCES:

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

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Butane; C_4H_{10}; [106-97-8] (2) N,N,N-Tributylbutanaminium bromide or tetrabutylammonium bromide; $C_{16}H_{36}NBr$; [1643-19-2] (3) Water; H_2O; [7732-18-5]	Wen, W.-Y.; Hung, J.H. *J. Phys. Chem.* 1970, *74*, 170-180.

VARIABLES:	PREPARED BY:
T/K: 278.15-308.15 P/kPa: 101.325 (1 atm) m_3/mol kg^{-1}: 0-0.310	H.L. Clever

EXPERIMENTAL VALUES:

T/K	Salt Molality m_3/mol kg^{-1}	Butane Solubility S_1/cm^3(STP) kg^{-1}	Setchenow Constant[1] k/kg mol^{-1}
278.15	0 0.310	62.00 ± 0.10 66.65	-0.104
288.15	0 0.310	39.20 ± 0.05 44.35	-0.180
298.15	0 0.310	26.34 ± 0.06 31.92	-0.286
308.15	0 0.310	19.27 ± 0.06 25.56	-0.435

[1] Setchenow constant, k/kg mol^{-1} = $(1/(m_3$/mol kg$^{-1})) \log (S_1^o/S_1)$.

The authors specify the value of the constant for m_3/mol kg^{-1} = 0.1

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

The apparatus was similar to that described by Ben-Naim and Baer (1). Teflon needle valves were used in place of stopcocks.

The apparatus consists of three main parts, a dissolution cell of 300 to 600 cm^3 capacity, a gas volume measuring column, and a manometer.

The solvent is degassed in the dissolution cell, the gas is introduced and dissolved while the liquid is kept stirred by a magnetic stirrer immersed in the water bath. Dissolution of the gas results in the change in the height of a column of mercury which is measured by a cathetometer.

SOURCE AND PURITY OF MATERIALS:

1. Butane. Matheson Co. Stated to be better than 99.9 per cent pure.

2. Tetrabutylammonium bromide. Eastman Kodak Co. Recrystallized and analyzed. Better than 99.9 per cent pure.

3. Water. Distilled from an all Pyrex apparatus. Specific conductivity 1.5 x 10^{-6} (ohm cm)$^{-1}$.

ESTIMATED ERROR:

δT/K = ±0.005

$\delta S_1/S_1$ = ±0.003

REFERENCES:

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

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6]	
(2) 2-Hydroxy-N,N,N-tris(2-hydroxyethyl)-ethanaminium bromide or tetraethanolammonium bromide; $C_8H_{20}NO_4Br$; [4328-04-5]	Wen, W.-Y.; Hung, J.H.
	J. Phys. Chem. <u>1970</u>, *74*, 170-180.
(3) Water; H_2O; [7732-18-5]	

VARIABLES:	PREPARED BY:
T/K: 278.15-308.15 P/kPa: 101.325 (1 atm) m_3/mol kg^{-1}: 0-0.508	H.L. Clever

EXPERIMENTAL VALUES:

T/K	Salt Molality m_3/mol kg^{-1}	Propane Solubility S_1/cm^3(STP) kg^{-1}	Setchenow Constant[1] k/kg mol^{-1}
278.15	0 0.153	69.57 ± 0.11 69.92	0.000
288.15	0 0.160	45.75 ± 0.06 46.13	-0.025
298.15	0 0.159 0.508	32.31 ± 0.08 32.64 33.93	-0.061
308.15	0 0.154	23.91 ± 0.007 24.78	-0.113

[1] Setchenow constant, k/kg mol^{-1} = $(1/(m_3$/mol kg^{-1})) log (S_1^o/S_1).

The authors specify the value of the constant for m_3/mol kg^{-1} = 0.1.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

The apparatus was similar to that described by Ben-Naim and Baer (1). Teflon needle valves were used in place of stopcocks.

The apparatus consists of three main parts, a dissolution cell of 300 to 600 cm^3 capacity, a gas volume measuring column, and a manometer.

The solvent is degassed in the dissolution cell, the gas is introduced and dissolved while the liquid is kept stirred by a magnetic stirrer immersed in the water bath. Dissolution of the gas results in the change in the height of a column of mercury which is measured by a cathetometer.

SOURCE AND PURITY OF MATERIALS:

1. Propane. Matheson Co. Stated to be better than 99.9 per cent pure.

2. Tetraethanolammonium bromide. Prepared and analyzed. Better than 99.9 per cent pure. m.p., t/°C 102.

3. Water. Distilled from an all Pyrex apparatus. Specific conductivity 1.5 x 10^{-6} (ohm cm)$^{-1}$.

ESTIMATED ERROR:

δT/K = ±0.005

$\delta S_1/S_1$ = ±0.003

REFERENCES:

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

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Butane; C_4H_{10}; [106-97-8] (2) Lanthanum chloride; $LaCl_3$; [10099-58-8] (3) Water; H_2O; [7732-18-5]	Morrison, T. J.; Billett, F. *J. Chem. Soc.* <u>1952</u>, 3819 - 3822.

| VARIABLES:
T/K: 285.75 - 344.85
p/kPa: 101.325 (1 atm) | PREPARED BY:

H. L. Clever |

EXPERIMENTAL VALUES:

Temperature			Salt Effect Parameters		
$t/°C$	T/K	$1/(T/K)$	$(1/c)\log(S°/S)$ [1]	$(1/m)\log(S°/S)$	$(1/m)\log(x°/x)$
12.6	285.75	0.0035	0.182	0.546	0.576
30.0	303.15	0.0033	0.154	0.462	0.492
49.4	322.55	0.0031	0.154	0.462	0.492
71.7	344.85	0.0029	0.140	0.420	0.450

[1] For the 1-3 electrolyte the compiler changed to m = c/3 for $m_2/mol\ kg^{-1}$ in the salt effect parameter.

The salt effect parameters were calculated from two measurements, the solubility of butane in water, S°, and in the one molal salt solution, S. Only the solubility of the butane in water, and the value of the salt effect parameter are given in the paper. The solubility values in the salt solution are not given.

The compiler calculated the values of the salt effect parameter using the mole fraction gas solubility ratio.

Note that the first salt effect parameter above uses the author's notation with c in gram equivalents per kg water. The author's c would be better represented as $m_2((1/3)LaCl_3)/mol\ kg^{-1} = 3\ m_2(LaCl_3)/mol\ kg^{-1}$.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The degassed solvent flows in a thin film down an absorption helix containing the butane gas plus solvent vapor at a total pressure of one atmosphere. The volume of gas absorbed is measured in an attached buret system (1).	(1) Butane. Prepared from Grignard reagent. A second sample, Anglo-Iranian Oil Co. stated to be 99 per cent pure, gave the same result. (2) Lanthanun chloride. "AnalaR" material. (3) Water. No information given.

ESTIMATED ERROR:
$\delta k/kg^{-1}\ mol = 0.010$

REFERENCES:
1. Morrison, T. J.; Billett, F. *J. Chem. Soc.* <u>1948</u>, 2033.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Butane; C_4H_{10}; [106-97-8] (2) Barium chloride; $BaCl_2$; [10361-37-2] (3) Water; H_2O; [7732-18-5]	Morrison, T. J.; Billett, F. *J. Chem. Soc.* 1952, 3819 - 3822.

| VARIABLES:
    T/K: 285.75 - 344-85
    P/kPa: 101.325 (1 atm) | PREPARED BY:

    H. L. Clever |

EXPERIMENTAL VALUES:

Temperature			Salt Effect Parameters		
$t/°C$	T/K	$1/(T/K)$	$(1/c)\log(S°/S)$ [1]	$(1/m)\log(S°/S)$	$(1/m)\log(x°/x)$
12.6	285.75	0.0035	0.250	0.500	0.523
30.0	303.15	0.0033	0.210	0.420	0.443
49.4	322.55	0.0031	0.180	0.360	0.383
71.7	344.85	0.0029	0.165	0.330	0.353

[1] For the 1-2 electrolyte the compiler changed to m = c/2 for
m_2/mol kg^{-1} in the salt effect parameter.

The salt effect parameters were calculated from two measurements, the
solubility of butane in water, S°, and in the one molal salt solution, S.
Only the solubility of the butane in water, and the value of the salt
effect parameter are given in the paper. The solubility values in the
salt solution are not given.

The compiler calculated the values of the salt effect parameter using the
mole fraction gas solubility ratio.

Note that the first salt effect parameter above uses the author's notation
with c in gram equivalents per kg water. The author's c would be better
represented as m_2(½$BaCl_2$)/mol kg^{-1} = 2 m_2($BaCl_2$)/mol kg^{-1}.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:

The degassed solvent flows in a thin film down an absorption helix containing the butane gas plus solvent vapor at a total pressure of one atmosphere. The volume of gas absorbed is measured in an attached buret system (1).	(1) Butane. Prepared from Grignard
	    reagent. A second sample, Anglo-
	    Iranian Oil Co. stated to be 99
	    per cent pure, gave the same
	    result.
	(2) Barium chloride. "AnalaR"
	    material.
	(3) Water. No information given.

	ESTIMATED ERROR: δk/kg^{-1} mol = 0.010
	REFERENCES: 1. Morrison, T. J.; Billett, F. *J. Chem. Soc.* 1948, 2033.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) Lithium chloride; LiCl; [7447-41-8] (3) Water; H_2O; [7732-18-5]	Morrison, T. J.; Billett, F. *J. Chem. Soc.* <u>1952</u>, 3819 - 3822.

VARIABLES:	PREPARED BY:
T/K: 285.75 - 344.85 p/kPa: 101.325 (1 atm)	H. L. Clever

EXPERIMENTAL VALUES:

Temperature			Salt Effect Parameters	
t/°C	T/K	$1/(T/K)$	$(1/m_2)\log(S°/S)$ [1]	$(1/m_2)\log(x°/x)$
12.6	285.75	0.0035	0.175	0.190
30.0	303.15	0.0033	0.152	0.167
49.4	322.55	0.0031	0.138	0.153
71.7	344.85	0.0029	0.138	0.153

[1] The authors used $(1/c)\log(S°/S)$ with c defined as g eq. salt per kg of
water. For the 1-1 electrolyte the compiler changed the c to an m for
m_2/mol kg^{-1}. The propane solubility S is cm^3(STP) kg^{-1}.

The salt effect parameters were calculated from two measurements, the
solubility of propane in water, S°, and in the one molal salt solution, S.
Only the solubility of the propane in water, and the value of the salt
effect parameter are given in the paper. The solubility values in the
salt solution are not given.

The compiler calculated the values of the salt effect parameter using the
mole fraction gas solubility ratio.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The degassed solvent flows in a thin film down an absorption helix containing the propane gas plus solvent vapor at a total pressure of one atmosphere. The volume of gas absorbed is measured in an attached buret system (1).	(1) Propane. Prepared from Grignard reagent. (2) Lithium chloride. "AnalaR" material. (3) Water. No information given.
	ESTIMATED ERROR: δk/kg^{-1} mol = 0.010
	REFERENCES: 1. Morrison, T. J.; Billett, F. *J. Chem. Soc.* <u>1948</u>, 2033.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Butane; C_4H_{10}; [106-97-8] (2) Lithium chloride; LiCl; [7447-41-8] (3) Water; H_2O; [7732-18-5]	Morrison, T. J.; Billett, F. J. Chem. Soc. 1952, 3819 - 3822.

| VARIABLES:
    T/K: 285.75 - 344.85
    p/kPa: 101.325 (1 atm) | PREPARED BY:
    H. L. Clever |

EXPERIMENTAL VALUES:

Temperature			Salt Effect Parameters	
$t/°C$	T/K	$1/(T/K)$	$(1/m_2)\log(S°/S)$ [1]	$(1/m_2)\log(x°/x)$
12.6	285.75	0.0035	0.198	0.213
30.0	303.15	0.0033	0.171	0.186
49.4	322.55	0.0031	0.155	0.170
71.7	344.85	0.0029	0.150	0.165

[1] The authors used $(1/c)\log(S°/S)$ with c defined as g eq. salt per kg of water. For the 1-1 electrolyte the compiler changed the c to an m for m_2/mol kg^{-1}. The butane solubility S is cm^3(STP) kg^{-1}.

The salt effect parameters were calculated from two measurements, the solubility of butane in water, S°, and in the one molal salt solution, S. Only the solubility of the butane in water, and the value of the salt effect parameter are given in the paper. The solubility values in the salt solution are not given.

The compiler calculated the values of the salt effect parameter using the mole fraction gas solubility ratio.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The degassed solvent flows in a thin film down an absorption helix containing the butane gas plus solvent vapor at a total pressure of one atmosphere. The volume of gas absorbed is measured in an attached buret system (1).	(1) Butane. Prepared from Grignard reagent. A second sample, Anglo-Iranian Oil Co. stated to be 99 per cent pure, gave the same result. (2) Lithium chloride. "AnalaR" material. (3) Water. No information given.

ESTIMATED ERROR:

$\delta k/kg^{-1}$ mol = 0.010

REFERENCES:
1. Morrison, T. J.; Billett, F.
   J. Chem. Soc. 1948, 2033.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) Sodium chloride; NaCl; [7647-14-5] (3) Water; H_2O; [7732-18-5]	Morrison, T. J.; Billett, F. J. Chem. Soc. 1952, 3819 - 3822.

VARIABLES:
    T/K: 285.75 - 344.85
    p/kPa: 101.325 (1 atm)
	PREPARED BY:
	
	    H. L. Clever

EXPERIMENTAL VALUES:

Temperature			Salt Effect Parameters	
$t/°C$	T/K	$1/(T/K)$	$(1/m_2)\log(S°/S)$ [1]	$(1/m_2)\log(x°/x)$
12.6	285.75	0.0035	0.216	0.231
30.0	303.15	0.0033	0.194	0.224
49.4	322.55	0.0031	0.178	0.193
71.7	344.85	0.0029	0.165	0.180

[1] The authors used $(1/c)\log(S°/S)$ with c defined as g eq. salt per kg of water. For the 1-1 electrolyte the compiler changed the c to an m for $m_2/mol\ kg^{-1}$. The propane solubility S is $cm^3(STP)\ kg^{-1}$.

The salt effect parameters were calculated from two measurements, the solubility of propane in water, S°, and in the one molal salt solution, S. Only the solubility of the propane in water, and the value of the salt effect parameter are given in the paper. The solubility values in the salt solution are not given.

The compiler calculated the values of the salt effect parameter using the mole fraction gas solubility ratio.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The degassed solvent flows in a thin film down an absorption helix containing the propane gas plus solvent vapor at a total pressure of one atmosphere. The volume of gas absorbed is measured in an attached buret system (1).	(1) Propane. Prepared from Grignard reagent. (2) Sodium chloride. "AnalaR" material. (3) Water. No information given.
	ESTIMATED ERROR: $\delta k/kg^{-1}\ mol = 0.010$
	REFERENCES: 1. Morrison, T. J.; Billett, F. J. Chem. Soc. 1948, 2033.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) Sodium chloride; NaCl; [7647-14-5] (3) Water; H_2O; [7732-18-5]	Umano, S.; Nakano, Y. *Kogyo Kagaku Zasshi* <u>1958</u>, *61*, 536-44.

VARIABLES:	PREPARED BY:
T/K = 264.7-298.2 P/kP = 10.3-102.5	H.L. Clever

EXPERIMENTAL VALUES:

Temperature		Sodium Chloride		Total Pressure	Propane Partial Pressure	Mol Ratio
t/°C	T/K	wt %	m_2/mol kg^{-1}	p/atm	p_1/atm	$10^5 (n_1/n_3)$
-8.5	264.7	16.36	3.347	0.1095	0.1068	0.2051
				0.3064	0.3036	0.5650
				0.5037	0.5010	0.9580
				0.7014	0.6987	1.3342
				1.0047	1.0020	1.8074
-5	268.2	11.45	2.213	0.1095	0.1057	0.4177
				0.3068	0.3031	0.9985
				0.5042	0.5005	1.6562
				0.7016	0.6978	2.2288
				1.0042	1.0005	3.2027
		16.36	3.347	0.1101	0.1065	0.1786

continued...

The Kelvin temperature and the sodium chloride molality values were calculated by the compiler.

The mole ratio is moles of propane per mole of water. For the solutions containing no sodium chloride the values are the same as the mole fraction. Multiplication by 55.51 will convert the values to molality, m_1/mol kg^{-1}.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus consists of a gas reservoir, a manometer-buret system, a thermostated mixing cell, and a solvent reservoir. The apparatus is evacuated, and then filled with gas to condition the glass surface, vinyl tubing and stopcock grease. The solvent is degassed by boiling under reduced pressure. The solvent is transferred to the evacuated mixing cell and the gas is added to the pressure of the measurement. The cell is shaken until equilibrium is attained.	1. Oakford Gas and Appliance Co. Long Beach, California, U.S.A. Purity found to be at least 99.0 per cent. 2. Source and purity not given. 3. Treatment not specified.

ESTIMATED ERROR:
$\delta T/K$ = 0.05 $\delta m_2/m_2$ = 0.01 $\delta n_1/n_1$ = 0.01 (compiler)

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) Sodium chloride; NaCl; [7647-14-5] (3) Water; H_2O; [7732-18-5]	Umano, S.; Nakano, Y. *Kogyo Kagaku Zasshi* 1958, *61*, 536-44.

VARIABLES:	PREPARED BY:
T/K: 264.7-298.2 *P*/kPa: 10.3-102.5	H.L. Clever

EXPERIMENTAL VALUES:

Temperature		Sodium Chloride		Total Pressure	Propane Partial Pressure	Mol Ratio
t/°C	T/K	wt %	m_2/mol kg^{-1}	p/atm	p_1/atm	$10^5 (n_1/n_3)$
-5	268.2	16.36	3.347	0.3175	0.3065	0.5191
				0.5020	0.4984	0.8903
				0.6993	0.6957	1.1398
				1.0014	0.9977	1.6501
		23.70	5.315	1.0118	1.0086	0.8087
0	273.2	0	0	0.1035	0.09747	0.4410
				0.3009	0.2948	1.5795
				0.4982	0.4922	3.1777
				0.6956	0.6896	4.6873
				0.9982	0.9922	6.7939
		2.96	0.522	0.1088	0.1028	0.5295
				0.3057	0.2998	1.5463
				0.5027	0.4968	2.6743
				0.7007	0.6948	3.6457
				1.0039	0.9980	5.1633
		5.77	1.048	0.1136	0.1078	0.4815
				0.3094	0.3037	1.3552
				0.5068	0.5010	2.1150
				0.7050	0.6992	3.0650
				1.0073	1.0016	4.0366
		11.45	2.213	0.1134	0.1078	0.3055
				0.3107	0.3051	0.8077
				0.5074	0.5019	1.3892
				0.7053	0.6997	1.8409
				1.0074	1.0018	2.5828
		16.36	3.347	0.1111	0.1058	0.1696
				0.3085	0.3032	0.4680
				0.5059	0.5005	0.7504
				0.7032	0.6979	1.0220
				1.0059	1.0005	1.4730
		23.70	5.315	1.0118	1.0072	0.7043
5	278.2	0	0	0.1048	0.09621	0.4755
				0.3022	0.2936	1.5059
				0.5008	0.4922	2.5663
				0.6969	0.6883	3.5123
				1.0008	0.9922	5.2597
		2.96	0.522	0.1005	0.09157	0.4297
				0.2946	0.2889	1.1992
				0.4952	0.4863	2.1037
				0.6929	0.6839	2.9700
				0.9966	0.9876	4.2357
		5.77	1.048	0.1013	0.0930	0.3336
				0.2987	0.2904	1.0695
				0.4960	0.4877	1.7265
				0.6945	0.6862	2.5254
				0.9971	0.9888	3.4242

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) Sodium Chloride; NaCl; [7647-14-5] (3) Water; H_2O; [7732-18-5]	Umano, S.; Nakano, Y. *Kogyo Kagaku Zasshi* <u>1958</u>, *61*, 536-44.

VARIABLES:	PREPARED BY:
T/K: 264.7-298.2 *P*/kPa: 10.3-102.5	H.L. Clever

EXPERIMENTAL VALUES:

Temperature		Sodium Chloride		Total Pressure	Propane Partial Pressure	Mol Ratio
t/°C	*T*/K	wt %	m_2/mol kg^{-1}	*p*/atm	p_1/atm	$10^5(x_1/x_3)$
5	278.2	11.45	2.213	0.1086 0.3057 0.5030 0.7004 1.0079	0.1007 0.2978 0.4952 0.6925 1.0000	0.2607 0.6694 1.0404 1.5609 2.1845
		16.36	3.347	0.1159 0.3130 0.5069 0.7043 1.0067	0.1084 0.3062 0.5069 0.6968 0.9992	0.1584 0.3485 0.5088 0.8903 1.2221
		23.70	5.315	1.0041	0.9974	0.5073
10	283.2	0	0	0.1090 0.3064 0.5038 0.7011 1.0037	0.09690 0.2943 0.4916 0.6880 0.9916	0.3078 1.1979 2.0493 3.0487 4.2204
		2.96	0.522	0.1141 0.3106 0.5071 0.7014 1.0033	0.1021 0.2986 0.4951 0.6895 0.9913	0.3449 1.0784 1.7806 2.4952 3.6475
		5.77	1.048	0.1026 0.3000 0.5046 0.7022 1.0043	0.0909 0.2883 0.4929 0.6905 0.9924	0.2942 0.8653 1.3730 2.0031 2.8709
		11.45	2.213	0.1171 0.3145 0.5119 0.7055 1.0071	0.1060 0.3033 0.5007 0.6942 0.9959	0.2167 0.6415 0.9466 1.3275 1.8558
		16.36	3.347	0.1032 0.3006 0.4964 0.7009 1.0107	0.0926 0.2899 0.4857 0.6885 1.0000	0.1366 0.3625 0.5512 0.8103 1.1421
		23.70	5.315	1.0012	0.9917	0.4550
15	288.2	0	0	0.1061 0.3033 0.5007 0.6974 1.0000	0.08914 0.2865 0.4839 0.6805 0.9832	0.2686 0.9077 1.6691 2.3853 3.4902
		2.96	0.522	0.1168 0.3139 0.5112	0.9943 0.2965 0.4939	0.3422 0.9182 1.4920

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) Sodium Chloride; NaCl; [7647-14-5] (3) Water; H_2O; [7732-18-5]	Umano, S.; Nakano, Y. *Kogyo Kagaku Zasshi* <u>1958</u>, *61*, 536-44.

VARIABLES:	PREPARED BY:
T/K: 264.7-298.2 P/kPa: 10.3-102.5	H.L. Clever

EXPERIMENTAL VALUES:

Temperature		Sodium Chloride		Total Pressure	Propane Partial Pressure	Mol Ratio
t/°C	T/K	wt %	m_2/mol kg^{-1}	p/atm	p_1/atm	$10^5(x_1/x_3)$
15	288.2	2.96	0.522	0.7086 1.0112	0.6912 0.9939	2.1916 3.0898
		5.77	1.048	0.1018 0.2991 0.4965 0.6939 0.9965	0.08558 0.2829 0.4803 0.6777 0.9803	0.2332 0.7281 1.2311 1.6318 2.4526
		11.45	2.213	0.1166 0.3134 0.5092 0.7041 1.0067	0.1010 0.2979 0.4937 0.6886 0.9912	0.1495 0.5041 0.7743 1.1473 1.4972
		16.36	3.347	0.1060 0.3033 0.4999 0.6981 1.0007	0.0911 0.2885 0.4851 0.6832 0.9858	0.1161 0.3116 0.4737 0.7003 0.9756
		23.70	5.315	1.0053	0.9917	0.4112
20	293.2	0	0	0.1039 0.3013 0.4981 0.6955 0.9981	0.08087 0.2782 0.4751 0.6724 0.9750	0.1309 0.8018 1.3908 1.9943 3.0749
		2.96	0.522	0.1045 0.3012 0.4985 0.6958 0.9993	0.08176 0.2798 0.4758 0.6731 0.9766	0.2700 0.7446 1.2423 1.8149 2.4687
		5.77	1.048	0.0962 0.2919 0.4883 0.6836 0.9854	0.07396 0.2695 0.4661 0.6608 0.9631	0.1658 0.6093 0.9729 1.4216 1.9701
		11.45	2.213	0.1049 0.3023 0.4997 0.6970 1.0001	0.0835 0.2809 0.4782 0.6756 0.9786	0.1162 0.4384 0.6929 1.0191 1.4871
		16.36	3.347	0.1122 0.3096 0.5069 0.7046 1.0072	0.0918 0.2891 0.4865 0.6841 0.9867	0.0863 0.3222 0.4545 0.6536 0.8977
		23.70	5.315	0.9906	0.9721	0.3770
25	298.2	2.96	0.522	0.1116 0.3090	0.08046 0.2778	0.2413 0.6931

COMPONENTS	ORIGINAL MEASUREMENTS:
(1) Propane; C$_3$H$_8$; [74-98-6] (2) Sodium Chloride; NaCl; [7647-14-5] (3) Water; H$_2$O; [7732-18-5]	Umano, S.; Nakano, Y. *Kogyo Kagaku Zasshi* <u>1958</u>, *61*, 536-44.

| VARIABLES:
 T/K: 264.7-298.2
 P/kPa: 10.3-102.5 | PREPARED BY:

 H.L. Clever |

EXPERIMENTAL VALUES: (concluded)

Temperature		Sodium Chloride		Total Pressure	Propane Partial Pressure	Mol Ratio
t/°C	T/K	wt %	m_2/mol kg^{-1}	p/atm	p_1/atm	$10^5(x_1/x_3)$
25	298.2	2.96	0.522	0.5074	0.4762	1.1643
				0.7049	0.6737	1.6451
				1.0060	0.9749	2.4117

The Kelvin temperature and the sodium chloride molality values were calculated by the compiler.

The mole ratio is moles or propane per mole of water. For the solutions containing no sodium chloride the values are the same as the mole fraction. Multiplication by 55.51 will convert the values to molality, m_1/mol kg^{-1}.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) Sodium chloride; NaCl; [7647-14-5] (3) Water; H_2O; [7732-18-5]	Yano, T.; Suetaka, T.; Umehara, T.; Horiuchi, A. *Kagaku Kogaku* <u>1974</u>, *38*, 320-323.

VARIABLES: T/K: 298.2 c_2/mol L^{-1}: 0-1.5 P/kPa: 101.325	PREPARED BY: C. L. Young

EXPERIMENTAL VALUES:

$$T/K = 298.2$$

Concentration of electrolyte c_2 /mol L^{-1}	Solubility[a] of propane /mmol L^{-1}
0.000	1.44
0.250	1.34
0.750	0.941
1.000	0.814
1.500	0.619

[a] At 1 atmosphere pressure.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Volumetric apparatus. Salt solution allowed to enter stirred absorption chamber. Pressure within absorption chamber adjusted to be as near atmospheric pressure as possible. Details in source and ref. 1.	1. High purity sample, purity better than 99.5 mole per cent. 2. Special grade. 3. Distilled.
	ESTIMATED ERROR: $\delta s/s$= 0.01 (compiler)
	REFERENCES: 1. Yano, T.; Suetaka, T.; Umehara, T. *Nippon Kagaku Kaishi* <u>1972</u>, *11*, 2194.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Butane; C_4H_{10}; [106-97-8] (2) Sodium chloride; NaCl; [7647-14-5] (3) Water; H_2O; [7732-18-5]	Umano, S.; Nakano, Y. *Kogyo Kagaku Zasshi* 1958, *61*, 536-44.

VARIABLES:	PREPARED BY:
T/K: 263.9-293.2 P/kPa: 61.7-101.9	H.L. Clever

EXPERIMENTAL VALUES:

Temperature		Sodium Chloride		Total Pressure	Butane Partial Pressure	Mol Ratio
t/°C	T/K	wt %	m_1/mol kg^{-1}	p/atm	p_1/atm	$10^5(x_1/x_3)$
-9.3	263.9	19.8	4.224	0.6093	0.6068	0.398
-8.6	264.6	16.46	3.371	0.5991	0.5963	0.617
-3.15	270.0	16.46	3.371	0.8557	0.7924	1.684
0	273.2	0	0	1.0030	0.9969	6.793
		4.79	0.961	0.9989	0.9931	3.950
		10.01	1.903	1.0000	0.9944	2.388
		16.46	3.371	1.0060	1.0009	1.200
		19.8	4.224	1.0041	0.9991	0.960
5	278.2	0	0	1.0030	0.9944	4.925
		4.79	0.861	0.9989	0.9906	2.746
		10.01	1.903	1.0000	0.9921	1.672
		16.46	3.371	1.0060	0.9987	0.921
		19.8	4.224	1.0041	0.9970	0.701

The Kelvin temperature and the sodium chloride molality values were calculated by the compiler.

The mole ratio is moles of butane per mole of water. For the solutions containing no sodium chloride the values are the same as the mole fraction. Multiplication by 55.51 will convert the values to molality, m_1/mol kg^{-1}.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:

The apparatus consists of a gas reservoir, a manometer-buret system, a thermostated mixing cell, and a solvent reservoir.
 	
 The apparatus is evacuated, and then filled with gas to condition the glass surface, vinyl tubing and stopcock grease. The solvent is degassed by boiling under reduced pressure. The solvent is transferred to the evacuated mixing cell and the gas is added to the presure of the measurement. The cell is shaken until equilibrium is attained.
	1. Oakford Gas and Appliance
	     Co. Long Beach, California
	     U.S.A. Purity found to be
	     at least 99.0 per cent.
	
	 2. Source and purity not given.
	
	 3. Treatment not specified.

ESTIMATED ERROR:
δT/K   =   0.05 $\delta m_2/m_2$ =   0.01 $\delta n_1/n_1$ =   0.01 (compiler)

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:

(1) Butane; C_4H_{10}; [106-97-8]
 	
(2) Sodium chloride; NaCl;
    [7647-14-5]
 	
(3) Water; H_2O; [7732-18-5]
	Rice, P. A.; Gale, R. P.;
	    Barduhn, A. J.
	
	J. Chem. Eng. Data <u>1976</u>, *21*, 204-6.

VARIABLES:	PREPARED BY:
T/K = 273.45 - 292.15 p_1/kPa = 51.98, 73.06, 101.325 m_2/mol kg^{-1} = 0, 0.621, 1.288	H. L. Clever

EXPERIMENTAL VALUES:

Temperature		Partial Pressure	Sodium Chloride		Solubility ppm	Salt Effect Parameter
$t/^0C$	T/K	p_1/atm	wt %	m_2/mol kg^{-1}		k_{smm}/kg mol^{-1}
0.3	273.45	1	0	0	(211.8)	-
			7.0	1.288	99.3	0.23
0.5	273.65	1	0	0	(209.2)	-
			3.5	0.621	137.2	0.27
3	276.15	1	0	0	(181.1)	-
		1	3.5	0.621	113.4	0.31
		0.513	7.0	1.288	40.9	-
		0.721			56.9	-
		1			79.8	0.25
7	280.15	1	0	0	(147.1)	-
			3.5	0.621	92.9	0.30
			7.0	1.288	65.5	0.25
11	284.15	1	0	0	(122.7)	-
			3.5	0.621	84.1	0.24
			7.0	1.288	55.0	0.25
14	287.15	1	0	0	(109.0)	-
			7.0	1.288	50.1	0.24
15	288.15	1	0	0	(105.1)	-
			3.5	0.621	74.7	0.22
19	292.15	1	0	0	(92.1)	-
			3.5	0.621	63.8	0.23
			7.0	1.288	46.0	0.21

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The solubility equilibrium was established in a one liter Pyrex cell with a Plexiglass top with ports for sampling, pressure connection, vacuum line, and introduction of the gas. About 700 cm^3 of solvent was placed in the cell, it was sealed, thermostated, and evacuated to the vapor pressure of the solvent for about one hour to degass the solvent. Butane gas was added and the system was stirred for 24-48 hours. It was assumed that equilibrium was established when no pressure change was observed in a four hour period. Saturation was approached from both a higher and a lower temperature. Samples of the liquid were taken in a microliter syringe. The samples were injected directly into a total carbon analyzer. Three to nine samples were analyzed. The compiler added the solubility in water from the smoothed equation	(1) Butane. Source not given. Stated to be 99.5 % instrument purity. (2) Sodium chloride. Source not given. Stated to be reagent grade. (3) Water. No information. **ESTIMATED ERROR:** $\delta T/K$ = ± 0.02 $\delta pmm/pmm$ = ± 0.01 of the author's data. The compiler also added the T/K and sodium chloride molality data, and calculated butane molality values (not shown) and the salt effect parameters. ppm = parts per million by weight

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Butane; C_4H_{10}; [106-97-8] (2) Sodium chloride; NaCl; [7647-14-5] (3) Water; H_2O; [7732-18-5]	Umano, S.; Nakano, Y. *Kogyo Kagaku Zasshi* 1958, *61*, 536-44.

| VARIABLES: T/K: 263.9-293.2
P/kPa: 61.7-101.9 | PREPARED BY:

H.L. Clever |

EXPERIMENTAL VALUES: concluded

Temperature		Sodium chloride		Total Pressure	Butane Partial Pressure	Mol Ratio
$t/°C$	T/K	wt %	$m_2/$mol kg^{-1}	$p/$atm	$p_1/$atm	$10^5(x_1/x_3)$
10	283.2	0	0	1.0030	0.9908	3.952
		4.79	0.861	0.9989	0.9872	2.222
		10.01	1.903	1.0000	0.9887	1.365
		16.46	3.371	1.0060	0.9956	0.833
		19.8	4.224	1.0059	0.9958	0.606
15	288.2	0	0	1.0030	0.9865	3.353
		4.79	0.861	0.9989	0.9826	1.949
		10.01	1.903	1.0000	0.9862	1.155
		16.46	3.371	1.0060	0.9910	0.698
		19.8	4.224	1.0059	0.9917	0.519
20	293.2	0	0	1.0030	0.9799	2.776
		4.79	0.861	0.9989	0.9765	1.713
		10.01	1.903	1.0000	0.9784	1.153
		16.46	3.371	1.0060	0.9853	0.632
		19.8	4.224	1.0059	0.9864	0.507

The Kelvin temperature and the sodium chloride molality values were calculated by the compiler.

The mole ratio is moles of butane per mole of water. For the solutions containing no sodium chloride the values are the same as the mole fraction. Multiplication by 55.51 will convert the values to molality, $m_1/$mol kg^{-1}.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:

The apparatus consists of a gas reservoir, a manometer-buret system, a thermostated mixing cell, and a solvent reservoir.
 	
The apparatus is evacuated, and then filled with gas to condition the glass surface, vinyl tubing and stopcock grease. The solvent is transferred to the evacuated mixing cell and the gas is added to the pressure of the measurement. The cell is shaken until equilibrium is attained.
	1. Oakford Gas and Appliance
	    Co. Long Beach, California
	    U.S.A. Purity found to
	    be at least 99.0 per cent.
	
	2. Source and purity not given.
	
	3. Treatment not specified.

ESTIMATED ERROR:
  $\delta T/K$ = 0.05
  $\delta m_2/m_2$ = 0.01
  $\delta n_1/n_1$ = 0.01 (compiler)

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Butane; C_4H_{10}; [106-97-8] (2) Sodium chloride; NaCl; [7647-14-5] (3) Water; H_2O; [7732-18-5]	Morrison, T. J.; Billett, F. *J. Chem. Soc.* <u>1952</u>, 3819 - 3822.

| VARIABLES:
 T/K: 285.75 - 344.85
 p/kPa: 101.325 (1 atm) | PREPARED BY:

 H. L. Clever |

EXPERIMENTAL VALUES:

Temperature			Salt Effect Parameters	
$t/°C$	T/K	$1/(T/K)$	$(1/m_2)\log(S°/S)^{[1]}$	$(1/m_2)\log(x°/x)$
12.6	285.75	0.0035	0.243	0.258
30.0	303.15	0.0033	0.217	0.232
49.4	322.55	0.0031	0.194	0.209
71.7	344.85	0.0029	0.176	0.191

[1] The authors used $(1/c)\log(S°/S)$ with c defined as g eq. salt per kg of water. For the 1-1 electrolyte the compiler changed the c to an m for m_2/mol kg^{-1}. The butane solubility S is cm^3(STP) kg^{-1}.

The salt effect parameters were calculated from two measurements, the solubility of butane in water, S°, and in the one molal salt solution, S. Only the solubility of the butane in water, and the value of the salt effect parameter are given in the paper. The solubility values in the salt solution are not given.

The compiler calculated the values of the salt effect parameter using the mole fraction gas solubility ratio.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The degassed solvent flows in a thin film down an absorption helix containing the butane gas plus solvent vapor at a total pressure of one atmosphere. The volume of gas absorbed is measured in an attached buret system (1).	(1) Butane. Prepared from Grignard reagent. A second sample, Anglo-Iranian Oil Co. stated to be 99 per cent pure, gave the same result. (2) Sodium chloride. "AnalaR" material. (3) Water. No information given.

REFERENCES:
1. Morrison, T. J.; Billett, F.
   J. Chem. Soc. <u>1948</u>, 2033.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Butane; C_4H_{10}; [106-97-8] (2) Sodium chloride; NaCl; [7647-14-5] (3) Water; H_2O; [7732-18-5]	Denton, W.H.; Smith, M.J.S.; Klaschka, J.T.; Forgan, R. *et al.* *Fourth Int. Symp. Fresh Water Sea* <u>1973</u>, *3*, 291-311.

VARIABLES:	PREPARED BY:
T/K: 298.15 m_2/mol kg^{-1}: 0-1.88 P/kPa: 0.101-101.325	W. Hayduk

EXPERIMENTAL VALUES:

T/K	Salt Concentration Molality[2]		Butane Solubility		Setchenow Constant[2]
	Mass%[1]	m_2/mol kg^{-1}	z[1] /mol$(10^6$mol$)^{-1}$	s[2] /cm^3(STP)kg^{-1}	k/kg mol^{-1}
298.15	0	0	21.0	25.0	0.197
	3.5	0.60	16.0	18.6	0.299
	7.0	1.20	9.2	10.4	
	10.5	1.88	6.6	7.26	0.267

[1]Results presented only on a log-log graph which was replotted by compiler for estimation of values shown here. Values show that Henry's law is obeyed; the slope of the graph is 1.

[2]Calculated by compiler using a real gas butane molar volume. The Setchenow constant was calculated on the basis of the butane solubility expressed as mol dm^{-3} and the salt concentration as mol kg^{-1}.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
A chromatographic technique for analysis of butane in water and aqueous sodium chloride solutions stated to be capable of detecting concentrations down to 0.001 mg dm^{-3} was used. Details not given.	Sources and purities not specified.
	ESTIMATED ERROR: $\delta z/z$ = 0.02 (authors)
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) Sodium bromide; NaBr; [7647-15-6] (3) Water; H_2O; [7732-18-5]	Yano, T.; Suetaka, T.; Umehara, T.; Horiuchi, A. *Kagaku Kogaku* <u>1974</u>, *38*, 320-323.

| VARIABLES:
T/K: 298.2
c_2/mol L^{-1}: 0-1.5
P/kPa: 101.325 | PREPARED BY:

C. L. Young |

EXPERIMENTAL VALUES:

$$T/K = 298.2$$

Concentration of electrolyte c_2/mol L^{-1}	Solubility[a] of propane /mmol L^{-1}
0.000	1.44
0.500	1.12
1.000	0.872

[a] At 1 atmosphere pressure.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Volumetric apparatus. Salt solution allowed to enter stirred absorption chamber. Pressure within absorption chamber adjusted to be as near atmospheric pressure as possible. Details in source and ref. 1.	1. High purity sample, purity better than 99.5 mole per cent. 2. Special grade. 3. Distilled.

| | ESTIMATED ERROR:

$\delta s/s$= 0.01 (compiler) |

| | REFERENCES:
1. Yano, T.; Suetaka, T.;
   Umehara, T.
   Nippon Kagaku Kaishi
   <u>1972</u>, *11*, 2194. |

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) Sodium carbonate; Na_2CO_3; [497-19-8] (3) Water; H_2O; [7732-18-5]	Yano, T.; Suetaka, T.; Umehara, T.; Horiuchi, A. *Kagaku Kogaku* <u>1974</u>, *38*, 320-323.

VARIABLES:
     T/K: 298.2
 c_2/mol L^{-1}:   0-1.0
     P/kPa: 101.325
	PREPARED BY:
	
	          C. L. Young

EXPERIMENTAL VALUES:

$$T/K = 298.2$$

Concentration of electrolyte c_2/mol L^{-1}	Solubility[a] of propane /mmol L^{-1}
0.000	1.44
0.500	0.628
1.000	0.301

[a] At 1 atmosphere pressure.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Volumetric apparatus. Salt solution allowed to enter stirred absorption chamber. Pressure within absorption chamber adjusted to be as near atmospheric pressure as possible. Details in source and ref. 1.	1. High purity sample, purity better than 99.5 mole per cent. 2. Special grade. 3. Distilled.
	ESTIMATED ERROR: $\delta s/s$= 0.01 (compiler)
	REFERENCES: 1. Yano, T.; Suetaka, T.; Umehara, T. *Nippon Kagaku Kaishi* <u>1972</u>, *11*, 2194.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Butane; C_4H_{10}; [106-97-8] (2) Z-9-Octadecenoic acid, sodium salt or sodium oleate; $C_{18}H_{33}O_2 \cdot Na$; [143-19-1] (3) Water; H_2O; [7732-18-5]	Zimmels, Y.; Metzer, A. *J. Coll. Interface Sci.* <u>1976</u>, *57*, 75-84.
VARIABLES: $\qquad T/K = 299.2$ $\qquad p_1/kPa = 71.1, 84.4, 97.7$	PREPARED BY: $\qquad$ H. L. Clever

EXPERIMENTAL VALUES:

Temperature		Sodium Oleate	Pressure Range	Henry's Constant[a]	Solubility
$t/^0C$	T/K	$10^5 c_2/\text{mol dm}^{-3}$	p_1/mmHg	K	$\text{cm}^3 (299.2 \text{ K}) \text{ dm}^{-3}$ at 760 mmHg
26	299.2	5	0-533	23.81	
			533-633	23.81	
			633-733	22.72	
				23.66 av.	
			0-733	23.74	32.0
		8	0-533	26.31	
			533-633	25.00	
			633-733	22.72	
				25.57 av.	
			0-733	25.39	29.9
		20	0-533	28.57	
			533-633	25.00	
			633-733	23.25	
				27.19 av.	
			0-733	27.31	27.8
		50	0-533	27.77	
			533-633	25.64	
			633-733	20.41	
				26.18 av.	
			0-733	24.80	30.6
		80	0-533	29.41	
			533-633	27.77	
			633-733	25.00	
				28.49 av	
			0-733	27.65	27.5

AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:

METHOD/APPARATUS/PROCEDURE:

An absorption cell, based on the design of Ben-Naim and Baer (1),was combined with an automated device which acted as a sensitive gas volume meter and constant pressure monitor.

Henry's constant was measured over pressure ranges of 0-533, 533-633 and 633-733 mmHg. The accummulative amount of gas absorbed in the three pressure ranges was summed (av. in above table) and compared with Henry's constant determined over the 0-733 mmHg pressure range.

[a] Henry's constant,

$K/\text{mmHg cm}^3 (299.2 \text{ K}) \text{ dm}^3 =$
$\qquad (p_1/\text{mmHg})/(S/\text{cm}^3 (299.2 \text{ K}) \text{ dm}^{-3}$

The solubility at 299.2 K and 760 mm Hg was calculated by the compiler from the 0-733 mmHg Henry's constant.

The paper shows the solubility of CH_4, C_2H_6, C_3H_8, and C_4H_{10} at 46 ^0C (319.2 K) in aqueous sodium oleate on a small graph.

SOURCE AND PURITY OF MATERIALS:
(1) Butane. Matheson Co., Inc. Stated to be 99.9 per cent or better purity.

(2) Sodium oleate. Prepared by the neutralization of oleic acid (Fluka, 99.5 %) by sodium hydroxide (analytical grade).

(3) Water. Distilled. Specific conductivity $(2\pm0.1)\times10^{-6}\Omega^{-1}\text{cm-}^1$ Surface tension 72.2-72.5 dyne cm^{-1}.

ESTIMATED ERROR:
$\qquad \delta T/K = \pm 0.1$
$\qquad \delta K/K = \pm 0.005$ (authors)

REFERENCES:

1. Ben Naim, A.; Bear, S.
   Trans. Faraday Soc. <u>1963</u>, *59*, 2735.

2. Zimmels, Y.
   Rev. Sci. Instrum. <u>1975</u>, *46*, 726.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) Potassium chloride; KCl; [7747-40-7] (3) Water; H_2O; [7732-18-5]	Yano, T.; Suetaka, T.; Umehara, T.; Horiuchi, A. *Kagaku Kogaku* <u>1974</u>, *38*, 320-323.

VARIABLES:	PREPARED BY:
T/K: 298.2 c_2/mol L^{-1}: 0-1.5 P/kPa: 101.325	C. L. Young

EXPERIMENTAL VALUES:

$$T/K = 298.2$$

Concentration of electrolyte c_2/mol L^{-1}	Solubility[a] of propane /mmol L^{-1}
0.000	1.44
0.250	1.35
0.500	1.14
1.000	0.895
1.500	0.669

[a] At 1 atmosphere pressure.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Volumetric apparatus. Salt solution allowed to enter stirred absorption chamber. Pressure within absorption chamber adjusted to be as near atmospheric pressure as possible. Details in source and ref. 1.	1. High purity sample, purity better than 99.5 mole per cent. 2. Special grade. 3. Distilled.

ESTIMATED ERROR:
$\delta s/s$= 0.01 (compiler)

REFERENCES:

1. Yano, T.; Suetaka, T.;
   Umehara, T.
   Nippon Kagaku Kaishi
   <u>1972</u>, *11*, 2194.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Butane; C_4H_{10}; [106-97-8] (2) Potassium chloride; KCl; [7447-40-7] (3) Water; H_2O; [7732-18-5]	Morrison, T. J.; Billett, F. *J. Chem. Soc.* 1952, 3819 - 3822.

VARIABLES:
    T/K: 285.75 - 344.85
    p/kPa: 101.325 (1 atm)
	PREPARED BY:
	    H. L. Clever

EXPERIMENTAL VALUES:

Temperature			Salt Effect Parameters	
$t/°C$	T/K	$1/(T/K)$	$(1/m_2)\log(S°/S)$ [1]	$(1/m_2)\log(x°/x)$
12.6	285.75	0.0035	0.200	0.215
30.0	303.15	0.0033	0.182	0.197
49.4	322.55	0.0031	0.164	0.179
71.7	344.85	0.0029	0.144	0.159

[1] The authors used $(1/c)\log(S°/S)$ with c defined as g eq. salt per kg of
    water. For the 1-1 electrolyte the compiler changed the c to an m for
    m_2/mol kg^{-1}. The butane solubility S is cm^3(STP) kg^{-1}.

The salt effect parameters were calculated from two measurements, the
solubility of butane in water, S°, and in the one molal salt solution, S.
Only the solubility of the butane in water, and the value of the salt
effect parameter are given in the paper. The solubility values in the
salt solution are not given.

The compiler calculated the values of the salt effect parameter using the
mole fraction gas solubility ratio.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The degassed solvent flows in a thin film down an absorption helix containing the butane gas plus solvent vapor at a total pressure of one atmosphere. The volume of gas absorbed is measured in an attached buret system (1).	(1) Butane. Prepared from Grignard reagent. A second sample, Anglo-Iranian Oil Co. stated to be 99 per cent pure, gave the same result. (2) Potassium chloride. "AnalaR" material. (3) Water. No information given.

	ESTIMATED ERROR: $\delta k/kg^{-1}$ mol = 0.010

	REFERENCES:
	
	    1. Morrison, T. J.; Billett, F.
	       J. Chem. Soc. 1948, 2033.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) Potassium bromide; KBr; [7758-02-3] (3) Water; H_2O; [7732-18-5]	Yano, T.; Suetaka, T.; Umehara, T.; Horiuchi, A. *Kagaku Kogaku* <u>1974</u>, *38*, 320-323.

VARIABLES:	PREPARED BY:
T/K: 298.2 c_2/mol L^{-1}: 0, 0.5 P/kPa: 101.325	C. L. Young

EXPERIMENTAL VALUES:

$$T/K = 298.2$$

Concentration of electrolyte c_2/mol L^{-1}	Solubility[a] of propane /mmol L^{-1}
0.000	1.44
0.500	1.11

[a] At 1 atmosphere pressure.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Volumetric apparatus. Salt solution allowed to enter stirred absorption chamber. Pressure within absorption chamber adjusted to be as near atmospheric pressure as possible. Details in source and ref. 1.	1. High purity sample, purity better than 99.5 mole per cent. 2. Special grade. 3. Distilled.
	ESTIMATED ERROR: $\delta s/s$= 0.01 (compiler)
	REFERENCES: 1. Yano, T.; Suetaka, T.; Umehara, T. *Nippon Kagaku Kaishi* <u>1972</u>, *11*, 2194.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Butane; C_4H_{10}; [106-97-8] (2) Potassium bromide; KBr; [7758-02-3] (3) Water; H_2O; [7732-18-5]	Morrison, T. J.; Johnstone, N. B. B. *J. Chem. Soc.* <u>1955</u>, 3655 - 9.

VARIABLES: T/K = 298.15 p/kPa = 101.325 m_2/mol kg^{-1} = 1.0	PREPARED BY: H. L. Clever

EXPERIMENTAL VALUES:

Temperature		Potassium Bromide	Salt Effect Parameter	
$t/°C$	T/K	m_2/mol kg^{-1}	k_{smm}/kg mol^{-1}	k_{smx}/kg mol^{-1}
25	298.15	1.0	0.174	0.189

The compiler calculated the k_{smx} value.

The salt effect parameter is based on two measurements, the solubility of butane in water and in 1.0 molal KBr solution.

The solubilities are not given in the paper.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The method of Morrison and Billett (1) is used. The previously degassed solvent flows in a thin film down an absorption helix through the solvent vapor saturated butane at a total pressure of one atmosphere. Volume changes are measured in attached calibrated burets.	(1) Butane. British Oxygen Co. Purest sample available. (2) Potassium bromide. No information. (3) Water. No information.
	ESTIMATED ERROR: δk_{smm}/kg mol^{-1} = ± 0.010
	REFERENCES: 1. Morrison, T. J.; Billett, F. *J. Chem. Soc.* <u>1952</u>, 3819.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) Potassium iodide; KI; [7681-11-0] (3) Water; H_2O; [7732-18-5]	Morrison, T. J.; Billett, F. *J. Chem. Soc.* <u>1952</u>, 3819 - 3822.

VARIABLES:
    T/K: 285.75 - 344.85
    p/kPa: 101.325 (1 atm)
	PREPARED BY:
	
	        H. L. Clever

EXPERIMENTAL VALUES:

Temperature			Salt Effect Parameters	
t/°C	T/K	$1/(T/K)$	$(1/m_2)\log(S°/S)$ [1]	$(1/m_2)\log(x°/x)$
12.6	285.75	0.0035	0.121	0.136
30.0	303.15	0.0033	0.103	0.118
49.4	322.55	0.0031	0.085	0.100
71.7	344.85	0.0029	0.067	0.082

[1] The authors used $(1/c)\log(S°/S)$ with c defined as g eq. salt per kg of water. For the 1-1 electrolyte the compiler changed the c to an m for m_2/mol kg^{-1}. The propane solubility S is cm^3(STP) kg^{-1}.

The salt effect parameters were calculated from two measurements, the solubility of propane in water, S°, and in the one molal salt solution, S. Only the solubility of the propane in water, and the value of the salt effect parameter are given in the paper. The solubility values in the salt solution are not given.

The compiler calculated the values of the salt effect parameter using the mole fraction gas solubility ratio.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The degassed solvent flows in a thin film down an absorption helix containing the propane gas plus solvent vapor at a total pressure of one atmosphere. The volume of gas absorbed is measured in an attached buret system (1).	(1) Propane. Prepared from Grignard reagent. (2) Potassium iodide. "AnalaR" material. (3) Water. No information given.
	ESTIMATED ERROR: $\delta k/kg^{-1}$ mol = 0.010
	REFERENCES: 1. Morrison, T. J.; Billett, F. *J. Chem. Soc.* <u>1948</u>, 2033.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Butane; C_4H_{10}; [106-97-8] (2) Potassium iodide; KI; [7681-11-0] (3) Water; H_2O; [7732-18-5]	Morrison, T. J.; Billett, F. J. Chem. Soc. 1952, 3819 - 3822.

VARIABLES:	PREPARED BY:
T/K: 285.75 - 344.85 p/kPa: 101.325 (1 atm)	H. L. Clever

EXPERIMENTAL VALUES:

	Temperature		Salt Effect Parameters	
t/°C	T/K	$1/(T/K)$	$(1/m_2)\log(S°/S)$ [1]	$(1/m_2)\log(x°/x)$
12.6	285.75	0.0035	0.109	0.124
30.0	303.15	0.0033	0.098	0.113
49.4	322.55	0.0031	0.080	0.095
71.7	344.85	0.0029	0.059	0.074

[1] The authors used $(1/c)\log(S°/S)$ with c defined as g eq. salt per kg of water. For the 1-1 electrolyte the compiler changed the c to an m for $m_2/mol\ kg^{-1}$. The butane solubility S is $cm^3(STP)\ kg^{-1}$.

The salt effect parameters were calculated from two measurements, the solubility of butane in water, S°, and in the one molal salt solution, S. Only the solubility of the butane in water, and the value of the salt effect parameter are given in the paper. The solubility values in the salt solution are not given.

The compiler calculated the values of the salt effect parameter using the mole fraction solubility ratio.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The degassed solvent flows in a thin film down an absorption helix containing the butane gas plus solvent vapor at a total pressure of one atmosphere. The volume of gas absorbed is measured in an attached buret system (1).	(1) Butane. Prepared from Grignard reagent. A second sample, Anglo-Iranian Oil Co. stated to be 99 per cent pure, gave the same result. (2) Potassium iodide. "AnalaR" material. (3) Water. No information given.

	ESTIMATED ERROR:
	$\delta k/kg^{-1}mol = 0.010$

	REFERENCES:
	1. Morrison, T. J.; Billett, F. J. Chem. Soc. 1948, 2033.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Butane; C_4H_{10}; [106-97-8] (2) Sea Salt (synthetic) (3) Water; H_2O; [7732-18-5]	Rice, P. A.; Gale, R. P.; Barduhn, A. J. *J. Chem. Eng. Data* <u>1976</u>, *21*, 204-6.

| VARIABLES:
    T/K = 276.15 - 292.15
    p_1/kPa = 101.325
Sea salt/wt % = 0, 3.5, 7.0 | PREPARED BY:

        H. L. Clever |

EXPERIMENTAL VALUES:

Temperature		Sea Salt wt %	Butane Solubility ppm
$t/°C$	T/K		
3	276.15	0	(181.1) 182.4
		3.5	114.1
		7.0	78.5
11	284.15	0	(122.7)
		3.5	83.1
		7.0	54.8
15	288.15	0	(105.1)
		3.5	75.0
19	292.15	0	(92.1) 91.9
		3.5	63.5
		7.0	45.5

The compiler added the T/K values. He also added the smoothed water solubility values in ( ) which were calculated from the author's data. See equation on the author's butane + water data.

The synthetic sea salt was prepared by weighing five salts to give the ppm (by weight) of NaCl 24,067, $MgCl_2$ 5,107, Na_2SO_4 4,016, $CaCl_2$ 1,130, and KCl 680 (1).

ppm = parts per million by weight

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The solubility equilibrium was established in a one liter Pyrex cell with a Plexiglass top with ports for sampling, pressure connection, vacuum line, and introduction of the gas. About 700 cm³ of solvent was placed in the cell; it was sealed, thermostated, and evacuated to the vapor pressure of the solvent for about one hour to degass the solvent. Butane gas was added and the system was stirred for 24-48 hours. It was assumed that equilibrium was established when no pressure change was observed in a four hour period. Saturation was approached from both a higher and a lower temperature. Samples of the liquid were taken in a microliter syringe. The samples were injected directly into a total carbon analyzer. Three to nine samples were analyzed from one or more runs. The results were averaged to give the results above.	(1) Butane. Source not given. Stated to be 99.5 % instrument purity. (2) Synthetic sea salt components. Reagent grade chemicals. All were dried, cooled and weighed except the $MgCl_2$ which was taken from a freshly opened bottle as $MgCl_2·6H_2O$. (3) Water. No information.

ESTIMATED ERROR:

$$\delta T/K = 0.02$$
$$\delta pmm/pmm = 0.01$$

REFERENCES:

1. Tallmadge, J. A.; Butt, J. B.;
       Solomon, H. J.
   Ind. Eng. Chem. <u>1964</u>, *56*(7), 46.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) Urea; CH_4N_2O; [57-13-6] (3) Water; H_2O; [7732-18-5]	Wen, W.-Y.; Hung, J.H. *J. Phys. Chem.* <u>1970</u>, *74*, 170-180.

VARIABLES:	PREPARED BY:
T/K: 278.15-308.15 P/kPa: 101.325 (1 atm) m_3/mol kg^{-1}: 0-0.495	H.L. Clever

EXPERIMENTAL VALUES:

T/K	Urea Molality m_3/mol kg^{-1}	Propane Solubility S_1/cm^3(STP) kg^{-1}	Setchenow Constant[1] k/kg mol^{-1}
278.15	0 0.495	69.57 ± 0.11 69.10	+0.013
288.15	0 0.495	45.75 ± 0.06 46.08	-0.002
298.15	0 0.495	32.31 ± 0.08 32.66	-0.10
308.15	0 0.495	23.91 ± 0.07 24.72	-0.012

[1] Setchenow constant, k/kg mol^{-1} = $(1/(m_3/\text{mol kg}^{-1}))$ log (S_1^o/S_1).

The authors specify the value of the constant for m_3/mol kg^{-1} = 0.1.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus was similar to that described by Ben-Naim and Baer (1). Teflon needle valves were used in place of stopcocks. The apparatus consists of three main parts, a dissolution cell of 300 to 600 cm^3 capacity, a gas volume measuring column, and a manometer. The solvent is degassed in the dissolution cell, the gas is introduced and dissolved while the liquid is kept stirred by a magnetic stirrer immersed in the water bath. Dissolution of the gas results in the change in the height of a column of mercury which is measured by a cathetometer.	1. Propane. Matheson Co. Stated to be better than 99.9 per cent pure. 2. Urea. No information. 3. Water. Distilled from an all Pyrex apparatus. Specific conductivity 1.5 x 10^{-6} (ohm cm)$^{-1}$.

	ESTIMATED ERROR:
	δT/K = ±0.005 $\delta S_1/S_1$ = ±0.003

	REFERENCES:
	1. Ben-Naim, A.; Baer, S. *Trans. Faraday Soc.* <u>1963</u>, *59*, 2735.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) Urea; CH_4N_2O; [57-13-6] (3) Water; H_2O; [7732-18-5]	Wetlaufer, D.B.; Malik, S.K.; Stoller, L.; Coffin, R.L. *J. Am. Chem. Soc.* 1964, *86*, 508-514.

VARIABLES:	PREPARED BY:
T/K: 278.15-318.15 c_2/mol dm^{-3}: 6.96 P/kPa: 101.325	W. Hayduk, C.L. Young

EXPERIMENTAL VALUES:

T/K	Urea conc.[1] c_2/mol dm^{-3}	Solution molar volume[1] /cm^{3}mol^{-1}	Solubility[1] s_1/mmol dm^{-3}	Mole Fraction[2] /$10^5 x_1$	Ostwald Coeff.[2] L/cm^{3}cm^{-3}	Bunsen Coeff.[2] α
278.15	6.96	(45.15)[3]	2.49	5.52	0.0557	0.0546
298.15	6.96	44.95	1.50	3.34	0.0361	0.0329
318.15	6.96	(44.65)	1.12	2.51	0.0289	0.0246

[1]Original data.

[2]Calculated by compilers using real gas molar volumes.

[3]Molar volumes of solvent shown in brackets were estimated.

[4]No correction was made for the amount of gas retained by the solvent during extraction, estimated by the authors to be 1-1.5 per cent; hence the results are expected to be too low by this amount.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
A modified Van Slyke-Neill manometric blood gas apparatus, fitted with a magnetic stirrer was used. The solvent was saturated with gas; then a sample was transferred to the Van Slyke extraction chamber for gas desorption and volume measurement.	1. Matheson Co. Instrument grade; minimum specified purity 99.5 per cent. 2. Commercial sample, purified by two recrystallizations from 65 per cent ethanol. 3. Distilled.
	ESTIMATED ERROR: δT/K = 0.05 $\delta s_1/s_1$ = 0.02 (authors)[4]
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Butane; C_4H_8; [106-97-8] (2) Urea; CH_4N_2O; [57-13-6] (3) Water; H_2O; [7732-18-5]	Wetlaufer, D.B.; Malik, S.K.; Stoller, L.; Coffin, R.L. *J. Am. Chem. Soc.* 1964, *86*, 508-514.

VARIABLES:	PREPARED BY:
T/K: 278.15-318.15 c_2/mol dm^{-3}: 6.96 P/kPa: 101.325	W. Hayduk, C.L. Young

EXPERIMENTAL VALUES:

T/K	Urea conc.[1] c_2/mol dm^{-3}	Solution molar volume[1] /cm^{3}mol^{-1}	Solubility[1] s_1/mmol dm^{-3}	Mole Fraction[2] /$10^5 x_1$	Ostwald Coeff.[2] L/cm^{3}cm^{-3}	Bunsen Coeff.[2] α
278.15	6.96	(45.15)[3]	2.63	5.83	0.0576	0.0564
298.15	6.96	44.95	1.44	3.20	0.0341	0.0309
318.15	6.96	(44.65)	0.98	2.20	0.0250	0.0210

[1]Original data.

[2]Calculated by compilers using real gas molar volumes.

[3]Molar volumes of solvent shown in brackets were estimated.

[4]No correction was made for the amount of gas retained by the solvent during extraction, estimated by the authors to be 1-1.5 per cent; hence the results are expected to be too low by this amount.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
A modified Van Slyke-Neill manometric blood gas apparatus, fitted with a magnetic stirrer was used. The solvent was saturated with gas; then a sample was transferred to the Van Slyke extraction chamber for gas desorption and volume measurement.	1. Matheson Co. C.P. grade; minimum specified purity 99 percent. 2. Commercial sample, purified by two recrystallizations from 65 per cent ethanol. 3. Distilled.

ESTIMATED ERROR:

$$\delta T/K = 0.05$$

$$\delta s_1/s_1 = 0.02 \quad \text{(authors)}[4]$$

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) 2-Methylpropane; C_4H_{10}; [75-28-5]	Wetlaufer, D.B.; Malik, S.K.; Stoller, L.; Coffin, R.L.
(2) Urea; CH_4N_2O; [57-13-6]	*J. Am. Chem. Soc.* 1964, 86, 508-514.
(3) Water; H_2O; [7732-18-5]	

VARIABLES: T/K: 278.15-318.15 c_2/mol dm^{-3}: 6.96 P/kPa: 101.325	PREPARED BY: W. Hayduk, C.L. Young

EXPERIMENTAL VALUES:

T/K	Urea conc.[1] c_2/mol dm^{-3}	Solution molar volume[1] /cm^{3}mol^{-1}	Solubility[1] s_1/mmol dm^{-3}	Mole Fraction[2] /$10^5 x_1$	Ostwald Coeff.[2] L/cm^{3}cm^{-3}	Bunsen Coeff.[2] α
278.15	6.96	(45.15)[3]	1.92	4.25	0.0421	0.0412
298.15	6.96	44.95	1.13	2.51	0.0268	0.0243
318.15	6.96	(44.65)	0.80	1.79	0.0204	0.0172

[1]Original data.

[2]Calculated by compilers using real gas molar volumes.

[3]Molar volumes of solvent shown in brackets were estimated.

[4]No correction was made for the amount of gas retained by the solvent during extraction, estimated by the authors to be 1-1.5 per cent; hence the results are expected to be too low by this amount.

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	ESTIMATED ERROR: $\delta T/K = 0.05$ $\delta s_1/s_1 = 0.02$ (authors)[4]
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