

COMPONENTS:		ORIGINAL MEASUREMENTS:	
1. Ammonia; NH ₃ ; [7664-41-7] 2. Aliphatic chloro-compounds.		Bell, R.P. <i>J. Chem. Soc.</i> <u>1931</u> , 1371-1382.	
VARIABLES:		PREPARED BY: C.L. Young.	
EXPERIMENTAL VALUES:		Partition coefficient, s^+	Mole fraction § of ammonia in liquid, x_{NH_3}
Solvent	T/K		
Tetrachloromethane; (Carbon tetrachloride); CCl ₄ ; [56-23-5]	293.15	7.17	0.0281
1,2-Dichloroethane; (Ethylene chloride); C ₂ H ₄ Cl ₂ ; [107-06-2]		26.6	0.0797
Trichloromethane; (Chloroform); CHCl ₃ ; [67-66-3]		69.8	0.193
s^+ defined as $s = 22.4 \times \frac{293}{273} \times c$ where c is the "solubility in equivalents/litre". § for a partial pressure of 101.325 kPa.			
AUXILIARY INFORMATION			
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:	
Volumetric apparatus consisting of bulb (~50cm ³ capacity) extended at the top as a graduated tube and joined at bottom to a capillary u-tube. Liquid saturated with gas at atmospheric pressure. Gas withdrawn in a current of air, absorbed in hydrochloric acid. Excess hydrochloric acid titrated with sodium hydroxide.		1. Obtained from cylinder, no other details given. 2. Merck and Kahlbaum samples dried over calcium chloride and fractionally distilled.	
		ESTIMATED ERROR: $\delta T/K = \pm 0.1$; $\delta x_{\text{NH}_3} = \pm 1\%$ (estimated by compiler)	
		REFERENCES:	

COMPONENTS: 1. Ammonia; NH ₃ ; [7664-41-7] 2. Trichloromethane, (Chloroform); CHCl ₃ ; [67-66-3]	ORIGINAL MEASUREMENTS: Seward, R.P. <i>J. Am. Chem. Soc.</i> <u>1932</u> , 54, 4598-605.																																								
VARIABLES: Pressure	PREPARED BY: P.G.T. Fogg.																																								
EXPERIMENTAL VALUES: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Concentration in liquid phase mol_{NH₃}/dm³ soln.</th> <th style="text-align: center;">Concentration in vapor phase mol_{NH₃}/dm³</th> <th style="text-align: center;">p_{NH_3}/mmHg</th> <th style="text-align: center;">Mole fraction in * liquid phase x_{NH_3}</th> </tr> </thead> <tbody> <tr><td>1.105</td><td>0.0244</td><td>453.5</td><td>0.0841</td></tr> <tr><td>0.851</td><td>0.0175</td><td>325.4</td><td>0.0656</td></tr> <tr><td>0.661</td><td>0.0132</td><td>245.4</td><td>0.0515</td></tr> <tr><td>0.423</td><td>0.00814</td><td>151.3</td><td>0.0334</td></tr> <tr><td>0.392</td><td>0.00749</td><td>139.2</td><td>0.0310</td></tr> <tr><td>0.246</td><td>0.00474</td><td>88.1</td><td>0.0196</td></tr> <tr><td>0.1157</td><td>0.002215</td><td>41.2</td><td>0.00928</td></tr> <tr><td>0.0888</td><td>0.001716</td><td>31.9</td><td>0.00713</td></tr> <tr><td>0.0393</td><td>0.000756</td><td>14.0</td><td>0.00316</td></tr> </tbody> </table> <p>Temperature = 298.2 K 760 mmHg = 1 atm = 1.013 x 10⁵Pa</p> <p>The density of the chloroform was given as 1.480 ± 0.002 g cm⁻³ The density of a solution containing 1.315 mol_{NH₃} dm³ was given as 1.450 g cm⁻³</p> <p>* The compiler has calculated densities of other solutions by assuming a linear relationship between molar concentration and density and has then calculated mole fraction concentrations.</p>		Concentration in liquid phase mol _{NH₃} /dm ³ soln.	Concentration in vapor phase mol _{NH₃} /dm ³	p_{NH_3} /mmHg	Mole fraction in * liquid phase x_{NH_3}	1.105	0.0244	453.5	0.0841	0.851	0.0175	325.4	0.0656	0.661	0.0132	245.4	0.0515	0.423	0.00814	151.3	0.0334	0.392	0.00749	139.2	0.0310	0.246	0.00474	88.1	0.0196	0.1157	0.002215	41.2	0.00928	0.0888	0.001716	31.9	0.00713	0.0393	0.000756	14.0	0.00316
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METHOD/APPARATUS/PROCEDURE: The apparatus consisted of a lower bulb of capacity 50 cm ³ connected via a stopcock to an upper bulb of capacity of about 1 dm ³ . Each bulb was fitted with another stopcock to allow filling and emptying. About 25 cm ³ of ammonia in chloroform was introduced into the lower bulb for each determination. The apparatus was placed in a thermostat and, in addition, inverted several times to allow liquid to pass back and forth from bulb to bulb. All liquid was then allowed to drain into the lower bulb and the connecting stopcock closed. The ammonia in the liquid phase in the smaller bulb and that in the gas phase in the larger bulb was estimated by titration. The pressure of ammonia was calculated from the concentration in the gas phase by assuming that the ideal gas law and Dalton's law were obeyed. Densities were measured with a pycnometer.	SOURCE AND PURITY OF MATERIALS: 2. U.S.P. standard; traces of ethanol removed by conc. H ₂ SO ₄ or anhydrous ZnCl ₂ ; washed and dried over K ₂ CO ₃ ; 0.1 wt % ethanol then added to inhibit oxidation.																																								
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COMPONENTS: 1. Ammonia; NH_3 ; [7664-41-7] 2. 1-Chlorooctane; $\text{C}_8\text{H}_{16}\text{Cl}$; [111-85-3]	ORIGINAL MEASUREMENTS: Gerrard, W.; Maladkar, V.K. <i>Chem. Ind.</i> <u>1970</u> , 925-926. Maladkar, V.K. Thesis, Univ. of London, <u>1970</u>						
VARIABLES:	PREPARED BY: P.G.T. Fogg						
EXPERIMENTAL VALUES: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">T/K</th> <th style="text-align: center;">Moles NH_3/moles $\text{C}_8\text{H}_{16}\text{Cl}$ (1 atm)</th> <th style="text-align: center;">Mole fraction* x_{NH_3} (1 atm.)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">273.2</td> <td style="text-align: center;">0.246</td> <td style="text-align: center;">0.197</td> </tr> </tbody> </table> <p>* Calculated by compiler. 1 atm = 1.013×10^5 Pascal</p>		T/K	Moles NH_3 /moles $\text{C}_8\text{H}_{16}\text{Cl}$ (1 atm)	Mole fraction* x_{NH_3} (1 atm.)	273.2	0.246	0.197
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273.2	0.246	0.197					
AUXILIARY INFORMATION							
METHOD/APPARATUS/PROCEDURE: Ammonia at barometric pressure was bubbled through a weighed quantity (about 2 g) of solvent in a glass vessel held in a thermostat until saturation was achieved. The concentration of ammonia was calculated from the increase in weight of the vessel after an allowance had been made for the weight of ammonia in the gas phase above the saturated solution. Details of the apparatus are given in ref. (1).	SOURCE AND PURITY OF MATERIALS: <ol style="list-style-type: none"> Obtained from a cylinder; dried by KOH pellets and a cold trap. Dried over CaCl_2; distilled under reduced pressure. ESTIMATED ERROR: REFERENCES: <ol style="list-style-type: none"> Gerrard, W. "Solubility of Gases and Liquids", Plenum Press, New York, <u>1976</u> p.3. 						

COMPONENTS:		ORIGINAL MEASUREMENTS:			
(1) Ammonia; NH_3 ; [7664-41-7] (2) Chlorobenzene; $\text{C}_6\text{H}_5\text{Cl}$; [108-90-7]		Short, I.; Sahgal, A.; Hayduk, W. <i>J. Chem. Eng. Data</i> <u>1983</u> ,			
VARIABLES: T/K : 263.15-333.15 P/kPa : 101.325		PREPARED BY: W. Hayduk			
EXPERIMENTAL VALUES:					
T/K	Ostwald Coefficient ¹ $\text{L}/\text{cm}^3 \text{ cm}^{-3}$	Bunsen Coefficient ² $\alpha/\text{cm}^3 \text{ (STP) cm}^{-3} \text{ atm}^{-1}$	Mole Fraction ¹ $10^4 x_1$		
263.15	21.9	22.73	924 (924.0) ³		
298.15	10.10	9.25	409 (409.0)		
333.15	5.24	4.30	200 (200.0)		
¹ Original data					
² Calculated by compiler					
³ The mole fraction solubility of the original data was used to determine the following equations for ΔG° and $\ln x_1$ and table of smoothed values: $\Delta G^\circ/\text{J mol}^{-1} = -RT \ln x_1 = 475.60 T \ln T - 2391.2 T - 167.80$ $\ln x_1 = 204.49/T - 5.79607 \ln T + 29.1412$					
T/K	$10^{-4} \Delta G^\circ/\text{J mol}^{-1}$	$10^4 x_1$	T/K	$10^{-4} \Delta G^\circ/\text{J mol}^{-1}$	$10^4 x_1$
263.15	5.143	924.0	303.15	8.220	367.2
273.15	5.886	723.5	313.15	9.029	297.8
283.15	6.648	572.1	323.15	9.855	243.2
293.15	7.425	456.4	333.15	10.69	200.0
298.15	7.820	409.0			
AUXILIARY INFORMATION					
METHOD/APPARATUS/PROCEDURE:			SOURCE AND PURITY OF MATERIALS:		
A volumetric method using a glass apparatus was employed. Degassed solvent contacted the gas while flowing as a thin film, at a constant rate, through an absorption spiral into a solution buret. A constant solvent flow was obtained by means of a calibrated syringe pump. The solution at the end of the spiral was considered saturated. Dry gas was maintained at atmospheric pressure in a gas buret by mechanically raising the mercury level in the buret at an adjustable rate. The solubility was calculated from the constant slope of volume of gas dissolved and volume of solvent injected. Degassing was accomplished using a two stage vacuum process described by Clever et al. (1).			1. Liquid Carbonic. Specified minimum purity 99.99 per cent.		
			2. Canlab. Baker Analyzed grade of minimum specified purity 99.0 per cent.		
			ESTIMATED ERROR: $\delta T/\text{K} = 0.1$ $\delta x_1/x_1 = 0.01$		
			REFERENCES: 1. Clever, H.L.; Battino, R.; Saylor, J.H.; Gross, P.M. <i>J. Phys. Chem.</i> <u>1957</u> , <i>61</i> , 1078.		