

COMPONENTS: (1) Propane; C ₃ H ₈ ; [74-98-6] Butane; C ₄ H ₁₀ ; [106-97-8] (2) Polar solvents, at high pressure	EVALUATOR: Walter Hayduk Department of Chemical Engineering University of Ottawa November, 1984
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CRITICAL EVALUATION:

The solubilities of both *propane* and *butane* were reported in 1,2-ethoxyethane (ethylene oxide) for pressures above 101.325 kPa by Hess and Tilton¹. The data for the solubility of *propane* obey Henry's law for the relatively low pressures involved and appear consistent. No comparable data are available; these data are classified as tentative. In contrast, the data for the solubility of *butane* in the same solvent appear quite inconsistent, they do not obey Henry's law even approximately even although at the relatively low pressures involved, they would be expected to. It is not possible to assess whether or not the low pressure solubility corresponding to 101 kPa (and a total pressure of approximately 202 kPa) is accurate; hence these data for *butane* are classified as doubtful. See also the Critical Evaluation for the solubility of *ethane* in the same solvent by the same authors².

References

1. Hess, L.G.; Tilton, V.V. *Ind. Eng. Chem.* 1950, *42*, 1251-1258.
2. Hayduk, W., Ed. *IUPAC Solubility Data Series, Ethane, Pergamon Press, Oxford, England* 1982, *11*, 197.

COMPONENTS:		ORIGINAL MEASUREMENTS:			
(1) Propane; C_3H_8 ; [74-98-6]		Hess, L. G.; Tilton, V. V.			
(2) 1,2-Epoxyethane (Ethylene oxide); C_2H_4O ; [75-21-8]		<i>Ind. Eng. Chem.</i> <u>1950</u> , 42, 1251-1258.			
VARIABLES:		PREPARED BY:			
T/K : 303.2, 318.2 P/kPa : 208.1-446.0		C. L. Young			
EXPERIMENTAL VALUES:					
t^a/C	T^b/K	Total pressure, ^a pounds per square inch gauge /psig	Mass per cent ^a in solution	Henry's constant ^b H/atm	Mole fraction ^b $/x_1$
30	303.2	30	4.7	21.7	0.047
30	303.2	40	7.9	21.5	0.079
30	303.2	50	11.1	21.5	0.111
45	318.2	50	3.7	31.4	0.037
45	318.2	60	5.9	31.2	0.059
45	318.2	70	8.1	31.2	0.081
<p>^a Original data.</p> <p>^b Calculated by compiler. Original data obeys Henry's law hence Henry's law constant is given. The mole fraction corresponding to gas partial pressure of 101.325 kPa is calculated to be 0.047. It is noted that solvent normal boiling point is 286.7 K.</p>					
AUXILIARY INFORMATION					
METHOD/APPARATUS/PROCEDURE:			SOURCE AND PURITY OF MATERIALS:		
High pressure, steel flow apparatus consisting of two presaturators for the gas and an equilibrium vessel containing a stirrer operated by a solenoid. The gas is supersaturated in the first saturator at a temperature 10 K above the equilibrium temperature. A steady flow of gas is made for at least 2 h after which liquid and vapor samples are withdrawn for analysis at 1-h intervals. Equilibrium indicated by constant consecutive compositions of both phases.			Source and purities not available.		
Details in ref. (1)			ESTIMATED ERROR: $\delta T/K = 0.1$; $\delta x_1/x_1 = \delta H/H = 0.10$ (estimated by compiler).		
			REFERENCES: 1. Wan, S.-W.; Dodge, B. F. <i>Ind. Eng. Chem.</i> <u>1940</u> , 32, 95.		

COMPONENTS:		ORIGINAL MEASUREMENTS:		
(1) Butane; C ₄ H ₁₀ ; [106-97-8]		Hess, L. G.; Tilton, V. V.		
(2) 1,2-Epoxyethane (Ethylene oxide); C ₂ H ₄ O; [75-21-8]		<i>Ind. Eng. Chem.</i> <u>1950</u> , 42, 1251-1258.		
VARIABLES:		PREPARED BY:		
T/K: 303.2		C. L. Young		
P/kPa: 308.1-583.8				
EXPERIMENTAL VALUES:				
t ^a /C	T ^b /K	Total pressure, ^a pounds per square inch /psig	Mass percent ^a in solution	Mole fraction ^b /x ₁
30	303.2	30	26.2	0.212
30	303.2	40	31.7	0.260
30	303.2	50	33.0	0.272
<p>^a Original data.</p> <p>^b Calculated by compiler.</p>				
AUXILIARY INFORMATION				
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:		
<p>High pressure, steel flow apparatus consisting of two presaturators for the gas and an equilibrium vessel containing a stirrer operated by a solenoid. The gas is supersaturated in the first saturator at a temperature 10 K above the equilibration temperature. A steady flow of gas is made for at least 2 h after which liquid and vapor samples are withdrawn for analysis at 1-h intervals. Equilibrium indicated by constant consecutive compositions of both phases.</p> <p>Details in ref. (1).</p>		<p>Source and purities not available.</p>		
		ESTIMATED ERROR:		
		$\delta T/K = 0.1$; $\delta x_1/x_1 = \delta H/H$ $= 0.10$ (estimated by compiler).		
		REFERENCES:		
		<p>1. Wan, S.-W.; Dodge, B. F. <i>Ind. Eng. Chem.</i> <u>1940</u>, 32, 95.</p>		