COMPONENTS:	EVALUATOR:
(1) Propane; C_3H_8; [74-98-6] (2) Two-component, non-aqueous solvent solutions	Walter Hayduk Department of Chemical Engineering University of Ottawa Ottawa, Canada K1N 9B4 November, 1984

CRITICAL EVALUATION:

Solubilities are available for *propane* in four two-component, non-aqueous solvent solutions; two of these contain the salt *sodium iodide* dissolved in *2-propanone (acetone)* and in *N, N-dimethylformamide* while the other two contain *octadecanoic (stearic) acid* also dissolved in *2-propanone* and *N, N-dimethylformamide*. The solubility data for *propane* in *2-propanone*, and *N, N-dimethylformamide*, of Rosenthal[1] have been examined elsewhere in this volume and found to be approximately 3-5 percent, and 10-15 percent, respectively, higher than other comparable data. It appears likely that the relative effects of the *sodium iodide* salt and *octadecanoic acid* on the solubility of *propane* in *2-propanone* and *N, N-dimethylformamide* are significant even although the actual solubilities may not be accurate. The presence of *sodium iodide* salt appreciably reduces the solubility of *propane* in both solvents; while the presence of *octadecanoic acid* slightly increases the solubility of *propane* in both solvents. These data are classified as tentative.

References

1. Rosenthal, W.; *Thès. fac. sci. Univ. Strasbourg (France)*, 1954.

COMPONENTS:

(1) Propane; C_3H_8; [74-98-6]

(2) Sodium iodide; NaI; [7681-82-5]

(3) 2-Propanone (acetone); C_3H_6O; [67-64-1]

ORIGINAL MEASUREMENTS:

Rosenthal, W.

Thès. fac. sci. Univ. Strasbourg (France) 1954.

VARIABLES:

T/K: 293.15

P/kPa: 101.325

m_2/mol kg^{-1}: 0 - 1.30

PREPARED BY:

W. Hayduk

EXPERIMENTAL VALUES:

T/K	Salt concentration in solvent: Mass fraction[1] c_2/g g^{-1}	Salt concentration in solvent: Molar conc.[2] m_2/mol kg^{-1}	Ostwald Coefficient[1] L/cm^3 cm^{-3}	Setschenow Constant[2] k_{scL}/kg mol^{-1}
293.15	0	0	11.76	
	0.1275	0.851	7.93	0.201
	0.1947	1.299	6.47	0.200

[1] Original data. The salt concentration was expressed as mass of salt per unit mass of salt solution.

[2] Molar concentration and Setschenow constant calculated by compiler as follows:

$$k_{scL} = (m_2)^{-1} \log (L^0 L^{-1})$$

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

The prepared solvent solution was charged into an evacuated cell after degassing, and the mass of solvent was determined by weight. Gas was introduced into the cell from a measuring burette in which the gas was stored over mercury. The cell was agitated while the gas pressure was maintained by adjusting the gas volume. The Ostwald coefficient was determined from the mass of solvent and volume of gas used. Solubilities were measured at pressures above and below atmospheric.

SOURCE AND PURITY OF MATERIALS:

1. Source and purity not given.
2. Source and purity not given. Recrystallized from water and dried.
3. Research grade. Purity not given. Dried and distilled.

ESTIMATED ERROR:

δT/K = 0.2

δP/kPa = 0.1

$\delta L/L$ = 0.02 (compiler)

REFERENCES:

COMPONENTS:

(1) Propane; C_3H_8; [74-98-6]

(2) Sodium iodide; NaI; [7681-82-5]

(3) N,N-Dimethylformamide; C_3H_7NO; [68-12-2]

ORIGINAL MEASUREMENTS:

Rosenthal, W.

Thès. fac. sci. Univ. Strasbourg (France) 1954.

VARIABLES:

T/K: 293.15

P/kPa: 101.325

m_2/mol kg^{-1}: 0,0.360

PREPARED BY:

W. Hayduk

EXPERIMENTAL VALUES:

T/K	Salt concentration in solvent: Mass fraction[1] c_2/g g^{-1}	Molar conc.[2] m_2/mol kg^{-1}	Ostwald Coefficient[1] L/cm^3 cm^{-3}	Setschenow Constant[2] k_{scL}/kg mol^{-1}
293.15	0	0	5.68	
	0.3603	0.3603	4.51	0.278

[1] Original data. The salt concentration was expressed as mass of salt per unit mass of salt solution.

[2] Molar concentration and Setschenow constant calculated by compiler as follows:

$$k_{scL} = (m_2)^{-1} \log (L^0 L^{-1})$$

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

The prepared solvent solution was charged into an evacuated cell after degassing, and the mass of solvent was determined by weight. Gas was introduced into the cell from a measuring burette in which the gas was stored over mercury. The cell was agitated while the gas pressure was maintained by adjusting the gas volume. The Ostwald coefficient was determined from the mass of solvent and volume of gas used. Solubilities were measured at pressures above and below atmospheric.

SOURCE AND PURITY OF MATERIALS:

1. Source and purity not given.
2. Source and purity not given.
3. S.E.P.P.I.C. of Paris. Purity not given. Exposure to air avoided. Distilled prior to use.

ESTIMATED ERROR:

δT/K = 0.2

δP/kPa = 0.1

$\delta L/L$ = 0.02 (compiler)

REFERENCES:

COMPONENTS:

(1) Propane; C_3H_8; [74-98-6]

(2) Octadecanoic (stearic) acid; $C_{18}H_{36}O_2$; [57-11-4]

(3) 2-Propanone (acetone); C_3H_6O; [67-64-1]

ORIGINAL MEASUREMENTS:

Rosenthal, W.

Thès. fac. sci. Univ. Strasbourg (France) 1954.

VARIABLES:

T/K: 293.15

P/kPa: 101.325

w_2/mass fraction: 0-0.0293

PREPARED BY:

W. Hayduk

EXPERIMENTAL VALUES:

T/K	Stearic acid conc. in solvent: Mass fraction[1] w_2	Mole fraction[2] x_2	Ostwald Coefficient[1] L/cm³cm⁻³	Bunsen Coefficient[2] α/cm³(STP)cm⁻³	Mole Fraction[2] x_1
293.15	0	0	11.76	10.91	0.0353
	0.01495	0.00309	11.92	11.06	0.0361
	0.0293	0.00613	11.95	11.09	0.0365

[1] Original data based on mass fraction stearic acid in gas-free solution.

[2] Calculated by compiler.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

The prepared solvent solution was charged into an evacuated cell after degassing, and the mass of solvent was determined by weight. Gas was introduced into the cell from a measuring burette in which the gas was stored over mercury. The cell was agitated while the gas pressure was maintained by adjusting the gas volume. The Ostwald coefficient was determined from the mass of solvent and volume of gas used. Solubilities were measured at pressures above and below atmospheric.

SOURCE AND PURITY OF MATERIALS:

1. Source and purity not given.
2. Merck. Melting point 69.3°C. Used without further purification.
3. Research grade. Purity not given. Dried and distilled.

ESTIMATED ERROR:

δT/K = 0.2

δP/kPa = 0.1

$\delta L/L$ = 0.02 (compiler)

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Propane; C_3H_8; [74-98-6] (2) Octadecanoic (stearic) acid; $C_{18}H_{36}O_2$; [57-11-4] (3) N,N-Dimethylformamide; C_3H_7NO; [68-12-2]	Rosenthal, W. *Thès. fac. sci. Univ. Strasbourg (France)* 1954.
VARIABLES: T/K: 293.15 P/kPa: 101.325 w_2/mass fraction: 0-0.0342	**PREPARED BY:** W. Hayduk

EXPERIMENTAL VALUES:

T/K	Stearic acid conc. in solvent: Mass fraction[1] w_2	Mole fraction[2] x_2	Ostwald Coefficient[1] L/cm^3cm^{-3}	Bunsen Coefficient[2] $\alpha/cm^3(STP)cm^{-3}$	Mole Fraction[2] x_1
293.15	0	0	5.68	5.27	0.0182
	0.0172	0.00448	5.78	5.36	0.0187
	0.0342	0.00902	5.98	5.55	0.0196

[1] Original data based on mass fraction stearic acid in gas-free solution.

[2] Calculated by compiler.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

The prepared solvent solution was charged into an evacuated cell after degassing, and the mass of solvent was determined by weight. Gas was introduced into the cell from a measuring burette in which the gas was stored over mercury. The cell was agitated while the gas pressure was maintained by adjusting the gas volume. The Ostwald coefficient was determined from the mass of solvent and volume of gas used. Solubilities were measured at pressures above and below atmospheric.

SOURCE AND PURITY OF MATERIALS:

1. Source and purity not given
2. Merck. Melting point 69.3 °C. Used without further purification.
3. S.E.P.P.I.C. of Paris. Purity not given. Exposure to air avoided. Distilled prior to use.

ESTIMATED ERROR:

$\delta T/K = 0.2$
$\delta P/kPa = 0.1$
$\delta x_1/x_1 = 0.02$ (compiler)

REFERENCES: