| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| 1. *N*-Methylmethanamine, (dimethylamine); $C_2H_7N$; [124-40-3]<br>2. Hexane; $C_6H_{14}$; [110-54-3] | Wolff, H.; Höppel, H.-E.<br>*Ber. Bunsenges. Phys. Chem.* 1966, *70*, 874-883. |
| VARIABLES:<br>Composition, temperature | PREPARED BY:<br>P. G. T. Fogg |

EXPERIMENTAL VALUES:

Variation of the total vapor pressure/Torr with variation of temperature and of mole fraction of $C_2H_7N$ in the liquid phase, $x_{C_2H_7N}$

| | T/K | | | | |
|---|---|---|---|---|---|
| $x_{C_2H_7N}$ | 223.15 | 233.15 | 253.15 | 273.15 | 293.15 |
| 0 | 2.2 | 3.8 | 14.3 | 45.4 | 121.0 |
| 0.0126 | 3.6 | 6.8 | 23.7 | 66.0 | 159.8 |
| 0.0315 | 5.9 | 11.2 | 36.0 | 92.2 | 198.7 |
| 0.0498 | 7.7 | 14.8 | 45.7 | 110.0 | 239.7 |
| 0.0714 | 9.7 | 18.2 | 53.8 | 131.9 | 282.3 |
| 0.0860 | 10.3 | 20.3 | 59.8 | 147.3 | 314.0 |
| 0.1005 | 11.7 | 22.5 | 65.9 | 161.3 | 341.2 |
| 0.142 | 14.2 | 26.4 | 80.0 | 191.4 | 402.3 |
| 0.196 | 16.5 | 31.4 | 96.2 | 234.7 | 497.2 |
| 0.214 | 17.3 | 32.8 | 102.3 | 247.5 | 525.2 |
| 0.262 | 18.4 | 36.1 | 114.8 | 278.3 | 590.4 |
| 0.325 | 20.0 | 39.6 | 124.8 | 315.0 | 682.3 |
| 0.375 | 21.1 | 41.7 | 133.9 | 340.8 | 739.6 |
| 0.450 | 22.6 | 44.6 | 144.2 | 373.0 | 818.2 |
| 0.512 | 23.5 | 46.4 | 152.3 | 397.3 | 879.5 |
| 0.587 | 24.5 | 48.9 | 160.0 | 424.4 | 948.9 |
| 0.643 | 25.2 | 50.3 | 166.7 | 443.7 | 992.0 |

Cont.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Apparatus described previously was used (1). Liquid mixtures of accurately known composition were introduced into a cell held in a thermostat controlled to ± 0.02°C. The total vapor pressures were measured by a mercury manometer.

The authors calculated activity coefficients of each component from the vapor pressure data by a method described by Barker (2). Constants for Redlich-Kister equations (3) for activity coefficients were evaluated and reported. The compositions of the vapor phase were also calculated by the authors.

SOURCE AND PURITY OF MATERIALS:

1. Vacuum distilled; purity checked by i.r. spectrometry.
2. Supplied by FLUKA; purity 99.96 mol %.

ESTIMATED ERROR:

$\delta T/K = \pm 0.02$ (estimated by authors)

REFERENCES:

1. Wolff, H.; Höpfner, A. *Z. Elektrochem.* 1962, *66*, 149.
2. Barker, J.A. *Aust. J. Chem.* 1953, *6*, 207.
3. Redlich, O.; Kister, A.T. *Ind. Eng. Chem.* 1948, *21*, 345.

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| 1. *N*-Methylmethanamine, (dimethylamine); $C_2H_7N$; [124-40-3]<br>2. Hexane; $C_6H_{14}$; [110-54-3] | Wolff, H.; Höppel, H.-E.<br>*Ber. Bunsenges. Phys. Chem.* 1966, *70*, 874-883. |
| VARIABLES:<br>Composition, temperature | PREPARED BY:<br>P. G. T. Fogg |

EXPERIMENTAL VALUES: Cont.

| | T/K | | | | |
|---|---|---|---|---|---|
| $x_{C_2H_7N}$ | 223.15 | 233.15 | 253.15 | 273.15 | 293.15 |
| 0.692 | 25.7 | 51.8 | 171.0 | 458.5 | 1030.9 |
| 0.760 | 26.3 | 52.7 | 178.3 | 478.0 | 1083.1 |
| 0.830 | 27.0 | 54.3 | 184.8 | 494.7 | 1120.5 |
| 0.867 | 27.4 | 55.3 | 188.5 | 506.5 | 1156.1 |
| 0.932 | 28.2 | 57.5 | 197.0 | 528.5 | 1201.6 |
| 0.956 | 28.6 | 58.6 | 201.0 | 537.8 | 1222.7 |
| 1 | 29.0 | 60.6 | 206.5 | 562.9 | 1271.5 |

760 Torr = 1 atm = $1.013 \times 10^5$ Pa

Constants for calculation of activity coefficients from the Redlich-Kister equations given below

| T/K | A | B | C |
|---|---|---|---|
| 223.15 | 1.496 | 0.149 | 0.216 |
| 233.15 | 1.385 | 0.065 | 0.159 |
| 243.15 | 1.304 | 0.061 | 0.118 |
| 253.15 | 1.192 | 0.069 | 0.111 |
| 263.15 | 1.092 | 0.122 | 0.111 |
| 273.15 | 0.965 | 0.082 | 0.096 |
| 283.15 | 0.901 | 0.116 | 0.086 |
| 293.15 | 0.811 | 0.133 | 0.103 |

$$\ln f_1 = A x_2^2 - B x_2^2(1 - 4 x_1) + C x_2^2(1 - 8 x_1 + 12 x_1^2)$$

$$\ln f_2 = A x_1^2 + B x_1^2(1 - 4 x_2) + C x_1^2(1 - 8 x_2 + 12 x_2^2)$$

where $f_1$ = activity coefficient of dimethylamine
$f_2$ = activity coefficient of hexane
$x_1$ = mole fraction of dimethylamine in the liquid phase
$x_2$ = mole fraction of hexane in the liquid phase.

Note: The authors, in a later paper (4), reported vapor pressure measurements on the same system which they considered to be more precise than measurements reported in this paper.

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| 1. *N*-Methylmethanamine, (dimethylamine); $C_2H_7N$; [124-40-3]<br>2. Hexane; $C_6H_{14}$; [110-54-3] | Wolff, H.; Würtz, R.<br>*J. Phys. Chem.*<br>1970, *74*, 1600-1606. |
| VARIABLES: | PREPARED BY: |
| Composition, temperature | P. G. T. Fogg |

EXPERIMENTAL VALUES:

Variation of the total vapor pressure/Torr with variation of temperature and of mole fraction of $C_2H_7N$ in the liquid phase, $x_{C_2H_7N}$

| | T/K | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $x_{C_2H_7N}$ | 223.15 | 233.15 | 243.15 | 253.15 | 263.15 | 273.15 | 283.15 | 293.15 |
| 0 | 2.2 | 3.8 | 7.7 | 14.3 | 26.7 | 45.5 | 75.6 | 121.3 |
| 0.0206 | 4.7 | 9.0 | 15.9 | 27.4 | 45.6 | 73.3 | 113.5 | 171.6 |
| 0.0706 | 10.4 | 19.1 | 33.4 | 55.2 | 87.5 | 133.5 | 198.2 | 285.9 |
| 0.1014 | 12.8 | 23.2 | 41.5 | 68.7 | 108.4 | 164.9 | 243.1 | 347.7 |
| 0.1508 | 15.3 | 29.1 | 51.8 | 86.1 | 136.1 | 206.5 | 303.5 | 428.8 |
| 0.2008 | 17.3 | 33.2 | 59.9 | 98.8 | 160.8 | 245.3 | 360.7 | 512.4 |
| 0.2707 | 19.6 | 37.6 | 68.6 | 116.5 | 187.7 | 289.1 | 428.3 | 612.0 |
| 0.2720 | 19.6 | 37.7 | 68.8 | 117.2 | 188.3 | 290.1 | 430.4 | 615.0 |
| 0.4031 | 21.9 | 43.2 | 79.6 | 137.7 | 224.9 | 350.4 | 522.7 | 750.0 |
| 0.6022 | 24.3 | 49.4 | 92.1 | 162.1 | 268.2 | 424.7 | 644.0 | 939.9 |
| 0.7157 | 25.7 | 52.4 | 98.8 | 174.2 | 289.4 | 461.5 | 704.0 | 1031.1 |
| 1.0 | 30.3 | 61.7 | 117.4 | 208.9 | 349.8 | 560.7 | 862.4 | 1276.9 |

760 Torr = 1 atm = $1.013 \times 10^5$ Pa

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Apparatus described previously was used (1). Liquid mixtures of accurately known composition were introduced into a cell held in a thermostat controlled to ± 0.02°C. The total vapor pressure was measured by a mercury manometer.

The authors considered that these measurements were more precise than measurements on the same system which they had reported in an earlier paper (2).

The authors calculated activity coefficients of each component from the vapor pressure data by a method described by Barker (3). Constants for Redlich-Kister equations (4) for activity coefficients were evaluated and reported.

SOURCE AND PURITY OF MATERIALS:

1. Prepared from dimethylammonium chloride; repeatedly fractionated until first and last fractions had vapor pressures within 0.2 Torr.
2. Research grade from Phillips Petroleum Co., Bartlesville, Oklahoma.

ESTIMATED ERROR:

δT/K = ± 0.02 (estimated by authors)

REFERENCES:
1. Wolff, H.; Höpfner, A. *Z. Elektrochem.* 1962, *66*, 149.
2. Wolff, H.; Höpfner, A. *Ber. Bunsenges. Phys. Chem.* 1966, *70*, 874.
3. Barker, J.A. *Aust. J. Chem.* 1953, *6*, 207.
4. Redlich, O.; Kister, A.T. *Ind. Eng. Chem.* 1948, *21*, 345.

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| 1. *N*-Methylmethanamine, (dimethylamine); $C_2H_7N$; [124-40-3]<br><br>2. Hexane; $C_6H_{14}$; [110-54-3] | Wolff, H.; Würtz, R.<br>*J. Phys. Chem.*<br>1970, *74*, 1600-1606. |

EXPERIMENTAL VALUES:

Constants for calculation of activity coefficients from the Redlich-Kister equations given below

| T/K | A | B | C |
|---|---|---|---|
| 223.15 | 1.474 | -0.059 | 0.076 |
| 233.15 | 1.404 | +0.002 | 0.124 |
| 243.15 | 1.294 | +0.002 | 0.089 |
| 253.15 | 1.187 | +0.027 | 0.086 |
| 263.15 | 1.085 | +0.035 | 0.055 |
| 273.15 | 0.989 | +0.048 | 0.057 |
| 283.15 | 0.892 | +0.045 | 0.050 |
| 293.15 | 0.794 | +0.042 | 0.048 |

$$\ln f_1 = A x_2^2 - B x_2^2(1 - 4 x_1) + C x_2^2(1 - 8 x_1 + 12 x_1^2)$$

$$\ln f_2 = A x_1^2 + B x_1^2(1 - 4 x_2) + C x_1^2(1 - 8 x_2 + 12 x_2^2)$$

where $f_1$ = activity coefficient of dimethylamine

$f_2$ = activity coefficient of hexane

$x_1$ = mole fraction of dimethylamine in the liquid phase

$x_2$ = mole fraction of hexane in the liquid phase.

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| 1. *N*-Methylmethanamine, (dimethylamine); $C_2H_7N$; [124-40-3]<br>2. Decane; $C_{10}H_{22}$; [124-18-5] | Gerrard, W.<br>*Solubility of Gases and Liquids*, *Plenum*, 1976, Chapter 10. |
| VARIABLES: | PREPARED BY: |
| Temperature, pressure | C.L. Young |

EXPERIMENTAL VALUES:

| T/K | P/mmHg | P/$10^5$Pa | Mole fraction of dimethylamine in liquid, $x_{(CH_3)_2NH}$ |
|---|---|---|---|
| 283.15 | 100 | 0.133 | 0.068 |
| | 200 | 0.267 | 0.140 |
| | 300 | 0.400 | 0.235 |
| | 400 | 0.533 | 0.338 |
| | 500 | 0.667 | 0.456 |
| | 600 | 0.800 | 0.598 |
| | 700 | 0.933 | 0.755 |
| | 760 | 1.013 | 0.840 |
| 288.15 | 760 | 1.013 | 0.665 |
| 293.15 | 100 | 0.133 | 0.065 |
| | 200 | 0.267 | 0.110 |
| | 300 | 0.400 | 0.168 |
| | 400 | 0.533 | 0.225 |
| | 500 | 0.667 | 0.288 |
| | 600 | 0.800 | 0.352 |
| | 700 | 0.933 | 0.436 |
| | 760 | 1.013 | 0.501 |
| 298.15 | 760 | 1.013 | 0.390 |

AUXILIARY INFORMATION

| METHOD/APPARATUS/PROCEDURE: | SOURCE AND PURITY OF MATERIALS: |
|---|---|
| Amine was passed into a known weight of pure liquid in a bubbler tube at a total pressure measured by a manometer assembly. The amount of abosrbed gas was estimated by weighing. The temperature was manually controlled to within 0.2K.<br>The apparatus and procedure are described by Gerrard [1,2]. | 1. British Drug Houses or Cambrian Gases sample.<br>2. Purified and attested by conventional procedures. |
| | ESTIMATED ERROR:<br>$\delta T/K = \pm 0.1$; $\delta x/x = \pm 3\%$<br>(estimated by compiler) |
| | REFERENCES:<br>1. Gerrard, W. *J. Appl. Chem. Biotechnol.* 1972, *22* 623-650.<br>2. Gerrard, W. *Solubility of Gases and Liquids. Plenum Press, New York.* 1976. Chapter 1. |

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| 1. *N*-Methylmethanamine, (dimethylamine); $C_2H_7N$; [124-40-3]<br>2. Aromatic hydrocarbons | Gerrard, W.<br>*Solubility of Gases and Liquids*, *Plenum*, 1976, Chapter 10. |
| VARIABLES: | PREPARED BY: |
| Temperature, pressure | C. L. Young |

EXPERIMENTAL VALUES:

| T/K | P/mmHg | $P/10^5$Pa | Mole fraction of dimethylamine in liquid, $x_{(CH_3)_2NH}$ |
|---|---|---|---|
| | Benzene; $C_6H_6$; [71-43-2] | | |
| 293.15 | 760 | 1.013 | 0.541 |
| | Methylbenzene (toluene); $C_7H_8$; [108-88-3] | | |
| 293.15 | 760 | 1.013 | 0.580 |
| | 1,3-Dimethylbenzene (*m*-xylene); $C_8H_{10}$; [108-38-3] | | |
| 283.15 | 100 | 0.133 | 0.070 |
| | 200 | 0.267 | 0.157 |
| | 300 | 0.400 | 0.262 |
| | 400 | 0.533 | 0.382 |
| | 500 | 0.667 | 0.517 |
| | 600 | 0.800 | 0.651 |
| | 700 | 0.933 | 0.790 |
| | 760 | 1.013 | 0.862 |
| 293.15 | 400 | 0.533 | 0.260 |
| | 500 | 0.667 | 0.336 |
| | 600 | 0.800 | 0.415 |
| | 700 | 0.933 | 0.504 |
| | 760 | 1.013 | 0.564 |

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Amine was passed into a known weight of pure liquid in a bubbler tube at a total pressure measured by a manometer assembly. The amount of absorbed gas was estimated by weighing. The temperature was manually controlled to within 0.2K.
The apparatus and procedure are described by Gerrard [1,2].

SOURCE AND PURITY OF MATERIALS:

1. British Drug Houses or Cambrian Gases sample.

2. Purified and attested by conventional procedures.

ESTIMATED ERROR:

$\delta T/K = \pm 0.1$; $\delta x/x = \pm 3\%$
(estimated by compiler)

REFERENCES:

1. Gerrard, W.
*J. Appl. Chem. Biotechnol.* 1972, *22* 623-650.
2. Gerrard, W.
*Solubility of Gases and Liquids.* *Plenum Press, New York.* 1976. Chapter 1.

| COMPONENTS: | ORIGINAL MEASUREMENTS: |
|---|---|
| 1. *N*-Methylmethanamine (dimethylamine); $C_2H_7N$; [124-40-3]<br>2. 1,3,5-Trimethylbenzene (mesitylene); $C_9H_{12}$; [108-67-8] | Gerrard, W.<br>*Solubility of Gases and Liquids*, *Plenum*, 1976, Chapter 10. |
| VARIABLES: | PREPARED BY: |
| Pressure | C. L. Young |

EXPERIMENTAL VALUES:

| T/K | *P*/mmHg | *P*/$10^5$Pa | Mole fraction of dimethylamine in liquid, $x_{(CH_3)_2NH}$ |
|---|---|---|---|
| 293.15 | 100 | 0.133 | 0.060 |
| | 200 | 0.267 | 0.124 |
| | 300 | 0.400 | 0.188 |
| | 400 | 0.533 | 0.255 |
| | 500 | 0.667 | 0.327 |
| | 600 | 0.800 | 0.404 |
| | 700 | 0.933 | 0.492 |
| | 760 | 1.013 | 0.549 |

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Amine was passed into a known weight of pure liquid in a bubbler tube at a total pressure measured by a manometer assembly. The amount of absorbed gas was estimated by weighing. The temperature was manually controlled to within 0.2K.
The apparatus and procedure are described by Gerrard [1,2].

SOURCE AND PURITY OF MATERIALS:

1. British Drug Houses or Cambrian Gases sample.

2. Purified and attested by conventional procedures.

ESTIMATED ERROR:

$\delta T/K = \pm 0.1$; $\delta x/x = \pm 3\%$

(estimated by compiler)

REFERENCES:

1. Gerrard, W.
*J. Appl. Chem. Biotechnol.* 1972, *22* 623-650.
2. Gerrard, W.
*Solubility of Gases and Liquids. Plenum Press, New York.* 1976. Chapter 1.