NBSIR 83-1692

COMPILATION AND EVALUATION OF AVAILABLE DATA ON PHASE EQUILIBRIA OF NATURAL AND SYNTHETIC GAS MIXTURES

F.R. Williamson
N.A. Olien

National Bureau of Standards
U.S. Department of Commerce
Boulder, Colorado 80303

June 1983

NBSIR 83-1692

COMPILATION AND EVALUATION OF AVAILABLE DATA ON PHASE EQUILIBRIA OF NATURAL AND SYNTHETIC GAS MIXTURES

F.R. Williamson
N.A. Olien

Chemical Engineering Science Division
National Engineering Laboratory
National Bureau of Standards
U.S. Department of Commerce
Boulder, Colorado 80303

June 1983

Final Report to:
Texas A & M Research Foundation
Under contract with:
Gas Research Institute
8600 West Bryn Mawr Avenue
Chicago, Illinois 60631

U.S. DEPARTMENT OF COMMERCE, Malcolm Baldrige, Secretary

NATIONAL BUREAU OF STANDARDS, Ernest Ambler, Director

CONTENTS

ABSTRACT

This report summarizes the results of a two-year effort to identify, compile, and evaluate the data available in the open literature for the liquid-vapor equilibria for binary and multicomponent mixtures of He, H_2, C_1 - C_5 alkanes, N_2, CO, CO_2, NH_3, H_2S, H_2O, CS_2, COS, HCN, NO_x and SO_x. There were 276 binary systems relevant to the gas industry. The result of the evaluation is that there are: 46 systems for which data are imperative and 104 systems for which data are needed but not imperative. The report lists the data needs in temperature and pressure range for each system for both Priority 1 and 2. The report includes three appendices: A - a listing of the ranges and quality of all available data for binary systems; B - the same for all multicomponent systems; and C - a complete bibliography of the 543 citations identified in the project.

Key words: bibliography; compilation; evaluation; liquid-vapor equilibrium; natural gas; phase equilibrium; synthetic natural gas.

Compilation and Evaluation of Available Data on Phase Equilibria of Natural and Synthetic Gas Mixtures

INTRODUCTION

Accurate data for the thermophysical properties of fluid mixtures are important to the natural gas industry for the efficient operation of existing plant, the design of new plant, and the custody transfer of gaseous fuels. The gas industry faces severe problems in the near future due to the lack of data, correlations, and predictive techniques for the properties of fluid mixtures associated with anticipated technological needs in the conversion of fossil resources, especially coal, to gaseous fuel [1-6]. In particular, it is imperative that we evaluate the current data base for natural gas (from conventional and unconventional sources) and for synthetically produced gas. From the standpoint of gas processing and separation operations, the most important properties are phase equilibria, because of the large effect they have on capital costs and production efficiency [7-9]. This report summarizes the results of the available data for liquid-vapor phase equilibria of selected systems important to the gas industry; other properties were assessed elsewhere. Binary systems were stressed although multicomponent mixture data were compiled and evaluated. The constituents of the mixtures are: He, H_2, C_1 - C_5 alkanes, N_2, CO, CO_2, NH_3, H_2S, H_2O, CS_2, COS, HCN, NO_x and SO_x (24 constituents). Naturally, not all of the possible binary combinations are of interest to the gas industry. Of the 276 possible binary systems, 124 were considered irrelevant to the natural gas industry.

APPROACH

The Chemical Engineering Science Division of the National Bureau of Standards has a substantial and long-standing research program in fluid properties, and the work reported here is dependent upon this previous work [10-14]. Of special importance is the recently completed work of Hiza, Kidnay, and Miller. [14]

The work reported here was conducted as follows:

1) Literature Search

   Fluid Mixtures Data Center - NBS-Boulder
   Chemical Abstracts Service
   Selected Phase Equilibria compilations [13-18]
   DECHEMA/Berlin Tech. Univ. Data Bank
   Science Citation Index
   Bulletin of Chemical Thermodynamics

2) Preparation of a machine-readable bibliography of the results from 1) above.

3) Acquisition of copies of original data sources.

4) Assessment of the quality of data. The data sets for each relevant system were assessed using the following rating system (all organizations involved in the project used the same rating system):

A - Those data assigned a weight of 0.75 - 1.00 for correlation purposes.

B - Those data assigned a weight of 0.25 - 0.74 for correlation purposes.

C - Those data assigned a weight of 0.00 - 0.24 for correlation purposes.

5) Recommendations for needed measurement. The following four categories were established for the data of the binary systems:

N - No data available, none needed

M_1 - Measurements needed (imperative)

M_2 - Measurements desirable, but not imperative

X - No priority 1 or 2 needed

RESULTS

1 - Literature Search

All of the sources listed in the previous section were searched initially, and then update searches on specific systems were performed at intervals during the course of the project. A total of 543 relevant references were identified.

2 - Preparation of machine-readable bibliography.

The bibliographic citations to the references identified in the above section were put into machine-readable form and entered into an information bank. They are identified by a six-digit accession number. The resulting bibliography appears as an Appendix C to this report.

3 - Acquisition of copies of original data sources.

Copies of all references identified in 1) above were acquired. Over 75% were already available to NBS through the NBS-Fluid Mixtures Data Center which is supported by the NBS-Office of Standard Reference Data.

4 - Assessment of the quality of the data.

Figure 1 shows the form prepared to record the relevant parameters regarding the data contained in each reference. A separate form was prepared for each system in each reference. The data assessment was performed at this time also. Data assignment normally requires a reasonable amount of subjective judgment involving the quality of a given investigator's previous work or the overall quality of the experimental results from a given laboratory. Where possible, the present report relied on more objective criteria such as judgment of published critical evaluations such as reported in [11, 12, 15, 16] or comparisons with standard correlation techniques such as reported in [8, 18]. The level of effort involved in the present work did not allow independent evaluation of each data set so that, as stated above, subjective judgments were often applied. However, the assessment was re-evaluated at the time the form shown in Fig. 2 was completed for each system (1 bar = 0.1 MPa). The summary tables for each of the relevant binary systems appear as Appendix A to this report, and the multicomponent systems as Appendix B. Appendix A includes tables for systems for which data are needed, but none are available.

RECOMMENDATIONS

The results of the tables in Appendix A were examined in light of current and future needs of the gas industry. Figure 2 is the form used to summarize the data for the relevant binary systems. The final results of the assessment and the ensuing recommendations are shown in Table 1, Priority 1 measurement needs; Table 2, Priority 2 measurement needs; and Table 3, a summary of the assessment and recommendations.

Priority 1 data needs are those for which adequate data do not exist and phase equilibria fall within the operating range of current or planned natural gas systems, natural gas and natural gas liquids processing plants, and synthetic gas plants. Also in priority 1 are systems which are important in the development of correlations, theories and the like. Priority 2 data are those which are of less importance to current or planned gas industry needs as well as possible future generations of synthetic gas plants. Also included in priority 2 data are data which would provide a more complete coverage of given systems.

The resulting statistics of the available data and measurement needs for the 276 relevant systems are as follows:

N - 124 (No data available, none needed)

M_1 - 46 (Measurements imperative)

M_2 - 104* (Measurements needed)

X - 22 (Current data are adequate)

296*

*There are only 276 relevant systems, but 20 M_2 systems are also included in M_1 systems.

The measurements required for the 46 Priority 1 systems are extensive and will require a substantial effort by the research community. In addition, some of the measurements are exceedingly difficult. It is suggested that GRI in consort with its Research Advisory Board and its thermophysical property contractors establish some sort of priority order or grouping for the Priority 1 systems.

ACKNOWLEDGMENTS

First of all, it would not have been possible to complete this project at the level of effort assigned to it without the pioneering work of M. J. Hiza, A. J. Kidnay, and R. C. Miller as reported in [13, 14]. In addition, we are grateful to the Office of Standard Reference Data and Dr. Howard J. White, Jr., for supporting that pioneering work. Finally, we express our thanks to Dr. Ferol Fish and Dr. Frank Little of the Gas Research Institute for their leadership in the project and to Professor K. R. Hall of Texas A & M University for the coordination and overall direction he provided to all participants in this project.

REFERENCES

[1] Fundamental data needs for coal conversion processes. RECON Systems, Inc., Somerville, N.J., Executive Summary Rept., Department of Energy Contract No. EY-76-C-02-4059, 6 p.

[2] Miller, R. P. Prospective needs for physical property data in the chemical and allied industries during the next decade. National Physical Lab., Teddington, England, Rept. No. NPL Chem. 84, 1978 June. 34 p.

[3] Brule, M. R.; Lee, L. L.; Starling, K. E. Predicting thermodynamic properties for fossil-fuel chemicals. Chem. Eng. (New York), Vol. 86, No. 25, 1979 November. 155-164.

[4] Bondi, A. What thermophysical and other physical properties data are needed? Chem. Eng. Progr., Vol. 75, 1979 April. 70-74.

[5] Yen, L. C.; Firth, J. F. S.; Chao, K. C.; Lin, H. M. Data deficiency hampers coal-gasification plant design. Chem. Eng. (New York), Vol. 84, 1977 May. 127-130.

[6] Synfuel trends. Chem. Eng. Progr., Vol. 76, No. 3, 1980 March. 43-92.

[7] Zudkevich, D.; Weinstein, N. J.; Daubert, T. E. Present phase equilibrium data and correlations in view of needs for producing fluid fuels from coal. RECON Systems, Inc., Somerville, N.J., Reprint from Fluids and Fluid Mixtures, Proc. National Physical Lab. Conf., Teddington, England, 1978 September 11-12. 87-102.

[8] Elliot, D. G.; Chappelear, P. S.; Chen, R. J. J.; McKee, R. L. Thermophysical properties: their effect on cryogenic gas processing. Amer. Chem. Soc. Symp., Ser. No. 60, 1977. 289-308.

[9] Miller, E. J.; Geist, J. M. Impact of recent developments in thermodynamics on chemical process design. Presented at the Joint meeting of the Chemical Industry Engineering Society of China and the American Institute of Chemical Engineers, Beijing, China, 1982 September.

[10] Hiza, M. J.; Drayer, D. E.; Flynn, T. M. Low temperature physical equilibria of some binary hydrogen systems. American Institute of Chemical Engineers 48th National Meeting, Denver, CO, 1962, August 26-29. Paper.

[11] Hiza, M. J.; Heck, C. K.; Kidnay, A. J. Liquid-vapor and solid-vapor equilibrium in the system hydrogen-ethane. Advances in Cryogenic Engineering, Vol. 13, Proc. 1967 Cryogenic Engineering Conf., Stanford, CA, Aug. 21-23, 1967, K. D. Timmerhaus, Editor. Plenum Press, New York, 1968. 343-356.

[12] Miller, R. C.; Kidnay, A. J.; Hiza, M. J. Liquid-vapor equilibria at 112.00 K for systems containing nitrogen, argon and methane. AIChE J., Vol. 19, No. 1, 1973, January. 145-151.

[13] Hiza, M. J.; Kidnay, A. J.; Miller, R. C.. Equilibrium properties of fluid mixtures - a bibliography of data on fluids of cryogenic interest. NSRDS Bibliographic Series. IFI/Plenum Press, New York, 1975. 166 p.

[14] Hiza, M. J.; Kidnay, A. J.; Miller, R. C. Equilibrium properties of fluid mixtures - 2, a bibliography of experimental data on selected fluids, NSRDS Bibliographic Series. IFI/Plenum Press, New York, 1982. 246 p.

[15] Miller, R. C.; Kidnay, A. J.; Hiza, M. J. Liquid + vapor equilibria in methane+ethene and in methane+ethane from 150.00 to 190.00 K. J. Chem. Thermodyn., Vol. 9, No. 2, 1977 February. 167-178.

[16] Hiza, M. J.; Miller, R. C.; Kidnay, A. J. A review, evaluation, and correlation of the phase equilibria, heat of mixing and change in volume on mixing for liquid mixtures of methane + ethane. J. Phys. Chem. Ref. Data, Vol. 8, No. 3, 1979. 799-816.

[17] Wichterle, I.; Linek, J. Hala, E. Vapor-liquid equilibrium data bibliography. Elsevier Scientific Publishing Co., New York, 1973. Supplement I, 1976, Supplement II, 1979.

[18] Knapp, H.; Doring, R.; Oellrich, L.; Plocker, U.; Prausnitz, J. M. Vapor-liquid equilibria for mixtures of low boiling substances. DECHEMA Chemistry Data Series, Vol. 6, 1982. 890 p.

FIGURE 1

VLE DATA EVALUATION

Accession number:

Author(s):

Publication year:

Mixture system:

Temperatures Pressure range Composition range

Number of isotherms: End points:

Number of mixtures:

Type of data: Vapor and liquid compositions ☐
Total vapor pressures ☐
Dew points / bubble points ☐
Other ☐ _____

Form of data: Numerical ☐ Number of points:
Correlation ☐
Graphical ☐

Additional properties reported: K ☐
V^E ☐
G^E ☐
H^E ☐
ρ_ℓ ☐ ρ_v ☐ ρ_{total} ☐
Other _____

Rating: A ☐
B ☐
C ☐

Comments:

FIGURE 2

System: Vapor-liquid equilibrium data: N=

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A=)					
Data Sets With Rating = B (N_B=)					
Data Sets With Rating = C (N_C=)					

*Same data

TABLE 1

Vapor-liquid equilibrium measurements needed: Priority 1 (imperative)

System	Temp., K	Press., bar	System	Temp., K	Press., bar
H_2 + CO	100-135	0- 50	CO_2 + neo-C_5H_{12}	255-435	0-100
H_2 + CH_4	170-200	0-200	CO_2 + i-C_5H_{12}	370-470	0-100
H_2 + CO_2	270-305	0-200	CO_2 + n-C_5H_{12}	370-475	0-100
H_2 + C_2H_6	190-310	0-150	CO_2 + H_2O	620-650	0-500
H_2 + C_3H_8	340-370	0-200	C_2H_6 + n-C_4H_{10}	200-400	0-100
H_2 + NH_3	190-280, 390-410	0-200	C_2H_6 + i-C_5H_{12}	250-470	0-100
N_2 + CO	115-135	0- 35	N_2O + H_2O	270-650	0-500
N_2 + NH_3	190-280, 390-410	0-200	C_3H_8 + i-C_5H_{12}	250-460	0-100
N_2 + n-C_4H_{10}	250-310 310-425	0- 80 0- 30	C_3H_8 + H_2O	400-650	0-500
N_2 + neo-C_5H_{12}	250-435	0- 40	H_2S + n-C_4H_{10}	270-400	0- 40
N_2 + n-C_5H_{12}	250-400	0- 40	H_2S + H_2O	440-650	0-500
N_2 + n-C_5H_{12}	250-400	0- 40	COS + H_2O	270-650	0-500
CH_4 + CO_2	270-305	0-100	NH_3 + H_2O	270-650	0-500
CH_4 + H_2S	200-375	0- 30	i-C_4H_{10} + i-C_5H_{12}	300-460	0-100
CH_4 + H_2O	400-650	0-500	i-C_4H_{10} + n-C_5H_{12}	300-470	0-100
CO_2 + C_2H_6	290-305	0-100	i-C_4H_{10} + H_2O	270-650	0-500
CO_2 + C_3H_8	340-370	0-100	n-C_4H_{10} + i-C_5H_{12}	350-460	0-100
CO_2 + H_2S	250-375	50-200	n-C_4H_{10} + H_2O	400-650	0-500
CO_2 + i-C_4H_{10}	390-410	0-100	NO_2/N_2O_4 + H_2O	270-650	0-500
CO_2 + n-C_4H_{10}	400-430	0-100	SO_2 + H_2O	270-650	0-500

Vapor–liquid equilibrium measurements needed: Priority 1 (imperative)

System	Temp., K	Press., bar	System	Temp., K	Press., bar
neo-C_5H_{12} + H_2O	270-650	0-500			
HCN + H_2O	270-650	0-500			
i-C_5H_{12} + H_2O	270-650	0-500			
n-C_5H_{12} + H_2O	340-580, 620-650	0-500			
SO_3 + H_2O	270-650	0-500			
CS_2 + H_2O	270-650	0-500			

TABLE 2

Vapor-liquid equilibrium measurements needed: Priority 2 (needed)

System	Temp., K	Press., bar	System	Temp., K	Press., bar
$CO + H_2S$	75-210, 300-375	0-200	CH_4 + neo-C_5H_{12}	180-430	0-150
$CO + COS$	130-380	0- 80	$CH_4 + HCN$	260-460	0-100
$CO + NH_3$	190-410	0-120	CH_4 + i-C_5H_{12}	180-350	0-150
$CO + NO_2/N_2O_4$	260-435	0-120	$CH_4 + H_2O$	270-300	0-500
CO + n-C_5H_{12}	200-400	0-200	$CO_2 + C_2H_6$	110-230	0-100
$CO + H_2O$	270-650	0-500	$CO_2 + N_2O$	210-280, 300-320	0-100
$NO + CH_4$	105-195	0-100	$CO_2 + C_3H_8$	230-250	0-100
$NO + CO_2$	105-305	0-100	$CO_2 + COS$	130-380	0-100
$NO + NH_3$	190-410	0-120	$CO_2 + NH_3$	190-410	0-120
$NO + NO_2/N_2O_4$	260-290 400-440	0-100 0-150	CO_2 + i-C_4H_{10}	110-320	0-100
$NO + H_2O$	270-650	0-500	CO_2 + n-C_4H_{10}	130-230	0- 50
$CH_4 + CO_2$	110-150	0-100	$CO_2 + NO_2/N_2O_4$	260-435	0-120
$CH_4 + N_2O$	180-320	0-100	$CO_2 + SO_2$	195-435	0-100
$CH_4 + C_3H_8$	250-370	0-100	$CO_2 + HCN$	260-460	0-100
$CH_4 + H_2S$	200-375	30-200	CO_2 + i-C_5H_{12}	200-290	0-100
$CH_4 + COS$	130-380	0- 80	CO_2 + n-C_5H_{12}	200-290	0-100
$CH_4 + NH_3$	190-410	0-120	$CO_2 + SO_3$	290-495	0-100
CH_4 + i-C_4H_{10}	350-410	0-150	$CO_2 + CS_2$	160-535	0-100
$CH_4 + NO_2/N_2O_4$	260-435	0-120	$C_2H_6 + N_2O$	180-320	0-100
$CH_4 + SO_2$	190-435	0-100	$C_2H_6 + H_2S$	200-375	0-200

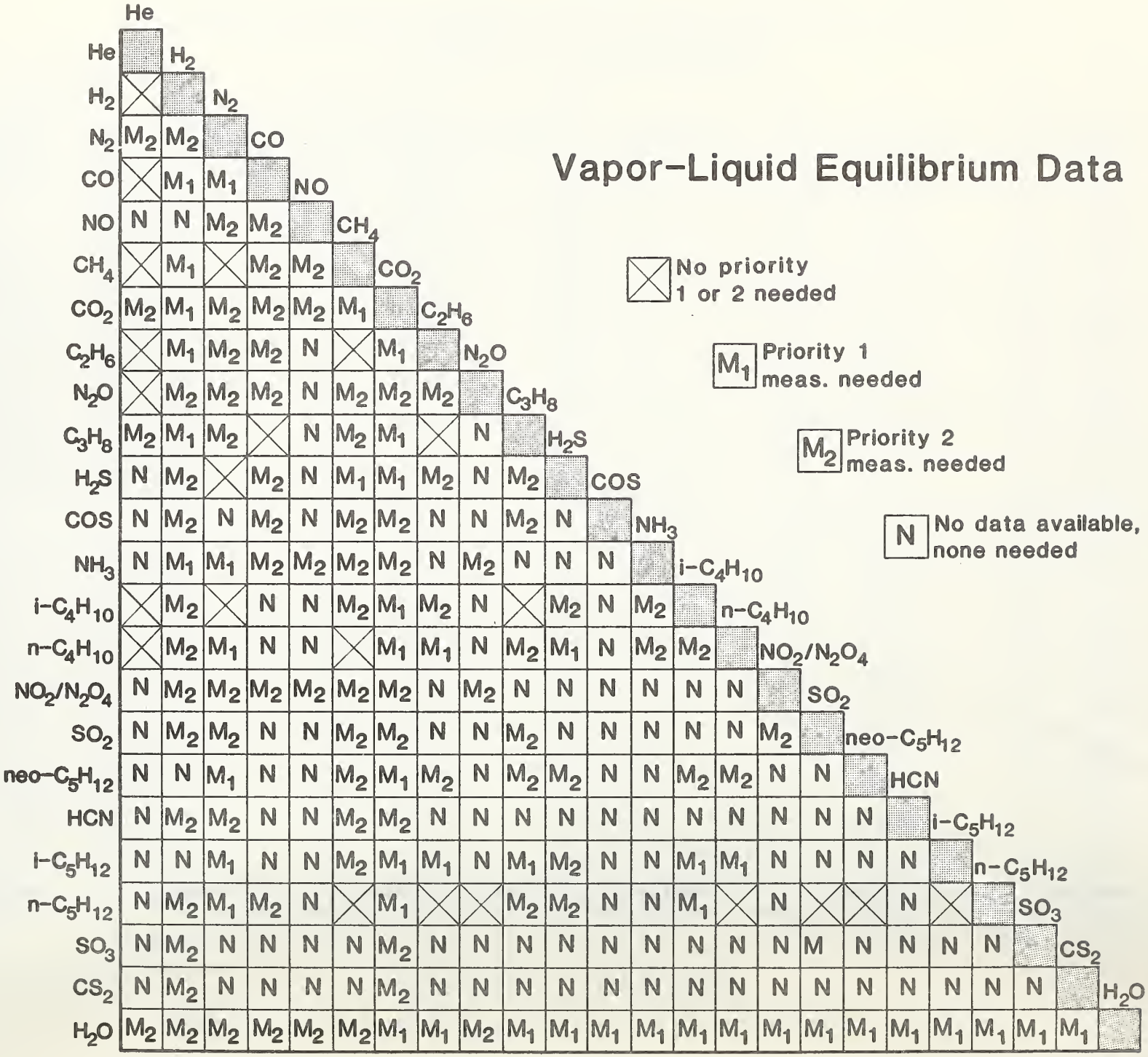
Vapor-liquid equilibrium measurements needed: Priority 2 (needed)

System	Temp., K	Press., bar	System	Temp., K	Press., bar
He + N_2	63- 75	0-100	H_2 + CS_2	160-535	0-100
He + CO_2	77-305	0-100	H_2 + H_2O	270-650	0-500
He + C_3H_8	100-305	0-200	N_2 + CO	70-115	0- 35
He + H_2O	270-650	0-500	N_2 + NO	105-185	0-100
H_2 + N_2	100-130	0- 50	N_2 + CO_2	200-220 220-300	0-100 0- 30
H_2 + CO	68-100	0- 15	N_2 + C_2H_6	90-140	0- 80
H_2 + CH_4	90-170	0- 20	N_2 + N_2O	180-220, 250-320	0-100
H_2 + CO_2	190-270	0- 40	N_2 + C_3H_8	290-370	0- 80
H_2 + C_2H_6	90-190	0- 30	N_2 + NO_2/N_2O_4	260-435	0-120
H_2 + N_2O	180-315	0-100	N_2 + SO_2	190-250, 300-435 250-300	0-100 30-100
H_2 + C_3H_8	85-340	0- 20	N_2 + neo-C_5H_{12}	180-250	0- 40
H_2 + H_2S	185-375	0-100	N_2 + HCN	260-460	0-100
H_2 + COS	130-380	0- 80	N_2 + i-C_5H_{12}	150-275 340-460	0- 40 0- 80
H_2 + i-C_4H_{10}	110-410	0- 40	N_2 + n-C_5H_{12}	150-275 340-460	0- 40 0- 80
H_2 + n-C_4H_{10}	130-430	0- 50	N_2 + H_2O	350-650	0-220
H_2 + NO_2/N_2O_4	260-435	0-120	CO + NO	105-185	0-100
H_2 + SO_2	195-435	0-100	CO + CH_4	90-200	0-100
H_2 + HCN	260-460	0-100	CO + CO_2	75-250	0-150
H_2 + n-C_5H_{12}	140-480	0-150	CO + C_2H_6	100-200 250-305	0-100 0-200
H_2 + SO_3	290-495	0-100	CO + N_2O	180-315	0-100

Vapor–liquid equilibrium measurements needed: Priority 2 (needed)

System	Temp., K	Press., bar	System	Temp., K	Press., bar
C_2H_6 + i-C_4H_{10}	200–300	0–100	i-C_4H_{10} + neo-C_5H_{12}	300–430	0–100
C_2H_6 + neo-C_5H_{12}	250–430	0–100	n-C_4H_{10} + neo-C_5H_{12}	350–430	0–100
C_2H_6 + H_2O	270–320	0–500	NO_2/N_2O_4 + SO_2	260–435	0–120
N_2O + NH_3	190–410	0–120	SO_2 + SO_3	290–495	0–100
N_2O + NO_2/N_2O_4	260–435	0–120			
C_3H_8 + H_2S	200–375	0–200			
C_3H_8 + COS	350–380	0–100			
C_3H_8 + n-C_4H_{10}	300–425	30–100			
C_3H_8 + SO_2	190–435	0–100			
C_3H_8 + neo-C_5H_{12}	250–430	0–100			
C_3H_8 + n-C_5H_{12}	250–470	0 –50			
H_2S + i-C_4H_{10}	250–410	0–100			
H_2S + n-C_4H_{10}	200–425	0–200			
H_2S + neo-C_5H_{12}	255–435	0–100			
H_2S + i-C_5H_{12}	110–465	0–100			
H_2S + n-C_5H_{12}	250–470	0–200			
H_2S + H_2O	270–320	0–300			
NH_3 + i-C_4H_{10}	195–410	0–120			
NH_3 + n-C_4H_{10}	190–320, 410–430	0–120			
i-C_4H_{10} + n-C_4H_{10}	250–425	10–100			

TABLE 3


Vapor–Liquid Equilibrium Data
No priority
1 or 2 needed
M1 Priority 1
meas. needed
M2 Priority 2
meas. needed
N No data available,
none needed
He
H2
N2
CO
NO
CH4
CO2
C2H6
N2O
C3H8
H2S
COS
NH3
i-C4H10
n-C4H10
NO2/N2O4
SO2
neo-C5H12
HCN
i-C5H12
n-C5H12
SO3
CS2
H2O

APPENDICES

Appendix A	System: Vapor-Liquid Equilibrium Data:*
Appendix B	Multicomponent Vapor-Liquid Equilibrium Data*
Appendix C	Data Source References (a listing in alphabetical order of all references to experimental data listed in Appendices A and B; included is a cross-reference between accession number and author).

*The appendices are arranged as follows for each system: N is the number of references; Temp., Press., and Comp. Range are self-explanatory; Accession number refers to an identification number assigned to each reference; Author is the first author of each reference.

$He + H_2$ System: Vapor-liquid equilibrium data: N = 9

	Temp. Range, K	Press. Range, bar	Comp. Range, mol		Accession No.	Author
Data Sets With Rating = A (N_A = 7)	20-30	1-20	0-.09	He	150220	Hiza
	17.4-21.8	2-59	.002-.031	He	3728	Smith
	15.5-29.8	19-102	.01-.363	He	54119	Sneed, et al
	15.5-32.5	2-34	.003-.209	He	28623	Sonntag, et al*
	20.4-31.5	2-35	.002-.18	He	25053	Sonntag, et al
	15.5-32.5	2-34	.003-.209	He	21933	Streett, et al*
	26-100	6-9170	.006-.45	He	95426	Streett
Data Sets With Rating = B (N_B = 2)	14-17	1-10	.001-.005	He	46018	Greene, Sonntag
	16.3-28.6	2-6.5	.01-.12	He	150026	Roellig, Giese
Data Sets With Rating = C (N_C =)						

*Same data

System: Vapor-liquid equilibrium data: N= 16

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 10)	82.70, 113.13	5-51	0.001-0.035 He	21435	Burch, R.J.
	77.6-125.9	11.6-68	0.0026-0.083 He	18927	Buzyna, G.
	77.2	14-67	0.005-0.062 He	21414	Davis, J.A.
	76.5-120	14-138	0.003-0.14 He	20429	DeVaney, W.E.
	68-111.5	5-217	0.001-0.14 He	6361	Kharakhorin, F.F.
	64.9-77.2	14-69	0.002-0.014 He	26156	Rodewald, N.C.
	67.5-90.3	6-25	0.0007-0.009 He	40179	Skripka, V.G.
	112.1-162.0	1091-10068	0.244-0.767 He	92174	Streett, W.B.
	78-137	129-4080	0.0366-0.63 He	65038	Streett, W.B.
	77.6-121.74	67-827	0.01-0.56 He	50612	Streett, W.B.
Data Sets With Rating = B (N_B= 4)	77.0-123.0	20,40,100	0.11-0.98He Vapor	86467	Davydov, I.A.
	64-108	5-150	0.01-0.10 He	150151	Fedoritenko, A.*
	64-108	5-150	0.01-0.10 He	25920	Ruhemann, M.*
	122-126	31-206	0.0064-0.38 He	67034	Tully, P.C.
Data Sets With Rating = C (N_C= 2) 70550,150175					

*Same data

System: Vapor-liquid equilibrium data: N = 2

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A = 2)	80-120	5-137	.005-.10 He	105282	Parrish, Steward
	77-128	17-136	.003-.167 He	40404	Sinor, Kurata
Data Sets With Rating = B (N_B =)					
Data Sets With Rating = C (N_C =)					

*Same data

$He + CH_4$ System: Vapor-liquid equilibrium data: N = 8

	Temp. Range, K	Press. Range, bar	Comp. Range, mol		Accession No.	Author
Data Sets With Rating = A (N_A = 7)	124-191	14-69	.008-.06	He	70826	DeVaney, et al
	95-185	5-205	.0001-.14	He	44762	Heck, Hiza
	91	13-103	.991-.998	He	29397	Hiza, Kidnay
	91-150	.1-170	0-.041	He	9643	Kharakhorin
	94-192	69-262	.002-.34	He	69667	Rhodes, et al
	93-188	.2-138	0-.13	He	36006	Sinor, et al
	95-290	34-9807	.002-.75	He	94794	Streett, et al
Data Sets With Rating = B (N_B = 1)	90-106	25-159	.001-.01	He	6364	Gonikberg, Fastovskii
Data Sets With Rating = C (N_C =)						

*Same data

$He + CO_2$ **System: Vapor-liquid equilibrium data: N= 4**

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 1)	220-290	10-199	.0006-.06 He	53324	MacKendrick, et al
Data Sets With Rating = B (N_B= 2)	253,273,293	19.5-139.3	0-0.049 He	63709	Burfield, et al
	181,190,200	20-120	.003-.011 He	62792	Liu
Data Sets With Rating = C (N_C= 1)	13359				

*Same data

$He + C_2H_6$ System: Vapor-liquid equilibrium data: N= 6

	Temp. Range, K	Press.Range, bar	Comp.Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 3)	170-290	9-202	.002-.09 He	61654	Heck
	95-150	4-132	.000001-.004 He	51011	Hiza, Duncan
	113-273	5-118	.0004-.025 He	70002	Nikitina, et al
Data Sets With Rating = B (N_B= 2)	144-227	21-48	.0007-.011 He	54087	Cannon, et al
	288-310	84-505	.065-.435 He	150259	Maslennikova, et al
Data Sets With Rating = C (N_C= 1) 150191					

*Same data

$He + N_2O$ System: Vapor-liquid equilibrium data: N= 1

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 1)	195-285	39-138	.0052-.042 He	105282	Parrish, Steward
Data Sets With Rating = B (N_B=)					
Data Sets With Rating = C (N_C=)					

*Same data

System: Vapor-liquid equilibrium data: N= 3

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 1)	123-348	.07-207	0-.13 He	40036	Schindler, et al
Data Sets With Rating = B (N_B= 1)	172-255	21-48	.001-.011 He	54087	Cannon, et al
Data Sets With Rating = C (N_C= 1)	7961				

*Same data

$He + NH_3$ System: Vapor-liquid equilibrium data: N= 2

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A=)					
Data Sets With Rating = B (N_B= 2)	228-283	21-48	.00009-.0009 He	54087	Cannon, et al
	293-473	10-700	0-.15 He	13359	Tsiklis
Data Sets With Rating = C (N_C=)					

*Same data

$He + i\text{-}C_4H_{10}$ System: Vapor-liquid equilibrium data: N = 1

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A = 1)	143-273	5-39	.0001-.014 He	68441	Nikitina, et al
Data Sets With Rating = B (N_B =)					
Data Sets With Rating = C (N_C =)					

*Same data

$He + n\text{-}C_4H_{10}$ **System: Vapor-liquid equilibrium data: N = 2**

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A = 1)	153-273	5-39	.00001-.011 He	68441	Nikitina, et al
Data Sets With Rating = B (N_B =)					
Data Sets With Rating = C (N_C = 1) 45496					

*Same data

$He + n\text{-}C_5H_{12}$ System: Vapor-liquid equilibrium data: N = 1

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A =)					
Data Sets With Rating = B (N_B = 1)	298	1	--	150177	Makranczy, et al
Data Sets With Rating = C (N_C =)					

*Same data

$He + H_2O$ System: Vapor-liquid equilibrium data: N = 22

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A = 1)	298-353	1	.000007-.000008 He	150021	Shoor, et al
Data Sets With Rating = B (N_B = 3)	298-308	1	--	150037	Feillolay, Lucas
	573	138	.295 He	150241	Luker, et al
	377-548	3-10	.0001-.0002 He	125573	Potter, Clynne

Data Sets With Rating = C (N_C = 18) 36403,64484,70831,103328,106980,150022,150032,150038,150047,150048, 150049,150052,150089,150097,150114,150134,150172,150257

*Same data

$H_2 + N_2$ System: Vapor-liquid equilibrium data: N= 16

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 8)	79-109	13-178	.02-.46 H_2	5657	Gonikberg, et al
	90-124	30	0-.78 H_2	108433	Knapp, et al
	90-95	6-46	.01-.11 H_2	11759	Maimoni
	63-110	78-572	.1-.36 H_2	124829	Streett, Calado
	77-88	17-190	.05-.465 H_2	90120	Yorizane*
	77-88	17-190	.05-.465 H_2	76577	Yorizane, et al*
	77	5-152	0-.36 H_2	50157	Yorizane, et al
	83-122	22-138	.03-.34 H_2	8905	Akers, Eubanks
Data Sets With Rating = B (N_B= 3)	65-70	25-51	.97-.98 H_2	5651	Dokoupil, et al
	63-75	5-45	.01-.91 H_2	14286	Omar, Dokoupil
	63-88	12-23	.02-.55 H_2	6216	Verschoyle
Data Sets With Rating = C (N_C= 5)	5732,13188,35926,39075,39627				

*Same data

H_2 + CO

System: Vapor-liquid equilibrium data: N = 5

	Temp. Range, K	Press. Range, bar	Comp. Range, mol		Accession No.	Author
Data Sets With Rating = A (N_A = 3)	70-125	50.7-529	.01-.99	H_2	150221	Tsang, Streett
	77-123	6-152	0-.395	H_2	50157	Yorizane, et al
	83-122	22-138	.04-.25	H_2	8905	Akers, Eubanks
Data Sets With Rating = B (N_B = 1)	68-88	17-228	.03-.54	H_2	6216	Verschoyle
Data Sets With Rating = C (N_C = 1) 5732						

*Same data

$H_2 + CH_4$ System: Vapor-liquid equilibrium data: N = 11

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A = 6)	116-172	34-276	.02-.35 H_2	6251	Benham, Katz
	91	17-208	.004-.10 H_2	5679	Freeth, Verschoyle
	90-117	10-127	.01-.12 H_2	24862	Kirk, Ziegler
	103-174	10-108	.003-.225 H_2	94700	Sagara, et al
	92-180	2-1380	.002-.61 H_2	150236	Tsang, et al
	103-163	10-152	0-.29 H_2	50157	Yorizane, et al
Data Sets With Rating = B (N_B = 3)	144	69	.08 H_2	6572	Cosway, Katz
	90-127	31-229	.02-.16 H_2	5617	Fastovskii, Gonikberg
	158-188	30-81	.02-.15 H_2	6241	Levitskaya
Data Sets With Rating = C (N_C = 2) 5884, 35926					

*Same data

$H_2 + CO_2$ System: Vapor-liquid equilibrium data: N = 11

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A = 5)	233-298	51-200	.01-.18 H_2	39337	Kaminishi, Toriumi
	220-290	10.7-200.5	.0013-.14 H_2	50699	Spano, et al
	220-290	9-1718	.0015-.56 H_2	150505	Tsang, Streett
	273	61-375	.05-.47 H_2	90120	Yorizane*
	273	61-375	.05-.47 H_2	76576	Yorizane, et al*
Data Sets With Rating = B (N_B =)					
Data Sets With Rating = C (N_C = 6)	8000,9518,150090,150109,150211,150212				

*Same data

$H_2 + C_2H_6$

System: Vapor-liquid equilibrium data: N= 8

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 4)	143-200	7-138	.003-.09 H_2	50609	Cohen, et al
	108-190	6-156	.92-.99 H_2	45223	Hiza, et al
	148-223	20-81	.006-.06 H_2	94700	Sagara, et al
	158,168,178,188	10-81	0.0-0.03 H_2	150515	Levitskaya, E.
Data Sets With Rating = B (N_B= 3)	200	69	.04 H_2	6572	Cosway, Katz
	158-188	30-81	.005-.03 H_2	6241	Levitskaya
	103-283	11-552	--	6369	Williams, Katz
Data Sets With Rating = C (N_C= 1) 639					

*Same data

$H_2 + C_3H_8$ System: Vapor-liquid equilibrium data: N = 5

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A = 2)	278-361	25-528	.01-.57 H_2	150095	Burriss, et al
	98-348	10-207	.002-.35 H_2	69775	Trust, Kurata
Data Sets With Rating = B (N_B = 2)	271-273	6-65	.3-.9 H_2	150136	Ahland
	89-297	17-552	--	6369	Williams, Katz
Data Sets With Rating = C (N_C = 1)	150067				

*Same data

$H_2 + NH_3$ System: Vapor-liquid equilibrium data: N= 6

	Temp. Range, K	Press. Range, bar	Comp. Range, mol		Accession No.	Author
Data Sets With Rating = A (N_A= 1)	278-394	34-414	0-.15	H_2	150544	Reamer, Sage
Data Sets With Rating = B (N_B= 2)	283-293	.03-.9	.03-.37	H_2	150517	Krasheninnikov, etal
	273-348	101-304	.69-.98	H_2	150514	Krichevskii, Khazanova
Data Sets With Rating = C (N_C= 3) 88684, 150389, 150391						

*Same data

$H_2 + i\text{-}C_4H_{10}$ System: Vapor-liquid equilibrium data: N = 1

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A = 1)	311-394	34-207	.02-.25 H_2	150060	Dean, Tooke
Data Sets With Rating = B (N_B =)					
Data Sets With Rating = C (N_C =)					

*Same data

System: Vapor-liquid equilibrium data: N= 5

H_2 + n-C_4H_{10}

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 2)	144-297	21-541	.01-.30 H_2	5100	Aroyan, Katz
	328-394	28-169	.02-.27 H_2	105717	Klink, et al
Data Sets With Rating = B (N_B= 2)	273-274	11-65	.86-.97 H_2	150136	Ahland
	297-389	22-107	.02-.11 H_2	30143	Nelson, Bonnell
Data Sets With Rating = C (N_C= 1)	150067				

*Same data

$H_2 + n\text{-}C_5H_{12}$

System: Vapor-liquid equilibrium data: N = 2

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A =)					
Data Sets With Rating = B (N_B = 1)	298	1	--	150177	Makranczy, et al

Data Sets With Rating = C (N_C = 1) 150067

*Same data

System: Vapor-liquid equilibrium data: N= 22

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 0)					
Data Sets With Rating = B (N_B= 5)	323	100-1010	.9986-.9997 H_2	5121	Bartlett
	285-345	1	--	150091	Morrison, Billett
	293-408	10-100	.018-.025 H_2	150183	Schroeder
	440-656	100-2500	.005-.90 H_2	150262	Seward, Franck
	298-333	1	.000013-.00014 H_2	150021	Shoor, et al
Data Sets With Rating = C (N_C= 17)	94543,150024,150046,150058,150067,150082,150097,150126,150127,150133, 150135,150147,150148,150172,150189,150229,150527				

*Same data

N_2 + CO System: Vapor-liquid equilibrium data: N= 9

	Temp. Range, K	Press. Range, bar	Comp. Range, mol		Accession No.	Author
Data Sets With Rating = A (N_A= 5)	68.09	0.2-0.3	0.2-0.8	CO	37444	Duncan, A.G.
	83.82	1.4-2.0	0.11-0.87	CO	16067	Pool, R.A.H.
	83.82	1.0-2.0	0.0-1.00	CO	39204	Sprow, F.B.
	70-122	0.2-27	0.1-0.9	CO	29934	Torocheshnikov, N.S.
	90.1-121.8	2.6-22	0.18-0.865	CO	13187	Yushkevich, N.F.
Data Sets With Rating = B (N_B= 3)	127.3-131.4	T_c only	0.2-0.8	CO	19414	Jones, I.W.
	83.1-118.7	2-16	0.16-0.89	CO	6240	Steckel, F.
	70.1,75.0,79.3	0.3-1.2	0.20-0.80	CO	6216	Verschoyle, T.T.H.
Data Sets With Rating = C (N_C= 1)	8905					

*Same data

$N_2 + CH_4$

System: Vapor-liquid equilibrium data: N = 21

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A=12)	91-190	0.6-51	0.05-0.986 CH_4	924	Bloomer, O.T.
	137-175	34	0.29-0.95 CH_4	150198	Brandt, L.W.
	91.6-124.1	0.2-5.6	0.009-0.15 N_2	25304	Cheung, H.
	99.82-175.04	1.0-45	0.01-0.99 CH_4	6350	Cines, M.R.
	80-186	1.0-48	0.05-0.94 CH_4	12784	Ellington, R.T.
	112.0-180.0	2.0-49	0.10-0.996 CH_4	104961	Kidnay, A.J.
	90.68	0.1-4.0	0.0-1.0 CH_4	111233	McClure, D.W.
	112.00	1.8-13	0.05-0.55 CH_4	83757	Miller, R.C.
	95.00-120.00	0.2-25	0.0-1.0 CH_4	100275	Parrish, W.R.
	90.67	0.1-4.0	0.0-1.0 CH_4	39204	Sprow, F.B.
	113.71-183.15	1.0-50	0.0-1.0 CH_4	97331	Stryjek, R.
	110.93	1.0-15	0.0-1.0 N_2	88754	Wilson, G.M.
Data Sets With Rating = B (N_B= 8)	122.0, 171.4	3.5-50	0.0-0.99 N_2	50610	Chang, S.D.
	82-150	1.0-16	0.18-0.93 CH_4	29966	Fastovskii, V.G.
	84-91	1.4-2.4	0.33-0.86 CH_4	45392	Fuks, S.
	140.1-180.1	T_c Only	0.20-0.80 CH_4	19414	Jones, I.W.
	135.2	7-39	0.1-0.8 N_2	150138	Lu, B.C.Y.
	84.5-106.5	1.0	0.33-0.95 CH_4	29935	McTaggart, H.A.
	113	1.1-17.6	0.0-1.0 N_2	84579	Skripka, V.G.
	89.8-132.92	0.8-22	0.225-0.98 CH_4	5717	Torocheshnikov, N.S.
Data Sets With Rating = C (N_C= 1)	6255				

*Same data

$N_2 + CO_2$

System: Vapor-liquid equilibrium data: N= 15

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 7)	253.15-288.15	24-144	0-0.57 N_2	76499	Arai, Y.
	233.15-298.15	37-127	0.05-0.25 N_2	39337	Kaminishi, G.
	288.15-301.15	61-103	0.006-0.19 N_2	150270	Krichevskii, I.R.
	270	31.6-121.8	0.0-0.353 N_2	123894	Somait, F.A.
	273.15	41-118	0.01-0.30 N_2	90120	Yorizane, M.
	273.15	41-118	0.01-0.30 N_2	76576	Yorizane, M.
	218.15-273.15	13-139	0.02-0.30 N_2	19620	Zenner, G.H.
Data Sets With Rating = B (N_B= 1)	273.15	41-152	0.01-0.285 N_2	9518	Abdullaev, Ya. A.
Data Sets With Rating = C (N_C= 7)	8000,35303,107564,150090,150109,150246,150279				

*Same data

System: Vapor–liquid equilibrium data: N = 9

$N_2 + C_2H_6$

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A = 6)	144.26, 199.82	34–69	0.10–0.21 N_2	6572	Cosway, H. F.
	109.1–301	7.0–126	0.05–0.80 N_2	12784	Ellington, R.T.
	200.0–290.0	2.0–132	0.0–0.57 N_2	118306	Grauso, L.
	138.71–194.26	0.1–135	0.0–0.73 N_2	97332	Stryjek, R.
	110.93	2.0–15	0.0–1.0 N_2	88754	Wilson, G.M.
	114–133	18–41	0.25–0.98 N_2	64158	Yu, P.
Data Sets With Rating = B (N_B = 3)	144.37–227.54	21–48	0.05–0.27 N_2	54087	Cannon, W. A.
	122.0–171.4	3.4–34	0.02–0.97 N_2	50610	Chang, S. D.
	92.8	0.2–0.4	0.005–0.01 N_2	25304	Cheung, H.
Data Sets With Rating = C (N_C = 0)					

*Same data

$N_2 + N_2O$ System: Vapor-liquid equilibrium data: N = 1

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A = 1)	213-253	5-79	0-.15 N_2	79086	Zeininger
Data Sets With Rating = B (N_B =)					
Data Sets With Rating = C (N_C =)					

*Same data

$N_2 + C_3H_8$ System: Vapor-liquid equilibrium data: N= 8

	Temp. Range, K	Press.Range, bar	Comp.Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 2)	230.0,260.0,290.0	3.0-159	0.0-0.53 N_2	118306	Grauso, L.
	103.15-353.15	0.07-138	0.0-0.32 N_2	40036	Schindler, D.L.
Data Sets With Rating = B (N_B= 5)	172.04-255.59	21-48	0.03-011 N_2	54087	Cannon, W. A.
	91.9-128.4	1.2-5.8	0.01-0.07 N_2	25304	Cheung, H.
	114.05,118.32,122.24	3.0-28	0.02-0.08 N_2	150138	Lu, B.C.Y.
	114.1,118.3,122.2	1.5-28	0.008-0.09 N_2	88753	Poon, D.P.L.
	311.6-365.2	51-146	0.1-0.5 N_2	45574	Roof, J.G.
Data Sets With Rating = C (N_C= 1) 6255					

*Same data

System: Vapor-liquid equilibrium data: N = 3

$N_2 + H_2S$

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A = 3)	256.4-344.3	17-207	0.004-0.16 N_2	101683	Besserer, G.J.
	200.15-227.98	1-137	0.0004-0.02 N_2	110898	Kalra, H.
	256,278,300,322,344	17-207	0.0-0.16 N_2	150522	Robinson, D.B.
Data Sets With Rating = B (N_B =)					
Data Sets With Rating = C (N_C =)					

*Same data

$N_2 + NH_3$

System: Vapor-liquid equilibrium data: N= 9

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 2)	303-383	970-3810	.05-.95 N_2	150534	Lindroos, Dodge
	278-394	34-414	0-.16 N_2	150543	Reamer, Sage
Data Sets With Rating = B (N_B= 2)	200-283	21-48	.0003-.003 N_2	54087	Cannon, et al
	273-348	101-304	.61-.96 N_2	150514	Krichevskii Khazanova
Data Sets With Rating = C (N_C= 5)	88684, 150390, 150341, 150520, 150521				

*Same data

N_2 + i-C_4H_{10} System: Vapor-liquid equilibrium data: N = 4

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A = 2)	255.37-394.26	2.0-207	0.005-0.46 N_2	123897	Kalra, H.
	283.21,338.65,399.26	6.0-207	0.006-0.46 N_2	119280	Robinson, D.B.
Data Sets With Rating = B (N_B = 2)	153.15-273.15	10-118	0.015-0.21 N_2	150190	Barsuk, S.D.
	258.15-318.15	7.0-99	Solubility	150162	Ryabtsev, N.I.
Data Sets With Rating = C (N_C =)					

*Same data

$N_2 + n\text{-}C_4H_{10}$

System: Vapor-liquid equilibrium data: N= 8

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 4)	310.93-422.04	36-291	0.011-0.55 N_2	150075	Akers, W. W.
	310.93	14-29	0.23-0.61 N_2	36802	Lehigh, W.R.
	310.93-410.93	16-235	0.02-0.66 N_2	150209	Roberts, L.R.
	153.15-273.15	5.0-196	0.0008-0.28 N_2	61574	Skripka, V.G.
Data Sets With Rating = B (N_B= 3)	303.15	Not given	Not given	150132	Haufe, S.
	298.15	7.0-100	Not given	150162	Ryabtsev, N.I.
	273.15,283.15,293.15	4.0-11	0.004-0.014 N_2	41049	Steinbach, H.
Data Sets With Rating = C (N_C= 1)	150067				

*Same data

$N_2 + SO_2$ System: Vapor-liquid equilibrium data: N= 2

	Temp. Range, K	Press.Range, bar	Comp.Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 1)	241-301	16-36	.003-.014 N_2	150546	Dean, Walls
Data Sets With Rating = B (N_B=)					
Data Sets With Rating = C (N_C= 1) 150547					

*Same data

$N_2 + i\text{-}C_5H_{12}$ System: Vapor-liquid equilibrium data: N= 2

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 1)	277.59-377.37	2.0-208	0.001-0.44 N_2	116899	Krishnan, T.R.
Data Sets With Rating = B (N_B= 1)	303.15,333.15	Not given	Not given	150132	Haufe, S.
Data Sets With Rating = C (N_C= 0)					

*Same data

$N_2 + n\text{-}C_5H_{12}$ System: Vapor-liquid equilibrium data: N= 3

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 1)	277.43-377.59	3.0-208	0.002-0.40 N_2	115116	Kalra, H.
Data Sets With Rating = B (N_B= 1)	298.15,313.15	10	Not given	150177	Makranczy, J.
Data Sets With Rating = C (N_C= 1)	87946				

*Same data

System: Vapor-liquid equilibrium data: N= 35

	Temp. Range, K	Press.Range, bar	Comp.Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 2)	324.65,375.65,398.15	101-616	0.0008-0.004 N_2	64489	O'Sullivan, T.D.
	298.15-373.15	21-102	0.0009-0.02 H_2O in vapor	49148	Rigby, M.
Data Sets With Rating = B (N_B= 9)	323	100-1010	0.9984-0.9995 N_2 in vapor	5121	Bartlett, E.P.
	298-623	51-507	0.03-0.9995 N_2 in vapor	83825	Maslennikova, V. Ya.
	286-346	1	Not given	150091	Morrison, T.J.
	298,348	100-300	0.0003-0.0006 N_2	150180	Paratella, A.
	323-503	101-304	0.804-0.999 N_2 in vapor	46672	Saddington, A.W.
	298-363	6-70	Not given	150183	Schroeder, W.
	303.15	11-59	0.00011-0.00064 N_2	150144	Smith, N.O.
	603-638	70-700	0.0-0.06 N_2	150013	Tsiklis, D.S.
	298	1	0.000012 N_2	150031	Wilcock, R.J.

Data Sets With Rating = C (N_C= 24) 20499,21436,106980,150022,150025,150053,150058,150067,150074,150076, 150092,150097,150118,150121,150127,150129,150133,150150,150174, 150178,150189,150257,150258,150275

*Same data

$CO + CH_4$

System: Vapor-liquid equilibrium data: N = 10

	Temp. Range, K	Press. Range, bar	Comp. Range, mol		Accession No.	Author
Data Sets With Rating = A (N_A = 6)	91-124	.3-5.2	.03-.25	CO	25304	Cheung, Wang
	123-178	4-47	.03-.97	CO	88244	Christiansen, et al
	91	.01-.3	0-1	CO	17785	Mathot, et al
	91	.1-3	0-1	CO	39204	Sprow, Prausnitz
	114-186	7-50	.02-.79	CO	11381	Toyama, et al
	143	15-39	.19-.80	CO	55395	Yorizane, et al
Data Sets With Rating = B (N_B = 1)	146-181	--	.2-.8	CO	19414	Jones, Rowlinson
Data Sets With Rating = C (N_C = 3)	14706,150268,19707					

*Same data

System: Vapor–liquid equilibrium data: N= 5

$CO + CO_2$

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 2)	223–283	8–142	.003–.46 CO	88751	Christiansen, et al
	223–283	24–131	.04–.37 CO	62196	Kaminishi, et al
Data Sets With Rating = B (N_B=)					
Data Sets With Rating = C (N_C= 3)	8000, 9518, 62447				

*Same data

System: Vapor-liquid equilibrium data: N = 1

$CO + C_2H_6$

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A = 1)	173-273	9-117	.01-.83 CO	73928	Trust, Kurata
Data Sets With Rating = B (N_B =)					
Data Sets With Rating = C (N_C =)					

*Same data

$CO + C_3H_8$ System: Vapor-liquid equilibrium data: N= 3

	Temp. Range, K	Press. Range, bar	Comp. Range, mol		Accession No.	Author
Data Sets With Rating = A (N_A= 2)	148-323	14-172	.02-.43	CO	73928	Trust, Kurata
	252-360	7-184	.20-.62	CO	3616	Widdoes, Katz
Data Sets With Rating = B (N_B= 1)	86-128	.2-6	.008-.21	CO	25304	Cheung, Wang
Data Sets With Rating = C (N_C=)						

*Same data

$CO + H_2S$ System: Vapor-liquid equilibrium data: N = 1

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A = 1)	203-293	2-237	.0004-.17 CO	102912	Fredenslund, Mollerup
Data Sets With Rating = B (N_B =)					
Data Sets With Rating = C (N_C =)					

*Same data

$CO + n\text{-}C_5H_{12}$ System: Vapor-liquid equilibrium data: N = 1

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A =)					
Data Sets With Rating = B (N_B = 1)	298	1	---	150177	Makranczy, et al
Data Sets With Rating = C (N_C =)					

*Same data

$CO + H_2O$ System: Vapor-liquid equilibrium data: N= 6

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A=)					
Data Sets With Rating = B (N_B= 1)	298-348	51	.0012-.0014 CO	150280	Granzhan
Data Sets With Rating = C (N_C= 5)	150058,150125,150127,150133,150152				

*Same data

$NO + NO_2$ System: Vapor-liquid equilibrium data: N= 1

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 1)	278-411	.6-103	0-.23 NO	150529	Selleck, et al
Data Sets With Rating = B (N_B=)					
Data Sets With Rating = C (N_C=)					

*Same data

System: Vapor–liquid equilibrium data: N = 2

$NO + H_2O$

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A =)					
Data Sets With Rating = B (N_B =)					
Data Sets With Rating = C (N_C = 2) 150125,150127					

*Same data

$CO_2 + CH_4$ System: Vapor-liquid equilibrium data: N= 14

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 12)	253-288	26-85	.04-.55 CH_4	76499	Arai, et al
	230-270	9-85	0-.7 CH_4	107053	Davalos, et al
	130-206	--	.795-.9984 CH_4	150377	Davis, et al
	200-271	11-79	.03-.92 CH_4	47558	Donnelly, Katz
	153-219	11.6-63.8	.768-.94 CH_4	111705	Hwang, et al
	233-283	35-82	.07-.52 CH_4	62196	Kaminishi, et al
	153-219	11.7-63.6	.10-.98 CH_4	120924	Mraw, et al
	173-220	26-66	.25-1 CH_4	53074	Neumann, Walch
	143-228	8-53	.80-.99 CH_4	9443	Pikaar
	278	69	.13 CH_4	150042	Robinson, et al
	270	31.6-83.2	0-.37 CH_4	123894	Somait, Kidnay
	283-293	45-83	0-.22 CH_4	150283	Toriumi, Kaminishi
Data Sets With Rating = B (N_B= 1)	166-258	44.2-51	.10-.99 CH_4	11348	Sterner
Data Sets With Rating = C (N_C= 1) 62447					

*Same data

$CH_4 + C_2H_6$ System: Vapor-liquid equilibrium data: N= 23

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 10)	139-300	3-68	0.05-0.975 C_1	12784	Ellington*
	199,241,255	26-48	0.27-0.47 C_1	50609	Cohen
	191-197	46-50	0.92-1.0 C_1	74084	Wichterle
	130-199	0.01-50	0.03-0.99 C_1	75234	Wichterle
	111	0.1-1.0	0.00-1.00 C_1	88754	Wilson
	92,112	H^E	0.3-0.8 C_1	104717	Miller
	160,180	0.2-33	0.0-1.0 C_1	114006	Miller
	139-300	3-68	0.05-0.975 C_1	150018	Bloomer*
	144-255	7-70	0.01-0.8 C_1	150116	Price
	250	13-66	0.0-0.7 C_1	107053	Davalos
Data Sets With Rating = B (N_B= 8)	178,188	30-41	0.7-0.9 C_1	6241	Levitskaya
	98-192	0.3-2.2	0.2-0.9 C_1	8793	Moran
	122,171	0.0-21	0.0-0.8 C_1	50610	Chang
	123-153	0.0-12	0.0-1.0 C_1	84579	Skripka
	125,135	2-4	0.4-0.7 C_1	117815	Hiza
	91,104	Not reported	0.5 C_1	133074	Calado
	169-273	3-65	0.2-0.6 C_1	150080	Guter
	130	0.4-3.5	0.1-1.0 C_1	150138	Lu
Data Sets With Rating = C (N_C= 5)	639,6249,16075,26751,73945				

*Same data

System: Vapor–liquid equilibrium data: N = 1

$N_2O + CH_4$

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A = 1)	213-253	4-51	0-.58 CH_4	79086	Zeininger
Data Sets With Rating = B (N_B =)					
Data Sets With Rating = C (N_C =)					

*Same data

$CH_4 + C_3H_8$ System: Vapor-liquid equilibrium data: N= 23

	Temp. Range, K	Press. Range, bar	Comp. Range, mol		Accession No.	Author
Data Sets With Rating = A (N_A= 7)	278,311	28-100	0.15-0.75	C_1	64378	Wiese
	278,311,344	14-86	0.00-0.55	C_1	64379	Wiese
	130-214	2-64	0.0-1.0	C_1	75233	Wichterle
	111	0.1-1.0	0.0-1.0	C_1	88754	Wilson
	116,135	0.2-4.9	0.1-1.0	C_1	98955	Calado
	92,112	H^E	0.3-0.8	C_1	104717	Miller
	144-283	7-70	0.00-0.74	C_1	150116	Price
Data Sets With Rating = B (N_B= 12)	158-273	3-100	0.01-1.0	C_1	3518	Akers
	92,112,128	0.01-1.6	0.03-0.47	C_1	25304	Cheung
	90-110	0.01-0.9	0.05-1.0	C_1	28799	Cutler
	305-356	56-90	0.2-0.6	C_1	45574	Roof
	210-350	17-48	0.24	C_1	59435	Yesavage
	180-329	17-68	0.49	C_1	67016	Yesavage
	91	0.05-0.1	0.27-0.78	C_1	71490	Stoecki
	123-153	0.00-12	0.0-1.0	C_1	84579	Skripka
	114-122	0.5-2.2	0.11-1.0	C_1	88573	Poon
	214	9-50	0.0-0.98	C_1	102931	Kalra
Data Sets With Rating = C (N_C= 4)	5730,150067,150077,150182					

*Same data

$CH_4 + C_3H_8$ System: Vapor-liquid equilibrium data: N= 23

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A=)					
Data Sets With Rating = B (N_B=)	277-511	14-680	0.1-0.9 C_1	150083	Reamer
	271-274	6-65	0.4-0.9 C_1	150136	Ahland
Data Sets With Rating = C (N_C=)					

*Same data

$H_2S + CH_4$ System: Vapor-liquid equilibrium data: N = 5

	Temp. Range, K	Press. Range, bar	Comp. Range, mol		Accession No.	Author
Data Sets With Rating = A (N_A = 4)	189-366	14-110	.005-.24	CH_4	47671	Kohn, Kurata
	278-344	12-134	0-.73	CH_4	150098	Reamer, et al
	311	41-124	.03-.26	CH_4	150040	Robinson, Bailey
	278-344	28-110	.02-.26	CH_4	150042	Robinson, et al
Data Sets With Rating = B (N_B = 1)	192-353	.5-75	.07-.89	CH_4	150086	Kohn, Kurata
Data Sets With Rating = C (N_C =)						

*Same data

$NH_3 + CH_4$ System: Vapor-liquid equilibrium data: N= 2

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A=)					
Data Sets With Rating = B (N_B=)					
Data Sets With Rating = C (N_C= 2) 88684,150520					

*Same data

$CH_4 + i\text{-}C_4H_{10}$ System: Vapor–liquid equilibrium data: N = 3

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A = 2)	198-377	5-118	0.0-0.98 C_1	84578	Barsuk
	310-378	6-116	0.0-0.38 C_1	150070	Olds
Data Sets With Rating = B (N_B =)					
Data Sets With Rating = C (N_C = 1) 5964					

*Same data

CH_4 + n-C_4H_{10} System: Vapor-liquid equilibrium data: N= 16

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 9)	211-411	2-132	0.03-0.92 C_1	14027	Roberts
	178-311	5-117	0.8-0.99 C_1	21434	Wang
	278-378	13-132	0.03-0.8 C_1	64379	Wiese
	166-283	0-114	0.0-1.0 C_1	90467	Kahre
	144-278	0-126	0.0-1.0 C_1	90468	Elliot
	205-294	0.7-124	0.0-0.8 C_1	91294	Mulholland
	294-394	2-133	0.0-0.48 C_1	150064	Sage
	311	66-131	0.3-0.74 C_1	150068	Rigas
	311	66-128	0.31-0.68 C_1	150523	Rigas
Data Sets With Rating = B (N_B= 5)	294-394	0-210	0.1-0.9 C_1	48068	Sage
	144-278	1-129	0.6-1.0 C_1	90465	Chen
	252-316	10-30	0.03-0.2 C_1	150065	Nederbragt
	272-274	4-65	0.7-0.94 C_1	150136	Ahland
	213-273	10-118	0.06-0.96 C_1	150190	Barsuk
Data Sets With Rating = C (N_C= 2)	82412,150067				

*Same data

$SO_2 + CH_4$ System: Vapor-liquid equilibrium data: N = 1

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A = 1)	241,301	17-36	.015-.03 CH_4	150546	Dean, Walls
Data Sets With Rating = B (N_B =)					
Data Sets With Rating = C (N_C =)					

*Same data

CH_4 + neo-C_5H_{12} System: Vapor-liquid equilibrium data: N= 1

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 1)	298	12-51	.07-.83 CH_4	71134	Rogers
Data Sets With Rating = B (N_B=)					
Data Sets With Rating = C (N_C=)					

*Same data

System: Vapor-liquid equilibrium data: N = 1

$CH_4 + i\text{-}C_5H_{12}$

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A = 1)	344-450	28-69	0-.30 CH_4	150081	Amick
Data Sets With Rating = B (N_B =)					
Data Sets With Rating = C (N_C =)					

*Same data

$CH_4 + n\text{-}C_5H_{12}$ **System: Vapor–liquid equilibrium data: N=** 10

	Temp. Range, K	Press. Range, bar	Comp. Range, mol		Accession No.	Author
Data Sets With Rating = A (N_A= 4)	173-273	.1-152	0-.18	CH_4	90466	Chen
	176-273	1-151	.05-.95	CH_4	107051	Chu
	311-444	1-169	0-.51	CH_4	150072	Sage
	273	59-158	.315-.775	CH_4	150516	Velikovskii
Data Sets With Rating = B (N_B= 3)	311-378	59-160	.07-.27	CH_4	150066	Sage
	298	1	--		150177	Makranczy
	311-377	14-170	.03-.74	CH_4	150140	Taylor

Data Sets With Rating = C (N_C= 3) 5964,87946,150067

*Same data

$CH_4 + H_2O$ System: Vapor-liquid equilibrium data: N= 35

	Temp. Range, K	Press.Range, bar	Comp.Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 10)	311	52-357	.998-.995 CH_4	150014	Culberson, McKetta
	298-444	22-689	.0003-.008 CH_4	150015	Culberson, McKetta
	311-394	4-38	.00006-.0006 CH_4	150201	Davis, McKetta
	298-303	3-52	.00006-.001 CH_4	150143	Duffy, et al
	298-423	41-469	.0006-.003 CH_4	150028	Michels, et al
	311-511	27-689	.35-.9996 CH_4	150071	Olds, et al
	325-398	101-608	.0014-.004 CH_4	64489	O'Sullivan, Smith
	298-373	24-93	.0009-.02 CH_4	49148	Rigby, Prausnitz
	298-353	1	.00001-.00002 CH_4	150021	Shoor, et al
	423-633	49-981	.07-.985 CH_4	150163	Sultanov, et al
Data Sets With Rating = B (N_B= 20)	283-303	1	---	150036	Ben-Naim, Yaacobi
	278-298	1	---	150035	Ben-Naim, et al
	275-313	1	---	150055	Claussen, Polglase
	298	36-667	.0008-.004 CH_4	150088	Culberson, et al
	273,293	1	---	150017	Eucken, Hertzberg
	298,308	1	---	150037	Feillolay, Lucas
	291-310	1	---	150130	Lannung, Gjaldbaek
	298	1	.00002 CH_4	150029	McAuliffe
	285-348	1	---	150091	Morrison, Billett
	259-287	16-108	.50-.52 CH_4	150513	Roberts, et al
Data Sets With Rating = C (N_C=)					

*Same data

$CH_4 + H_2O$

System: Vapor-liquid equilibrium data: N=

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A=)					
(Continuation)	303-353	10-70	.02-.03 CH_4	150183	Schroeder
	423-633	49-1079	---	150164	Sultanov, et al
Data Sets With Rating = B (N_B=)	278-308	1	---	150020	Wen, Hung
	278-318	1	---	150050	Wetlaufer, et al
	274-303	1	---	150213	Yamamoto, et al

Data Sets With Rating = C (N_C= 5) 150067,150125,150133,150146,150173

*Same data

$CO_2 + C_2H_6$

System: Vapor-liquid equilibrium data: N= 15

	Temp. Range, K	Press. Range, bar	Comp. Range, mol		Accession No.	Author
Data Sets With Rating = A (N_A= 7)	250	13-21	0-1	C_2H_6	107053	Davalos, et al
	223-293	5-63	0-1	C_2H_6	98958	Fredenslund, Mollerup
	273	24-40	0-1	C_2H_6	66179	Hakuta, et al
	222-289	7-57	.08-.93	C_2H_6	98719	Hamam, Lu
	283-293	31-63	0-1	C_2H_6	42929	Khazanova, et al
	283-298	30-63	0-1	C_2H_6	118307	Ohgaki, Katayama
	289	36-57	.08-.98	C_2H_6	150181	Robinson, Kalra
Data Sets With Rating = B (N_B= 3)	248-323	12-50	0-1	C_2H_6	88424	Gugnoni, et al
	241-283	---	0-1	C_2H_6	99626	Gugnoni, et al
	291-305	49-74	0-1	C_2H_6	112414	Khazanova, et al
Data Sets With Rating = C (N_C= 5)	51325, 122297, 150030, 150115, 150540					

*Same data

System: Vapor-liquid equilibrium data: $CO_2 + N_2O$ N= 3

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 2)	293-307	53-73	.26-.88 CO_2	150364	Cook
	277-293	35-56	0-1 CO_2	24301	Rowlinson, et al
Data Sets With Rating = B (N_B= 1)	280-311	34-78	.08-.98 CO_2	150541	Caubet
Data Sets With Rating = C (N_C=)					

*Same data

System: Vapor-liquid equilibrium data: N= 5

$CO_2 + C_3H_8$

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 2)	244-267	4.8-26.4	.09-.82 CO_2	110896	Hamam, Lu
	278-344	7-69	.20-.79 CO_2	150099	Reamer, et al
Data Sets With Rating = B (N_B= 3)	233-273	1-34	0-1 CO_2	3518	Akers, et al
	290-367	12-70	.36-.96 CO_2	150059	Poettmann, Katz
	305-361	49-68	.13-.90 CO_2	45574	Roof, Baron
Data Sets With Rating = C (N_C=)					

*Same data

$H_2S + CO_2$ System: Vapor-liquid equilibrium data: N= 5

	Temp. Range, K	Press. Range, bar	Comp. Range, mol		Accession No.	Author
Data Sets With Rating = A (N_A= 4)	273-365	15-86	.10-.94	H_2S	150171	Bierlein, Kay
	278-344	28-69	.60-.89	H_2S	150042	Robinson, et al
	311	41	.815-.84	H_2S	150040	Robinson, Bailey
	225-364	7-83	.09-.98	H_2S	2201	Sobocinski, Kurata
Data Sets With Rating = B (N_B= 1)	221-273	2-36	0-1	H_2S	150184	Steckel
Data Sets With Rating = C (N_C=)						

*Same data

$CO_2 + i\text{-}C_4H_{10}$ **System: Vapor-liquid equilibrium data: N= 2**

	Temp. Range, K	Press. Range, bar	Comp. Range, mol		Accession No.	Author
Data Sets With Rating = A (N_A= 2)	311-394	5-72	0-.88	CO_2	87419	Besserer, Robinson*
	311-394	5-72	0-.88	CO_2	150522	Robinson, Besserer*
Data Sets With Rating = B (N_B=)						
Data Sets With Rating = C (N_C=)						

*Same data

$CO_2 + n\text{-}C_4H_{10}$ System: Vapor-liquid equilibrium data: N= 8

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 6)	311	5-74	.03-.90 CO_2	76314	Besserer, Robinson
	273	1.7-7.4	.41-.85 CO_2	150142	Hirata, Suda
	228-283	.3-41	.008-.93 CO_2	110898	Kalra, et al
	311-411	4-80	.17-.83 CO_2	150073	Olds, et al
	283	4-41	.03-.93 CO_2	150181	Robinson, Kalra
	278-311	28-55	.82-.92 CO_2	21434	Wang, McKetta
Data Sets With Rating = B (N_B= 1)	300-416	3-80	.14-.86 CO_2	150059	Poettmann, Katz
Data Sets With Rating = C (N_C= 1) 105715					

*Same data

$CO_2 + i\text{-}C_5H_{12}$

System: Vapor-liquid equilibrium data: N = 1

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A = 1)	278-378	1.5-89	0-1 CO_2	150373	Besserer, Robinson
Data Sets With Rating = B (N_B =)					
Data Sets With Rating = C (N_C =)					

*Same data

System: Vapor-liquid equilibrium data: N= 4

CO_2 + n-C_5H_{12}

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A=1)	278-378	.3-96	0-1 CO_2	150197	Besserer, Robinson
Data Sets With Rating = B (N_B= 2)	298-313	1	---	150177	Makranczy, et al
	296-405	1-98	.46-.96 CO_2	150059	Poettmann, Katz
Data Sets With Rating = C (N_C= 1) 87946					

*Same data

$CO_2 + H_2O$

System: Vapor-liquid equilibrium data: N= 42

	Temp. Range, K	Press. Range, bar	Comp. Range, mol		Accession No.	Author
Data Sets With Rating = A (N_A= 5)	298-373	17-51	.97-.999	CO_2	150051	Coan, King
	373-773	.1-905	0-.5	CO_2	150187	Khitarov, Malinin
	473-603	98-588	.01-.13	CO_2	150165	Malinin
	373-623	100-1500	.004-.25	CO_2	150157	Takenouchi, Kennedy
	323-623	200-3500	.008-.355	CO_2	150100	Toedheide, Franck
Data Sets With Rating = B (N_B= 8)	273-288	1-53	.002-.07	CO_2	150193	Haehnel
	293-303	5-29	.25-1	CO_2	150123	Kritchewsky, et al
	367-454	.8-1	.70-.72	CO_2	150033	Maass, Mennie
	273-298	---	.005-.08	CO_2	150384	Morgan, Maass
	286-348	1	---		150091	Morrison, Billett
	244-296	15-61	.0002-.001	CO_2	150532	Stone
	293-308	25-77	.008-.03	CO_2	150101	Vilcu, Gainar
	273-373	1-94	.001-.03	CO_2	150269	Zelvenskii

Data Sets With Rating = C (N_C= 29) 150022, 150034, 150043, 150044, 150045, 150054, 150106, 150111, 150117, 150120, 150124, 150128, 150133, 150155, 150156, 150166, 150167, 150168, 150176, 150179, 150186, 150188, 150192, 150194, 150196, 150202, 150210, 150214, 150537 ***Same data**

$N_2O + C_2H_6$

System: Vapor-liquid equilibrium data: N = 1

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A =)					
Data Sets With Rating = B (N_B =)					
Data Sets With Rating = C (N_C = 1) 150540					

*Same data

$C_2H_6 + C_3H_8$

System: Vapor-liquid equilibrium data: N = 9

	Temp. Range, K	Press. Range, bar	Comp. Range, mol		Accession No.	Author
Data Sets With Rating = A (N_A = 2)	255,283	7-21	0.02-0.9	C_2	150116	Price
	303-369	11-50	0.0-1.0	C_2	150139	Miksovsky
Data Sets With Rating = B (N_B = 6)	311-367	14-28	0.0-1.0	C_2	13495	Matschke
	127-250	0-15	0.0-1.0	C_2	64372	Djordjevich
	203-273	0.2-24	0.0-1.0	C_2	84579	Skripka
	304-307	47-49	0.97-0.99	C_2	91853	Miniovich
	197,202,273	0.2-24	0.0-1.0	C_2	150102	Hirata
	303-369	10-50	0.0-1.0	C_2	150137	Miksovsky
Data Sets With Rating = C (N_C = 1)	108496					

*Same data

$H_2S + C_2H_6$

System: Vapor-liquid equilibrium data: N = 4

	Temp. Range, K	Press. Range, bar	Comp. Range, mol		Accession No.	Author
Data Sets With Rating = A (N_A = 3)	267-360	17-83	.11-.89	C_2H_6	150096	Kay, Brice
	283	16-31	.02-.95	C_2H_6	150181	Robinson, Kalra
	200-283	.7-31	.01-.97	C_2H_6	119280	Robinson, et al
Data Sets With Rating = B (N_B =)						

Data Sets With Rating = C (N_C = 1) 76312

*Same data

$C_2H_6 + i\text{-}C_4H_{10}$ **System: Vapor-liquid equilibrium data: N = 3**

	Temp. Range, K	Press. Range, bar	Comp. Range, mol		Accession No.	Author
Data Sets With Rating = A (N_A = 2)	311-394	5-54	0-.96	C_2H_6	87420	Besserer
	311-394	11-54	0-.96	C_2H_6	150522	Robinson
Data Sets With Rating = B (N_B = 1)	203-273	0-24	0-1	C_2H_6	84579	Skripka
Data Sets With Rating = C (N_C =)						

*Same data

System: Vapor-liquid equilibrium data: N= 6

C_2H_6 + n-C_4H_{10}

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 2)	310-366	14-56	.25-.78 C_2H_6	125467	Dingrani
	303-363	4-53	.04-.93 C_2H_6	150506	Lhotak
	:				
Data Sets With Rating = B (N_B= 3)	229-419	5-57	0-.99 C_2H_6	150062	Kay
	339-394	32-54	.1-.75 C_2H_6	150206	Mehra
	339	34-57	---	150307	Herlihy
Data Sets With Rating = C (N_C= 1)	150512				

*Same data

C_2H_6 + n-C_5H_{12} **System: Vapor-liquid equilibrium data: N=** 4

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 1)	278-444	3-61	0.0-1.0	150119	Reamer
Data Sets With Rating = B (N_B= 1)	339	34-63	K-Values	150370	Herlihy
Data Sets With Rating = C (N_C= 2) 87946,150369					

*Same data

$C_2H_6 + H_2O$

System: Vapor-liquid equilibrium data: N = 18

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A = 7)	286-353	1	.68-.92 C_2H_6	150170	Abou El-Nour, et al
	298-373	23-36	.0009-.04 C_2H_6	150051	Coan, King
	311-444	4-685	.00009-.003 C_2H_6	150087	Culberson, McKetta
	311	42-120	.0009-.002 C_2H_6	150014	Culberson, McKetta
	311-444	4-84	.00009-.001 C_2H_6	150088	Culberson, et al
	473-673	200-3500	.02-.92 C_2H_6	150084	Danneil, et al
	311-511	22-682	.8-.9994 C_2H_6	150057	Reamer, et al
Data Sets With Rating = B (N_B = 10)	283-303	1	---	150036	Ben-Naim, Yaacobi
	278-298	1	---	150035	Ben-Naim, et al
	275-313	1	---	150055	Claussen, Polglase
	273,293	1	---	150017	Eucken, Hertzberg
	298	1	.00003 C_2H_6	150131	Gjaldbaek, Niemann
	298	1	.00006 C_2H_6	150029	McAuliffe
	285-346	1	---	150091	Morrison, Billett
	261-288	3-68	.018-.355 C_2H_6	150513	Roberts, et al
	278-308	1	---	150020	Wen, Hung
	278-318	1	---	150050	Wetlaufer, et al
Data Sets With Rating = C (N_C = 1)	150125				

*Same data

$N_2O + n\text{-}C_5H_{12}$

System: Vapor-liquid equilibrium data: N = 1

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A =)					
Data Sets With Rating = B (N_B = 1)	298,313	1	---	150177	Makranczy, et al
Data Sets With Rating = C (N_C =)					

*Same data

System: Vapor-liquid equilibrium data: N= 6

$N_2O + H_2O$

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 1)	298-373	22-50	.95-.999 N_2O	150051	Coan, King
Data Sets With Rating = B (N_B= 1)	303-323	1	.29-.45 N_2O	150511	Borgstedt, Gillies
Data Sets With Rating = C (N_C= 4)	150034, 150043, 150082, 150214				

*Same data

$H_2S + C_3H_8$

System: Vapor-liquid equilibrium data: N = 4

	Temp. Range, K	Press. Range, bar	Comp. Range, mol		Accession No.	Author
Data Sets With Rating = A (N_A = 3)	217-344	1.4-27.6	.02-.985	H_2S	150199	Brewer, et al
	324-367	28-41	.01-.465	H_2S	150105	Gilliland, Scheeline
	272-366	7-80	.16-.90	H_2S	150260	Kay, Rambosek
Data Sets With Rating = B (N_B = 1)	243-288	2-17	0-1	H_2S	150184	Steckel
Data Sets With Rating = C (N_C =)						

*Same data

$COS + C_3H_8$ System: Vapor-liquid equilibrium data: N= 1

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 1)	266-355	4-39	0-1 COS	150374	Miranda, et al
Data Sets With Rating = B (N_B=)					
Data Sets With Rating = C (N_C=)					

*Same data

$C_3H_8 + i\text{-}C_4H_{10}$

System: Vapor-liquid equilibrium data: N= 4

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 1)	267-394	1.2-41	0.0-1.0 C_3	39202	Hipkin
Data Sets With Rating = B (N_B= 3)	253,263,273	0.7-4.7	0.0-1.0 C_3	84579	Skripka
	237,249	0.4-2	0.0-1.0 C_3	150102	Hirata
	340	10-24	0.0-1.0 C_3	150103	Hirata
Data Sets With Rating = C (N_C=)					

*Same data

C_3H_8 + n-C_4H_{10} **System: Vapor-liquid equilibrium data: N=** 6

	Temp. Range, K	Press.Range, bar	Comp.Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 2)	332-425	20-43	0.0-1.0 C_3	150203	Kay
	303,323,343,363	4-34	0.06-0.91 C_3	150507	Beranek
Data Sets With Rating = B (N_B= 4)	253,263,273	0.5-4.7	0.0-1.0 C_3	84579	Skripka
	391,404	42-43	0.46,0.7 C_3	150056	Grieves
	310-411	5.5-42	0.16-0.82 C_3	150061	Nysewander
	237,249	0.2-2	0.0-1.0 C_3	150102	Hirata
Data Sets With Rating = C (N_C=)					

*Same data

$SO_2 + C_3H_8$ System: Vapor-liquid equilibrium data: N= 1

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A=)					
Data Sets With Rating = B (N_B= 1)	323-363	13-44	.36-.79 SO_2	150524	Glowka
Data Sets With Rating = C (N_C=)					

*Same data

C_3H_8 + i-C_5H_{12} System: Vapor-liquid equilibrium data: N= 1

	Temp. Range, K	Press. Range, bar	Comp. Range, mol		Accession No.	Author
Data Sets With Rating = A (N_A=)						
Data Sets With Rating = B (N_B= 1)	273-448	1-45	.1-.9	C_3H_8	150069	Vaughn
Data Sets With Rating = C (N_C=)						

*Same data

$C_3H_8 + n\text{-}C_5H_{12}$ System: Vapor-liquid equilibrium data: N= 4

	Temp. Range, K	Press. Range, bar	Comp. Range, mol		Accession No.	Author
Data Sets With Rating = A (N_A= 3)	337-383	3.3-38	.5-.98	C_3H_8	99841	Vejrosta
	332-468	20-44	0-1	C_3H_8	150203	Kay
	294-378	7-41	.79	C_3H_8	150533	Sage
Data Sets With Rating = B (N_B= 1)	327-444	7.2-45	.35-.79	C_3H_8	150063	Sage
Data Sets With Rating = C (N_C=)						

*Same data

$C_3H_8 + H_2O$ System: Vapor-liquid equilibrium data: N= 13

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 6)	289-411	1-35	.00001-.0003 C_3H_8	150107	Azarnoosh, McKetta
	311-370	13-44	.0002-.9993 C_3H_8	150159	Klausutis
	279-422	6-193	.0002-.99996 C_3H_8	150530	Kobayashi, Katz
	277-323	1	.00002-.00006 C_3H_8	150023	Kreshek, et al
	289-359	1	.0003-.005 C_3H_8	150110	Poettmann, Dean
	473-593	230-2000	.01-.05 C_3H_8	150255	Sanchez, Coll
Data Sets With Rating = B (N_B= 7)	293-303	1	---	150055	Claussen, Polglase
	587-663	174-1872	.03-.265 C_3H_8	131999	deLoos, et al
	273-311	1	.9995-.99994 C_3H_8	150195	Hachmuth
	298	1	.00006 C_3H_8	150029	McAuliffe
	285-347	1	---	150091	Morrison, Billett
	278-308	1	---	150020	Wen, Hung
	278-318	1	---	150050	Wetlaufer, et al
Data Sets With Rating = C (N_C=)					

*Same data

System: Vapor–liquid equilibrium data: N = 2

H_2S + i-C_4H_{10}

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A = 2)	278-378	2-62	0-1 H_2S	150104	Besserer, Robinson*
	278-378	2-62	0-1 H_2S	150522	Robinson, Besserer*
Data Sets With Rating = B (N_B =)					
Data Sets With Rating = C (N_C =)					

*Same data

$H_2S + n\text{-}C_4H_{10}$ System: Vapor-liquid equilibrium data: N = 1

	Temp. Range, K	Press. Range, bar	Comp. Range, moi	Accession No.	Author
Data Sets With Rating = A (N_A =)					
Data Sets With Rating = B (N_B =)					
Data Sets With Rating = C (N_C = 1) 150041					

*Same data

System: Vapor-liquid equilibrium data: N = 2

$H_2S + n\text{-}C_5H_{12}$

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A = 1)	278-444	1-90	.06-.99 H_2S	150093	Reamer, et al
Data Sets With Rating = B (N_B = 1)	298-313	1	---	150177	Makranczy, et al
Data Sets With Rating = C (N_C =)					

*Same data

$H_2S + H_2O$

System: Vapor-liquid equilibrium data: N= 7

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 3)	273-323	.5-1	.0005-.003 H_2S	150002	Clarke, Glew
	433-603	1	.0008-.014 H_2S	150276	Kozintseva
	311-444	7-345	.003-.16 H_2S	150250	Selleck, et al
Data Sets With Rating = B (N_B= 1)	283-453	20-670	.001-.04 H_2S	150273	Lee, Mather

Data Sets With Rating = C (N_C= 3) 150222,150232,150518

*Same data

$NH_3 + n\text{-}C_4H_{10}$ System: Vapor-liquid equilibrium data: N= 1

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 1)	317-420	21-103	0-1 NH_3	150378	Kay, Fisch
Data Sets With Rating = B (N_B=)					
Data Sets With Rating = C (N_C=)					

*Same data

$NH_3 + H_2O$

System: Vapor-liquid equilibrium data: N = 12

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A = 4)	333-420	.2-17	0-.26 NH_3	150542	Clifford, Hunter
	420-499	1	.0000017-.00018 NH_3	150386	Jones
	364-420	1-4	.0009-.04 NH_3	150375	Polak, Lu
	273-363	.03-11	.09-.85 NH_3	150536	Wilson
Data Sets With Rating = B (N_B = 6)	363	---	.003-.02 NH_3	150528	Dvorak, Boublik
	371-454	1	.49-.50 NH_3	150033	Maass, Mennie
	273-333	.13-10	.21-.51 NH_3	150538	Mittasch, et al
	273-298	---	.002-.36 NH_3	150384	Morgan, Maass
	273-313	1-5	.25-.67 NH_3	150508	Neuhausen, Patrick
	224-470	.1-20	0-1 NH_3	150519	Wucherer
Data Sets With Rating = C (N_C = 2)	150518,150539				

*Same data

$i\text{-}C_4H_{10}$ + $n\text{-}C_4H_{10}$ System: Vapor-liquid equilibrium data: N = 6

	Temp. Range, K	Press. Range, bar	Comp. Range, mol		Accession No.	Author
Data Sets With Rating = A (N_A = 5)	334,354,374	6-20	0.0-1.0	$i\text{-}C_4$	150102	Hirata
	334,354,374	6-20	0.0-1.0	$i\text{-}C_4$	150141	Hirata
	273	1.1-1.5	0.09-0.93	$n\text{-}C_4$	150142	Hirata
	278-344	1.5-10.3	0.25,0.5,0.75	$i\text{-}C_4$	150204	Martinez-Ortez
	346-373	10.3-19.6	0.05-0.96	$i\text{-}C_4$	150266	Yokayama
Data Sets With Rating = B (N_B = 1)	344-407	8.8-33	0.25-0.75	$i\text{-}C_4$	150079	Connolly
Data Sets With Rating = C (N_C =)						

*Same data

$i\text{-}C_4H_{10} + H_2O$ **System: Vapor-liquid equilibrium data: N=** 6

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 2)	280-295	3-4	.9997-.99991 C_4H_{10}	150027	Black, et al
	311-378	2-22	.00001-.00007 C_4H_{10}	150207	Reed, McKetta
Data Sets With Rating = B (N_B= 4)	283-313	2-5	---	150169	Kazaryan, Ryabtsev
	298	1	.00005 C_4H_{10}	150029	McAuliffe
	278-343	1	---	150154	Nosov, Barlyaev
	278-318	1	---	150050	Wetlaufer, et al
Data Sets With Rating = C (N_C=)					

*Same data

$n\text{-}C_4H_{10}$ + $n\text{-}C_5H_{12}$ System: Vapor-liquid equilibrium data: N = 2

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A = 1)	358-464	10-37	0.14-0.87 $n\text{-}C_4$	103629	Kay
Data Sets With Rating = B (N_B = 1)	298.15	0.7-1.1	0.02-0.27 C_4	150362	Calingaert
Data Sets With Rating = C (N_C =)					

*Same data

System: Vapor-liquid equilibrium data: N= 17

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 9)	278-294	3-6	.9998-.99992 C_4H_{10}	150027	Black, et al
	311-378	73-694	.00006-.997 C_4H_{10}	150108	Brooks, et al
	628,637	255-1125	.05-.40 C_4H_{10}	150084	Danneil, et al
	277-323	1	.00001-.00006 C_4H_{10}	150023	Kreshek, et al *
	311-411	1-66	.00002-.00018 C_4H_{10}	150085	LeBreton, McKetta
	311-425	4-44	.95-.9995 C_4H_{10}	150545	Reamer, et al
	311-511	1.4-689	0-.0017 C_4H_{10}	150531	Reamer, et al
	276-292	1	.00006-.0002 C_4H_{10}	150208	Rice, et al
	311-411	4-34	.97-.9991 C_4H_{10}	150525	Wehe, McKetta
Data Sets With Rating = B (N_B= 7)	278-298	1	---	150035	Ben-Naim, et al
	293-303	1	---	150055	Claussen, Polglase
	283-313	1-4	---	150169	Kazaryan, Ryabtsev
	298	1	.00006 C_4H_{10}	150029	McAuliffe
	284-349	1	---	150091	Morrison, Billett
	278-308	1	---	150020	Wen, Hung
	278-318	1	---	150050	Wetlaufer, et al
Data Sets With Rating = C (N_C= 1) 150012					

*Same data

SO_2 + n-C_5H_{12} System: Vapor-liquid equilibrium data: N = 1

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A =)					
Data Sets With Rating = B (N_B = 1)	298,313	1	---	150177	Makranczy, et al
Data Sets With Rating = C (N_C =)					

*Same data

$SO_2 + H_2O$

System: Vapor-liquid equilibrium data: N= 10

	Temp. Range, K	Press. Range, bar	Comp. Range, mol		Accession No.	Author
Data Sets With Rating = A (N_A=)						
Data Sets With Rating = B (N_B= 4)	298-393	.14-5	.01-.07	SO_2	150363	Campbell, Maass
	283-363	1.0-1.3	.01-.16	SO_2	150535	Hudson
	273-298	---	.0008-.14	SO_2	150384	Morgan, Maass
	293-333	---	.0011-.02	SO_2	150510	Vosolsobe*, et al
Data Sets With Rating = C (N_C= 6)	150361,150371,150382,150387,150509,150526					

*Same data

neo-C_5H_{12} + n-C_5H_{12} System: Vapor-liquid equilibrium data: N= 1

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 1)	441-463	---	.18-.79 n-C_5H_{12}	150078	Partington
Data Sets With Rating = B (N_B=)					
Data Sets With Rating = C (N_C=)					

*Same data

System: Vapor-liquid equilibrium data: N= 2

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 1)	298-353	1	.000004-.00001 C_5H_{12}	150021	Shoor, et al
Data Sets With Rating = B (N_B= 1)	288-318	1	---	150050	Wetlaufer, et al
Data Sets With Rating = C (N_C=)					

*Same data

$i\text{-}C_5H_{12} + n\text{-}C_5H_{12}$ System: Vapor-liquid equilibrium data: N= 2

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 1)	328-385	2.3-7.8	.43-.96 $n\text{-}C_5H_{12}$	150205	McCormick
Data Sets With Rating = B (N_B= 1)	311-322	1.1-2.0	0-1 $n\text{-}C_5H_{12}$	150278	McClain
Data Sets With Rating = C (N_C=)					

*Same data

$i\text{-}C_5H_{12} + H_2O$ **System: Vapor-liquid equilibrium data: N = 2**

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A = 1)	279-295	1	.9996-.9998 C_5H_{12}	150027	Black, et al
Data Sets With Rating = B (N_B = 1)	298	1	.00005 C_5H_{12}	150029	McAuliffe
Data Sets With Rating = C (N_C =)					

*Same data

$n\text{-}C_5H_{12} + H_2O$ **System: Vapor-liquid equilibrium data: N=** 6

	Temp. Range, K	Press. Range, bar	Comp. Range, mol	Accession No.	Author
Data Sets With Rating = A (N_A= 4)	279-298	1	.9995-.9999 C_5H_{12}	150027	Black, et al
	573-625	152-709	.01-.41 C_5H_{12}	150200	Connolly
	278-308	1	.00003 C_5H_{12}	150160	Liabastre
	293-344	.5-3	.00003-.00006 C_5H_{12}	150161	Namiot, Beider
Data Sets With Rating = B (N_B= 1)	298	1	.00004 C_5H_{12}	150029	McAuliffe
Data Sets With Rating = C (N_C= 1)					

150122

*Same data

Multicomponent Vapor-Liquid Equilibrium Data

System	Rating	Temp. Range, K	Press. Range, bar	Accession No.	Author
$He + N_2 + CH_4$	A	76.5-130	14-138	17059	Boone, et al
" "	A	76.5-174	7-83	91184	Rhodes, et al
" "	A	80-144	7-83	120297	Tully, Stroud
$He + N_2 + CH_4 + C_2H_6 + C_3H_8$	B	100-215	1-61	50700	Gonzalez, Lee
$He + N_2 + CH_4 + C_2H_6 + C_3H_8 + i\text{-}C_4H_{10} + n\text{-}C_4H_{10} + i\text{-}C_5H_{12}$	A	103-228	7-34	11765	Brandt, et al
$He + N_2 + CH_4 + C_2H_6 + C_3H_8 + i\text{-}C_4H_{10} + n\text{-}C_4H_{10} + i\text{-}C_5H_{12} + n\text{-}C_5H_{12}$	A	89-255	7-34	150225	DeVaney, et al
$He + N_2 + CH_4 + C_2H_6 + C_3H_8 + n\text{-}C_4H_{10}$	A	103-228	7-34	150224	Boone, et al
" "	A	105-255	7-34	11765	Brandt, et al
" "	B	111-235	3-69	50700	Gonzalez, Lee
" "	B	123-183	7	150247	Stutzman, Brown
$He + N_2 + C_3H_8$	A	273	34-207	40036	Schindler, et al
$H_2 + N_2 + CO$	A	83-122	22-138	8905	Akers, Eubanks
" "	C	--	--	5732	Ruhemann, Tsin
" "	C	--	--	6216	Verschoyle
$H_2 + N_2 + CO + CH_4$	A	78	2-10	150281	Torocheshnikov Semenova
$H_2 + N_2 + CH_4$	A	144	34-69	6572	Cosway, Katz
" "	C	--	--	35926	Steckel, Tsin
$H_2 + N_2 + CH_4 + C_2H_6$	A	144-200	34-69	6572	Cosway, Katz
$H_2 + N_2 + CO_2$	B	273-293	52-206	8283	Abdulaev
$H_2 + N_2 + H_2O$	B	298-323	100-1010	5121	Bartlett
$H_2 + CO + CH_4$	C	--	--	150237	Kosyakov, et al
$H_2 + CO + CH_4 + CO_2$	B	273	8-46	150264	Yorizane, et al
$H_2 + CO + CH_4 + CO_2 + C_3H_8$	B	273	8-42	150264	Yorizane, et al

System	Rating	Temp. Range, K	Press. Range, bar	Accession No.	Author
$H_2 + CO + CH_4 + CO_2 + n\text{-}C_4H_{10}$	B	273	9-46	150264	Yorizane, et al
$H_2 + CO + CO_2$	A	233-283	51-203	62196	Kaminishi, et al
" "	C	--	--	62447	Kaminishi, Toriumi
" "	C	--	--	150283	Toriumi, Kaminishi
$H_2 + CO + C_3H_8$	C	--	--	11157	Stein, et al
" "	A	223-323	34-138	69775	Trust, Kurata
$H_2 + CH_4 + C_2H_6$	A	115-255	13-138	50609	Cohen, et al
" "	A	144-200	34-69	6572	Cosway, Katz
" "	B	158-188	30-81	6241	Levitskaya
$H_2 + CH_4 + C_3H_8$	A	144-255	34-69	6251	Behnam, Katz
$H_2 + CH_4 + C_3H_8 + n\text{-}C_4H_{10}$	B	271-273	5-64	150136	Ahland
$N_2 + CH_4 + CO_2$	A	233-273	61-101	80644	Sarashina, et al
" "	A	270	45-110	123894	Somait, Kidnay
$N_2 + CH_4 + C_2H_6$	B	122-171	0-50	50610	Chang, Lu
" "	A	144-200	34-69	6572	Cosway, Katz
" "	B	101-116	--	150138	Lu, et al
" "	B	112	14	69471	Lu, Yu, Poon
$N_2 + CH_4 + C_2H_6$	A	114-129	15-35	64158	Yu, et al
$N_2 + CH_4 + C_2H_6 + C_3H_8$	B	116-201	2-55	50700	Gonzalez, Lee
" "	A	115-200	2-48	150234	Gregory, et al
$N_2 + CH_4 + C_2H_6 + C_3H_8 + i\text{-}C_4H_{10}$	A	175-202	28-39	59300	Banks, Haselden
$N_2 + CH_4 + C_2H_6 + C_3H_8 + i\text{-}C_4H_{10} + n\text{-}C_4H_{10} + n\text{-}C_5H_{12}$	A	198-253	53-63	150261	Nikitina, et al

System	Rating	Temp. Range, K	Press. Range, bar	Accession No.	Author
$N_2 + CH_4 + C_2H_6 + C_3H_8 + n\text{-}C_4H_{10}$	B	116-220	2-58	50700	Gonzalez, Lee
$N_2 + CH_4 + C_3H_8$	B	114-122	0-22	88753	Poon, Lu
$N_2 + CH_4 + n\text{-}C_4H_{10}$	A	311-411	34-207	19027	Roberts, McKetta
" "	A	311-378	7-207	13445	Sauer
$N_2 + C_2H_6 + C_3H_8$	B	77-87	0-2	25304	Cheung, Wang
$N_2 + C_2H_6 + n\text{-}C_4H_{10}$	C	--	--	36802	Lehigh, McKetta
$CO + CH_4 + CO_2$	A	223-243	34-69	88751	Christiansen, et al
$CH_4 + CO_2 + C_2H_6$	A	250	21-30	107053	Davalos
$CH_4 + CO_2 + H_2S$	A	222-239	21-48	26297	Hensel, Massoth
" "	A	311	41-124	150040	Robinson, Bailey
" "	A	278-344	28-110	150042	Robinson, et al
$CH_4 + CO_2 + n\text{-}C_4H_{10}$	C	--	--	60917	Robinson, Saxena
" "	C	--	--	62117	Saxena, Robinson
" "	A	178-311	28-117	21434	Wang, McKetta
$CH_4 + C_2H_6 + C_3H_8$	A	144-283	7-70	150116	Price, Kobayashi
$CH_4 + C_2H_6 + C_3H_8$	C	--	--	150182	Rutherford
" "	A	114-228	1	63416	Watanabe, et al
" "	A	158-214	2-60	75235	Wichterle, Kobayashi
$CH_4 + C_2H_6 + C_3H_8 + i\text{-}C_4H_{10}$	B	244	14	150248	DePriester
$CH_4 + C_2H_6 + C_3H_8 + n\text{-}C_4H_{10}$	B	222	14-20	150248	DePriester
$CH_4 + C_2H_6 + C_3H_8 + n\text{-}C_4H_{10} + n\text{-}C_5H_{12}$	B	244	7	150248	DePriester
" "	C	--	--	150239	Etter, Kay
" "	A	311	36-120	150251	Hanson, Brown

Multicomponent Vapor-Liquid Equilibrium Data

System	Rating	Temp. Range, K	Press. Range, bar	Accession No.	Author
$CH_4 + C_2H_6 + n\text{-}C_4H_{10}$	C	--	--	13680	Cota, Thodos
" "	C	--	--	150223	Forman, Thodos
$CH_4 + C_2H_6 + n\text{-}C_5H_{12}$	A	311	34-138	150233	Billman, et al
$CH_4 + C_3H_8 + n\text{-}C_4H_{10}$	A	311	50-121	150242	Rigas, et al
" "	A	278-378	14-117	64379	Wiese, et al
$CH_4 + C_3H_8 + n\text{-}C_5H_{12}$	A	311	34-138	150271	Carter, et al
" "	A	344-378	34-138	150244	Dourson, et al
$CH_4 + H_2S + n\text{-}C_4H_{10}$	C	--	--	60917	Robinson, Saxena
" "	C	--	--	62117	Saxena, Robinson
$CO_2 + C_2H_6 + C_3H_8$	A	244-267	6-30	111245	Hamam, Lu
$C_2H_6 + C_3H_8 + n\text{-}C_4H_{10}$	B	343-396	47-54	150056	Grieves, Thodos
$C_2H_6 + C_3H_8 + n\text{-}C_4H_{10} + n\text{-}C_5H_{12}$	C	--	--	150239	Etter, Kay
$C_2H_6 + C_3H_8 + n\text{-}C_5H_{12}$	C	--	--	150239	Etter, Kay
$C_2H_6 + n\text{-}C_4H_{10} + n\text{-}C_5H_{12}$	A	366-422	31-65	150215	Mehra, Thodos
$C_3H_8 + n\text{-}C_4H_{10} + n\text{-}C_5H_{12}$	C	--	--	150239	Etter, Kay

APPENDIX C

Data Source References

8000 Abdulaev, Ya. A. Phase relations in mixtures of carbon dioxide with hydrogen, nitrogen and carbon monoxide. (in Russian) Zh. Fiz. Khim., 13(7), 986-8 (1939).

8283 Abdulaev, Ya. A. Study of the solubility of nitrogen-hydrogen mixtures in liquid carbon dioxide. (in Russian) Zh. Prikl. Khim. (Leningrad), 14(3), 302-4 (1941).

9518 Abdullaev, Ya. A. Study of equilibria of the liquid carbon dioxide system in the presence of technical gases. (in Russian) Zh. Khim. Promsti., 16(2), 37-40 (1939).

150170 Abou El-Nour, F., Harting, P., Schuetze, H. Thermodynamic carbon isotope effect for solubility of ethane in water. Isotopenpraxis, 13(8), 296-8 (1977).

103328 Abrosimov, V. K., Strakhov, A. N., Krestov, G. A. Solubility of He, Ne and Ar in heavy water of various isotopic compositions at 283-318 degrees K. (in Russian) Izv. Vyssh. Uchebn. Zaved., Khim. Khim. Tekhnol., 17(10), 1463-5 (1974).

150150 Adeney, W. E., Becker, H. G. The determination of the rate of solution of atmospheric nitrogen and oxygen by water. Part II. Sci. Proc. R. Dublin Soc., 15, 609-28 (1919).

150136 Ahland, E. The determination and computation of condensation points in hydrocarbon gas mixtures with a high hydrogen content. (in German) GWF, Gas-Wasserfach, 107(11), 273-9 (1966).

150048 Akerloef, G. The solubility of noble gases in aqueous salt solutions at 25 degrees. J. Am. Chem. Soc., 57, 1196-201 (1935).

150075 Akers, W. W., Attwell, L. L., Robinson, J. A. Volumetric and phase behavior of nitrogen-hydrocarbon systems. Nitrogen-butane system. Ind. Eng. Chem., 46(12), 2539-40 (1954).

3518 Akers, W. W., Burns, J. F., Fairchild, W. R. Low-temperature phase equilibria. Methane-propane system. Ind. Eng. Chem., 46(12), 2531-4 (1954).

8905 Akers, W. W., Eubanks, L. S. Vapor-liquid equilibria in the system hydrogen-nitrogen-carbon monoxide. Adv. Cryog. Eng., 3, 275-93 (1960).

3518 Akers, W. W., Kelley, R. E., Lipscomb, T. G. Low-temperature phase equilibria. Carbon dioxide-propane system. Ind. Eng. Chem., 46(12), 2535-6 (1954).

150279 Altunin, V. V., Gvozdkov, A. V., Sosinovskii, V. K. Study of liquid-vapor phase equilibrium in binary systems with carbon dioxide. (in Russian) Tr. Mosk. Energ. Inst., 177, 28-32 (1974).

150081 Amick, E. H., Jr., Johnson, W. B., Dodge, B. F. P-V-T-X relationships for the system: methane-isopentane. Chem. Eng. Prog., Symp. Ser., 48(3), 65-72 (1952).

150246 Andrews, T. On the properties of matter in the gaseous and liquid states under various conditions of temperature and pressure. Philos. Trans. R. Soc. London, Ser. A, 178, 45-56 (1887).

76499 Arai, Y., Kaminishi, G., Saito, S. The experimental determination of the P-V-T-X relations for the carbon dioxide-nitrogen and the carbon dioxide-methane systems. J. Chem. Eng. Jpn., 4(2), 113-22 (1971).

5100 Aroyan, H. J., Katz, D. L. Low temperature vapor-liquid equilibria in hydrogen-n-butane system. Ind. Eng. Chem., 43(1), 185-9 (1951).

150107 Azarnoosh, A., McKetta, J. J. The solubility of propane in water. Pet. Refiner, 37(11), 275-8 (1958).

59300 Banks, R., Haselden, G. G. The measurement and prediction of enthalpies and phase equilibria in natural gas mixtures. Pap. - Int. Conf. Liquefied Nat. Gas, 1969, 117-37 (1969).

150190 Barsuk, S. D., Benyaminovich, O. A. Investigation of liquid-vapor equilibria in mixtures of nitrogen-isobutane and methane-n-butane at low temperatures. (in Russian) Tr., Vses. Nauchno-Issled. Inst. Prir. Gazov, 100-5 (1975).

84578 Barsuk, S. D., Skripka, V. G., Benyaminovich, O. A. Investigation of the liquid-vapor equilibrium in the methane-isobutane system at low temperatures. (in Russian) Gazov. Promst., 15(9), 38-41 (1970).

150106 Bartholome, E., Friz, H. Solubility of carbon dioxide in water at high pressures. (in German) Chem.-Ing.-Tech., 28(11), 706-8 (1956).

5121 Bartlett, E. P. The concentration of water vapor in compressed hydrogen, nitrogen and a mixture of these gases in the presence of condensed water. J. Am. Chem. Soc., 49, 65-78 (1927).

150196 Barton, J. R., Hsu, C. C. Solubility of cyclopropane in alkyl carboxylic acids. J. Chem. Eng. Data, 16(1), 93-5 (1971).

150092 Basset, J., Dode, M. Solubility of nitrogen in water at high pressures to 4500 kg/cm(2). C. R. Hebd. Seances Acad. Sci., 203, 775-7 (1936).

150257 Behnke, A. R., Yarbrough, O. D. Physiologic studies of helium. U. S. Nav. Med. Bull., 36, 542-9 (1938).

6251 Benham, A. L., Katz, D. L. Vapor-liquid equilibria for hydrogen-light-hydrocarbon systems at low temperatures. AIChE J., 3(1), 33-6 (1957).

150035 Ben-Naim, A., Wilf, J., Yaacobi, M. Hydrophobic interaction in light and heavy water. J. Phys. Chem., 77(1), 95-102 (1973).

150036 Ben-Naim, A., Yaacobi, M. Effects of solutes on the strength of hydrophobic interaction and its temperature dependence. J. Phys. Chem., 78(2), 170-8 (1974).

106980 Benson, B. B., Krause, D., Jr. Empirical laws for dilute aqueous solutions of nonpolar gases. J. Chem. Phys., 64(2), 689-709 (1976).

150025 Benson, B. B., Parker, P. D. M. Relations among the solubilities of nitrogen, argon and oxygen in distilled water and sea water. J. Phys. Chem., 5, 1489-96 (1961).

150507 Beranek, P., Wichterle, I. Vapour-liquid equilibria in the propane-n-butane system at high pressures. Fluid Phase Equilib., 6, 279-82 (1981).

76314 Besserer, G. J., Robinson, D. B. A high pressure autocollimating refractometer for determining coexisting liquid and vapor phase densities. Can. J. Chem. Eng., 49(5), 651-6 (1971).

87419 Besserer, G. J., Robinson, D. B. Equilibrium-phase properties of i-butane-carbon dioxide system. J. Chem. Eng. Data, 18(3), 298-301 (1973).

87420 Besserer, G. J., Robinson, D. B. Equilibrium-phase properties of i-butane-ethane system. J. Chem. Eng. Data, 18(3), 301-4 (1973).

150197 Besserer, G. J., Robinson, D. B. Equilibrium-phase properties of n-pentane-carbon dioxide system. J. Chem. Eng. Data, 18(4), 416-9 (1973).

150373 Besserer, G. J., Robinson, D. B. Equilibrium-phase properties of isopentane-carbon dioxide system. J. Chem. Eng. Data, 20(1), 93-6 (1975).

101683 Besserer, G. J., Robinson, D. B. Equilibrium-phase properties of nitrogen-hydrogen sulfide system. J. Chem. Eng. Data, 20(2), 157-61 (1975).

150104 Besserer, G. J., Robinson, D. B. The equilibrium phase properties of the i-butane-hydrogen sulfide system. J. Chem. Eng. Jpn., 8(1), 11-5 (1975).

150361 Beuschlein, W. L., Simenson, L. O. Solubility of sulfur dioxide in water. J. Am. Chem. Soc., 62, 610-2 (1940).

150171 Bierlein, J. A., Kay, W. B. Phase-equilibrium properties of system carbon dioxide-hydrogen sulfide. Ind. Eng. Chem., 45(3), 618-24 (1953).

150233 Billman, G. W., Sage, B. H., Lacey, W. N. Phase behavior in the methane-ethane-n-pentane system. Trans. Am. Inst. Min., Metall. Pet. Eng., 174, 13-24 (1948).

150027 Black, C., Joris, G. G., Taylor, H. S. The solubility of water in hydrocarbons. J. Chem. Phys., 16(5), 537-43 (1948).

150018 Bloomer, O. T., Gami, D. C., Parent, J. D. Physical-chemical properties of methane-ethane mixtures. Inst. Gas Technol., Chicago, Res. Bull., 22, 44 pp (1953).

924 Bloomer, O. T., Parent, J. D. Liquid-vapor phase behavior of the methane-nitrogen system. Chem. Eng. Prog., Symp. Ser., 49(6), 11-24 (1953).

150537 Boexkes, W., Emig, G. Determination of CO(2) solubility in water. (in German) Chem.-Ing.-Tech., 41(23), 1273-6 (1969).

150111 Bohr, C. Definition and method of determination of the invasion and evasion coefficients of solution of gases in liquids. Values of the named constants as well as of the absorption coefficients of carbon dioxide with solution in water and in sodium chloride solutions. (in German) Ann. Phys. (Leipzig), 68, 500-25 (1899).

150224 Boone, W. J., Jr., De Vaney, W. E., Miller, J. E. Low-temperature phase equilibria of helium-bearing natural gases: Exell gas. Rep. Invest. - U. S., Bur. Mines, 6008, 23 pp (1962).

17059 Boone, W. J., Jr., DeVaney, W. E., Stroud., L. Vapor-liquid equilibria for a helium-nitrogen-methane system. Rep. Invest. - U. S., Bur. Mines, 6178, 35 pp (1963).

150511 Borgstedt, H. H., Gillies, A. J. Determination of the solubility of nitrous oxide in water by gas chromatography. Anesthesiology, 26(5), 675-8 (1965).

150198 Brandt, L. W., Stroud, L. Phase equilibria in natural gas systems. Apparatus with windowed cell for 800 p.s.i.g. and temperatures to -320 degrees F. Ind. Eng. Chem., 50(5), 849-52 (1958).

11765 Brandt, L. W., Stroud, L., Miller, J. E. Phase equilibria in natural gas systems. Data for two helium-bearing natural gases. J. Chem. Eng. Data, 6(1), 6-13 (1961).

150199 Brewer, J., Rodewald, N., Kurata, F. Phase equilibria of the propane-hydrogen sulfide system from the cricondontherm to the solid-liquid-vapor region. AIChE J., 7(1), 13-6 (1961).

150108 Brooks, W. B., Gibbs, G. B., McKetta, J. J. Mutual solubilities of light hydrocarbon-water systems. Pet. Refiner, 30(10), 118-20 (1951).

21435 Burch, R. J. Low temperature phase equilibria of the gas-liquid system helium-neon-nitrogen. J. Chem. Eng. Data, 9(1), 19-24 (1964).

63709 Burfield, D. W., Richardson, H. P., Guereca, R. A. Vapor-liquid equilibria and dielectric constants for the helium-carbon dioxide system. AIChE J., 16(1), 97-100 (1970).

150095 Burriss, W. L., Hsu, N. T., Reamer, H. H., Sage, B. H. Phase behavior of the hydrogen-propane system. Ind. Eng. Chem., 45(1), 210-3 (1953).

18927 Buzyna, G., Macriss, R. A., Ellington, R. T. Vapor-liquid equilibrium in the helium-nitrogen system. Chem. Eng. Prog., Symp. Ser., 59(44), 101-11 (1963).

150089 Cady, H. P., Elsey, H. M., Berger, E. V. The solubility of helium in water. J. Am. Chem. Soc., 44, 1456-61 (1922).

98955 Calado, J. C. G., Garcia, G. A., Staveley, L. A. K. Thermodynamics of the liquid system methane + propane. J. Chem. Soc., Faraday Trans. 1, 70(8), 1445-51 (1974).

133074 Calado, J. C. G., Gomes de Azevedo, E. J. S., Soares, V. A. M. Thermodynamic properties of binary liquid mixtures of ethane and ethylene with methane and the rare gases. Chem. Eng. Commun., 5, 149-63 (1980).

150362 Calingaert, G., Hitchcock, L. B. The application of the phase rule to the calculation of liquid and vapor compositions in binary systems. Deviations from Raoult's law for hydrocarbon mixtures. J. Am. Chem. Soc., 49, 750-65 (1927).

150363 Campbell, W. B., Maass, O. Equilibria in sulphur dioxide solutions. Can. J. Res., 2, 42-64 (1930).

54087 Cannon, W. A., Robson, J. H., English, W. D. Liquid propellant gas absorption study. Douglas Missile Space Syst. Div., Astropower Lab., Newport Beach, Calif., Rep., DAC-60510-F2, 72 pp (1968).

150271 Carter, R. T., Sage, B. H., Lacey, W.N. Phase behavior in the methane-propane-n-pentane system. Trans. Am. Inst. Min., Metall. Pet. Eng., 142, 170-8 (1941).

150541 Caubet, F. The liquefaction of gas mixtures. (in German) Z. Phys. Chem., Stoechiom. Verwandschaftsl., 49, 101-16 (1904).

50610 Chang, S.-D., Lu, B. C.-Y. Vapor-liquid equilibria in the nitrogen-methane-ethane system. Chem. Eng. Prog., Symp. Ser., 63(81), 18-27 (1967).

39075 Charlesworth, P. L., Ruhemann, M. Low temperature hydrogen recovery from industrial gases. Bull. Inst. Int. Froid, Annexe, 1965-4, 467-75 (1965).

90465 Chen, R. J. J., Chappelear, P. S., Kobayashi, R. Dew-point loci for methane-n-butane binary system. J. Chem. Eng. Data, 19(1), 53-8 (1974).

90466 Chen, R. J. J., Chappelear, P. S., Kobayashi, R. Dew-point loci for methane-n-pentane binary system. J. Chem. Eng. Data, 19(1), 58-61 (1974).

82412 Chen, R. J. J., Ruska, W. E. A., Chappelear, P. S., Kobayashi, R. Development of a method for direct determination of dew point loci of methane-heavier hydrocarbon mixtures at low temperatures and elevated pressures. Adv. Cryog. Eng., 18, 202-7 (1973).

25304 Cheung, H., Wang, D. I.-J. Solubility of volatile gases in hydrocarbon solvents at cryogenic temperatures. Ind. Eng. Chem. Fundam., 3(4), 355-61 (1964).

88751 Christiansen, L. J., Fredenslund, A., Gardner, N. Gas-liquid equilibria of the CO(2)-CO and CO(2)-CH(4)-CO systems. Adv. Cryog. Eng., 19, 309-19 (1974).

88244 Christiansen, L. J., Fredenslund, A., Mollerup, J. Vapour-liquid equilibrium of the CH(4)-Ar, CH(4)-CO, and Ar-CO systems at elevated pressures. Cryogenics, 13(7), 405-13 (1973).

150133 Christoff, A. On the dependence of absorption on the surface tension. (in German) Z. Phys. Chem., Stoechiom. Verwandschaftsl., 55, 622-34 (1906).

107051 Chu, T.-C., Chen, R. J. J., Chappelear, P. S., Kobayashi, R. Vapor-liquid equilibrium of methane-n-pentane system at low temperatures and high pressures. J. Chem. Eng. Data, 21(1), 41-4 (1976).

6350 Cines, M. R., Roach, J. T., Hogan, R. J., Roland, C. H. Nitrogen-methane vapor-liquid equilibria. Chem. Eng. Prog., Symp. Ser., 49(6), 1-10 (1953).

150002 Clarke, E. C. W., Glew, D. N. Aqueous nonelectrolyte solutions. Part VIII. Deuterium and hydrogen sulfides solubilities in deuterium oxide and water. Can. J. Chem., 49(5), 691-8 (1971).

150055 Claussen, W. F., Polglase, M. F. Solubilities and structures in aqueous aliphatic hydrocarbon solutions. J. Am. Chem. Soc., 74, 4817-9 (1952).

150118 Clever, H. L., Battino, R., Saylor, J. H., Gross, P. M. The solubility of helium, neon, argon and krypton in some hydrocarbon solvents. J. Phys. Chem., 61, 1078-82 (1957).

150542 Clifford, I. L., Hunter, E. The system ammonia-water at temperatures up to 150 degrees C. and at pressures up to twenty atmospheres. J. Phys. Chem., 37, 101-18 (1933).

150051 Coan, C. R., King, A. D., Jr. Solubility of water in compressed carbon dioxide, nitrous oxide, and ethane. Evidence for hydration of carbon dioxide and nitrous oxide in the gas phase. J. Am. Chem. Soc., 93(8), 1857-62 (1971).

50609 Cohen, A. E., Hipkin, H. G., Koppany, C. R. Experimental vapor-liquid equilibrium data for hydrogen-ethane and hydrogen-methane-ethane. Chem. Eng. Prog., Symp. Ser., 63(81), 10-7 (1967).

150079 Connolly, J. F. Ideality of n-butane:isobutane solutions. J. Phys. Chem., 66(6), 1082-6 (1962).

150200 Connolly, J. F. Solubility of hydrocarbons in water near the critical solution temperatures. J. Chem. Eng. Data, 11(1), 13-6 (1966).

150364 Cook, D. The carbon-dioxide-nitrous-oxide system in the critical region. Proc. R. Soc. London, Ser. A, 219, 245-56 (1953).

6572 Cosway, H. F., Katz, D. L. Low-temperature vapor-liquid equilibria in ternary and quaternary systems containing hydrogen, nitrogen, methane, and ethane. AIChE J., 5(1), 46-50 (1959).

13680 Cota, H. M., Thodos, G. Critical temperatures and critical pressures of hydrocarbon mixtures. Methane-ethane-n-butane system. J. Chem. Eng. Data, 7(1), 62-5 (1962).

94543 Crozier, T. E., Yamamoto, S. Solubility of hydrogen in water, seawater, and NaCl solutions. J. Chem. Eng. Data, 19(3), 242-4 (1974).

150088 Culberson, O. L., Horn, A. B., McKetta, J. J., Jr. Phase equilibria in hydrocarbon-water systems. The solubility of ethane in water at pressures to 1200 pounds per square inch. Trans. Am. Inst. Min., Metall. Pet. Eng., 189, 1-6 (1950).

150087 Culberson, O. L., McKetta, J. J., Jr. Phase equilibria in hydrocarbon-water systems. II - The solubility of ethane in water at pressures to 10,000 psi. Trans. Am. Inst. Min., Metall. Pet. Eng., 189, 319-22 (1950).

150015 Culberson, O. L., McKetta, J. J., Jr. Phase equilibria in hydrocarbon-water systems. III - The solubility of methane in water at pressures to 10,000 psia. Trans. Am. Inst. Min., Metall. Pet. Eng., 192, 223-6 (1951).

150014 Culberson, O. L., McKetta, J. J., Jr. Phase equilibria in hydrocarbon-water systems. IV - vapor-liquid equilibrium constants in the methane-water and ethane-water systems. Trans. Am. Inst. Min., Metall. Pet. Eng., 192, 297-300 (1951).

28799 Cutler, A. J. B., Morrison, J. A. Excess thermodynamic functions for liquid mixtures of methane+propane. Trans. Faraday Soc., 61(3), 429-42 (1965).

150084 Danneil, A., Toedheide, K., Franck, E. U. Vaporization equilibria and critical curves in the systems ethane/water and n-butane/water at high pressures. (in German) Chem.-Ing.-Tech., 39(13), 816-22 (1967).

107053 Davalos, J., Anderson, W. R., Phelps, R. E., Kidnay, A. J. Liquid-vapor equilibria at 250.00K for systems containing methane, ethane, and carbon dioxide. J. Chem. Eng. Data, 21(1), 81-4 (1976).

150377 Davis, J. A., Rodewald, N., Kurata, F. Solid-liquid-vapor phase behavior of the methane-carbon dioxide system. AIChE J., 8(4), 537-9 (1962).

21414 Davis, J. A., Rodewald, N., Kurata, F. An apparatus for phase studies between 20 degrees K. and 300 degrees K. Ind. Eng. Chem., 55(11), 36-42 (1963).

150201 Davis, J. E., McKetta, J. J. Solubility of methane in water. Pet. Refiner, 39(3), 205-6 (1960).

86467 Davydov, I. A., Budnevich, S. S. Study of equilibrium composition of a nitrogen-helium mixture. (in Russian) Inzh.-Fiz. Zh., 20(6), 1082-6 (1971).

150060 Dean, M. R., Tooke, J. W. Vapor-liquid equilibria in three hydrogen-paraffin systems. Ind. Eng. Chem., 38(4), 389-93 (1946).

150546 Dean, M. R., Walls, W. S. Solubility of nitrogen and methane in sulfur dioxide. Ind. Eng. Chem., 39(8), 1049-51 (1947).

131999 de Loos, T. W., Wijen, A. J. M, Diepen, G. A. M. Phase equilibria and critical phenomena in fluid (propane + water) at high pressures and temperatures. J. Chem. Thermodyn., 12(2), 193-204 (1980).

150248 DePriester, C. L. Light-hydrocarbon vapor-liquid distribution coefficients. Pressure-temperature-composition charts and pressure-temperature nomographs. Chem. Eng. Prog., Symp. Ser., 49(7), 1-43 (1953).

20429 DeVaney, W. E., Dalton, B. J., Meeks, J. C., Jr. Vapor-liquid equilibria of the helium-nitrogen system. J. Chem. Eng. Data, 8(4), 473-8 (1963).

70826 DeVaney, W. E., Rhodes, H. L., Tully, P. C. Phase equilibria data for helium-methane system. J. Chem. Eng. Data, 16(2), 158-61 (1971).

150225 De Vaney, W. E., Stroud., L., Boone, W. J., Jr. Low-temperature phase equilibria of a natural gas of low helium content. Rep. Invest. - U. S., Bur. Mines, 6499, 20 pp (1964).

150172 de Wet, W. J. Determination of gas solubilities in water and some organic liquids. J. S. Afr. Chem. Inst., 17, 9-13 (1964).

125467 Dingrani, J. G., Thodos, G. Vapor-liquid equilibrium behavior of the ethane-n-butane-n-hexane system. Can. J. Chem. Eng., 56(5), 616-23 (1978).

64372 Djordjevich, L., Budenholzer, R. A. Vapor-liquid equilibrium data for ethane-propane system at low temperatures. J. Chem. Eng. Data, 15(1), 10-2 (1970).

5651 Dokoupil, Z., Van Soest, G., Swenker, M. D. P. On the equilibrium between the solid phase and the gas phase of the systems hydrogen-nitrogen, hydrogen-carbon monoxide and hydrogen-nitrogen-carbon monoxide. Commun. Kamerlingh Onnes Lab. Univ. Leiden, 297, 59 pp (1955); reprinted from Appl. Sci. Res., Sect. A, 5, 182-240 (1955).

47558 Donnelly, H. G., Katz, D. L. Phase equilibria in the carbon dioxide-methane system. Ind. Eng. Chem., 46(3), 511-7 (1954).

150547 Dornte, R. W., Ferguson, C. V. Solubility of nitrogen and oxygen in liquid sulfur dioxide. Ind. Eng. Chem., 31, 112-3 (1939).

150232 Douabul, A. A., Riley, J. P. The solubility of gases in distilled water and seawater - V. Hydrogen sulphide. Deep-Sea Res. Oceanogr. Abstr., 26A(3), 259-68 (1979).

21436 Douglas, E. Solubilities of oxygen, argon, and nitrogen in distilled water. J. Phys. Chem., 68(1), 169-74 (1964).

150244 Dourson, R. H., Sage, B. H., Lacey, W. N. Phase behavior in the methane-propane-n-pentane system. Trans. Am. Inst. Min., Metall. Pet. Eng., 151, 206-15 (1943).

150143 Duffy, J. R., Smith, N. O., Nagy, B. Solubility of natural gases in aqueous salt solutions - I. Liquidus surfaces in the system CH(4)-H(2)O-NaCl-CaCl(2) at room temperatures and at pressures below 1000 psia. Geochim. Cosmochim. Acta, 24, 23-31 (1961).

37444 Duncan, A. G., Staveley, L. A. K. Thermodynamic functions for the liquid systems argon + carbon monoxide, oxygen + nitrogen, and carbon monoxide + nitrogen. Trans. Faraday Soc., 62(3), 548-52 (1966).

150528 Dvorak, K., Boublik, T. Liquid-vapour equilibria. XXIX. Measurement of equilibrium data in systems with high equilibrium ratio of the components. Collect. Czech. Chem. Commun., 28, 1249-55 (1963).

150369 Ekiner, O., Thodos, G. Critical temperatures and critical pressures of the ethane-n-pentane system. J. Chem. Eng. Data, 11(2), 154-5 (1966).

12784 Ellington, R. T., Eakin, B. E., Parent, J. D., Gami, D. C., Bloomer, O. T. Vapor-liquid phase equilibria in the binary systems of methane, ethane and nitrogen. Thermodyn. Transp. Prop. Gases, Liqu., Solids, Pap. Symp. Therm. Prop., 1959, 180-94 (1959).

90468 Elliot, D. G., Chen, R. J. J., Chappelear, P. S., Kobayashi, R. Vapor-liquid equilibrium of methane-n-butane system at low temperatures and high pressures. J. Chem. Eng. Data, 19(1), 71-7 (1974).

150156 Ellis, A. J. The solubility of carbon dioxide in water at high temperatures. Am. J. Sci., 257, 217-34 (1959).

150155 Ellis, A. J., Golding, R. M. The solubility of carbon dioxide above 100 degrees C in water and in sodium chloride solutions. Am. J. Sci., 261, 47-60 (1963).

150022 Enns, T., Scholander, P. F., Bradstreet, E. D. Effect of hydrostatic pressure on gases dissolved in water. J. Phys. Chem., 69(2), 389-91 (1965).

150192 Ermolaev, M. I., Kapitanov, V. F., Nesterova, A. K., Batishchev, V. V. The carbon dioxide-water binary system. Russ. J. Phys. Chem. (Engl. Transl.), 45(1), 167 (1971).

150134 Estreicher, T. The solubility ratio of argon and helium in water. (in German) Z. Phys. Chem., Stoechiom. Verwandschaftsl., 31, 176-87 (1899).

150239 Etter, D. O., Kay, W. B. Critical properties of mixtures of normal paraffin hydrocarbons. J. Chem. Eng. Data, 6(3), 409-14 (1961).

150017 Eucken, A., Hertzberg, G. Salting out effects and ion hydration. (in German) Z. Phys. Chem. (Leipzig), 195(1), 1-23 (1950).

150129 Farhi, L. E., Edwards, A. W. T., Homma, T. Determination of dissolved N(2) in blood by gas chromatography and (a-A)N(2) difference. J. Appl. Physiol., 18, 97-106 (1963).

5617 Fastovskii, V. G., Gonikberg, M. G. Solubility of gases in liquids at low temperatures and high pressures. III. Solubility of hydrogen in liquid methane. (in Russian) Zh. Fiz. Khim., 14(3), 427-8 (1940).

29966 Fastovskii, V. G., Petrovskii, Yu. V. An investigation of the liquid/vapour equilibrium in the nitrogen-methane system. (in Russian) Zh. Fiz. Khim., 31(10), 2317-21 (1957).

150151 Fedoritenko, A., Ruhemann, M. Equilibrium diagrams of helium-nitrogen mixtures. Tech. Phys. USSR, 4, 36-43 (1937).

150037 Feillolay, A., Lucas, M. The solubility of helium and methane in aqueous tetrabutylammonium bromide solutions at 25 and 35 degrees. J. Phys. Chem., 76(21), 3068-72 (1972).

150173 Fischer, F., Zerbe, C. On the solubility of methane in water and organic solvents under pressure. (in German) Brennst.-Chem., 4(2), 17-9 (1923).

70550 Foerg, W., Wirtz, P. Helium and nitrogen removal from natural gas. Linde Rep. Sci. Technol., 15, 46-53 (1970); transl. of Linde Ber. Tech. Wiss., 28, 44-50 (1970).

150223 Forman, J. C., Thodos, G. Experimental determination of critical temperatures and pressures of mixtures: the methane-ethane-n-butane system. AIChE J., 8(2), 209-13 (1962).

150174 Fox, C. J. J. On the coefficients of absorption of nitrogen and oxygen in distilled water and sea-water, and of atmospheric carbonic acid in sea-water. Trans. Faraday Soc., 5, 68-87 (1909).

150124 Franck, E. U., Toedheide, K. Thermal properties of supercritical mixtures of carbon dioxide and water to 750 degrees C and 2000 atm. (in German) Z. Phys. Chem. (Frankfurt am Main), 22, 232-45 (1959).

98958 Fredenslund, A., Mollerup, J. Measurement and prediction of equilibrium ratios for the C(2)H(6)+CO(2) system. J. Chem. Soc., Faraday Trans. 1, 70(9), 1653-60 (1974).

102912 Fredenslund, A., Mollerup, J. Gas-liquid equilibrium of hydrogen sulphide + carbon monoxide. J. Chem. Thermodyn., 7(7), 677-82 (1975).

5679 Freeth, F. A., Verschoyle, T. T. H. Physical constants of the system methane-hydrogen. Proc. R. Soc. London, Ser. A, 130, 453-63 (1931).

150049 Friedman, H. L. The solubilities of sulfur hexafluoride in water and of the rare gases, sulfur hexafluoride and oxmium tetroxide in nitromethane. J. Am. Chem. Soc., 76, 3294-7 (1954).

150067 Frolich, P. K., Tauch, E. J., Hogan, J. J., Peer, A. A. Solubilities of gases in liquids at high pressure. Ind. Eng. Chem., 23(5), 548-50 (1931).

150122 Fuehner, H. Water solubility in homologous series. (in German) Ber. Dtsch. Chem. Ges., 5713, 510-5 (1924).

45392 Fuks, S., Bellemans, A. Excess free energies and volumes of two simple binary liquid mixtures: methane-krypton and nitrogen-methane. Bull. Soc. Chim. Belg., 76(5-6), 290-9 (1967).

150038 Gardiner, G. E., Smith, N. O. Solubility and partial molar properties of helium in water and aqueous sodium chloride from 25 to 100 degrees and 100 to 600 atmospheres. J. Phys. Chem., 76(8), 1195-202 (1972).

150105 Gilliland, E. R., Scheeline, H. W. High-pressure vapor-liquid equilibrium for the systems propylene-isobutane and propane-hydrogen sulfide. Ind. Eng. Chem., 32(1), 48-54 (1940).

150518 Ginzburg, D. M., Pikulina, N. S., Litvin, V. P. System NH(3)-H(2)S-H(2)O at 600 mm Hg. (in Russian) Zh. Prikl. Khim. (Leningrad), 39(10), 2371-3 (1966).

150131 Gjaldbaek, J. C., Niemann, H. The solubility of nitrogen, argon and ethane in alcohols and water. Acta Chem. Scand., 12(5), 1015-23 (1958).

150524 Glowka, S. Liquid-vapour equilibria and thermodynamic functions of propane-sulphur dioxide and propane-dimethyl ether systems up to 300 degrees C. Bull. Acad. Pol. Sci., Ser. Sci. Chim., 20(2), 163-7 (1972).

150175 Gonikberg, M. G., Fastowsky, W. G. The solubility of gases in liquids at low temperatures and high pressures. 2. The solubility of helium in liquid nitrogen at temperatures from 78.0 to 109.0 degrees K and pressures up to 295 atm. (in German) Acta Physicochim. URSS, 12(1), 67-72 (1940).

6364 Gonikberg, M., Fastowsky, W. The solubility of gases in liquids at low temperatures and high pressures. IV. The solubility of helium in liquid methane at temperatures of 90.3 degrees K and 106.0 degrees K and pressures up to 160 atm. (in German) Acta Physicochim. URSS, 13(3), 399-404 (1940).

5657 Gonikberg, M. G., Fastowsky, W. G., Gurwitsch, J. G. The solubility of gases in liquids at low temperatures and high pressures. I. The solubility of hydrogen in liquid nitrogen at temperatures of 79.0-109.0 degrees K and pressures up to 190 atm. (in German) Acta Physicochim. URSS, 11(6), 865-82 (1939).

50700 Gonzalez, M. H., Lee, A. L. Dew and bubble points of simulated natural gases. J. Chem. Eng. Data, 13(2), 172-6 (1968).

150074 Goodman, J. B., Krase, N. W. Solubility of nitrogen in water at high pressures and temperatures. Ind. Eng. Chem., 23(4), 401-4 (1931).

150280 Granzhan, V. A. Solubility of carbon monoxide in methanol, water, acetic acid, methyl acetate and in binary mixtures of solvents at a pressure of 50 at. (in Russian) Tr. Gos. Nauchno-Issled. Proektn. Inst. Azotn. Promsti. Prod. Org. Sint., 37, 5-9 (1974).

118306 Grauso, L., Fredenslund, A., Mollerup, J. Vapour-liquid equilibrium data &/2 4(e systems C(2)H(6) + N(2), C(2)H(4) + N(2), C(3)H(8) + N(2), and (3) (6) + N(2). Fluid Phase Equilib., 1(1), 13-26 (1977).

46018 Greene, N. E., Sonntag, R. E. Solid-liquid-vapor equilibrium in the system hydrogen-helium. Adv. Cryog. Eng., 13, 357-62 (1968).

150234 Gregory, D. P., Djordjevich, L., Kao, R., Anderson, G. L., Eakin, B. E., Bodle, W. W. Thermodynamic properties of a lean natural gas at cryogenic conditions. Tech. Rep. - Inst. Gas Technol. (Chicago), 11, 91 pp (1973).

150056 Grieves, R. B., Thodos, G. Critical temperatures and pressures of ternary hydrocarbon mixtures: the ethane-propane-n-butane system. J. Appl. Chem., 13, 466-70 (1963).

88424 Gugnoni, R. J., Eldridge, J. W., Okay, V. C., Lee, T. J. CO(2)-ethane system predictions. Hydrocarbon Process., 52(9), 197-8 (1973).

99626 Gugnoni, R. J., Eldridge, J. W., Okay, V. C., Lee, T. J. Carbon dioxide-ethane phase equilibrium and densities from experimental measurements and the B-W-R equation. AIChE J., 20(2), 357-62 (1974).

150080 Guter, M., Newitt, D. M., Ruhemann, M. Two-phase equilibrium in binary and ternary systems. II. The system methane-ethylene. III. The system methane-ethane-ethylene. Proc. R. Soc. London, Ser. A, 176, 140-52 (1940).

150195 Hachmuth, K. H. Dehydrating commercial propane. West. Gas, 8(1), 55-6+62-4 (1932).

150193 Haehnel, O. On the strength of aqueous carbonic acid manufactured at higher pressures. (in German) Zentralbl. Mineral., Geol. Palaeontol., 25-32 (1920).

66179 Hakuta, T., Nagahama, K., Suda, S. Binary vapor-liquid equilibria of CO(2)-C(2) hydrocarbons. Kagaku Kogaku, 33(9), 904-7 (1969).

105715 Hall, K. R., Eubank, P. T., Myerson, A. S., Nixon, W. E. A new technique for collecting binary vapor-liquid equilibrium data without measuring composition: the method of intersecting isochores. AIChE J., 21(6), 1111-4 (1975).

98719 Hamam, S. E. M., Lu, B. C.-Y. Vapor-liquid equilibrium in the ethane-carbon dioxide system. Can. J. Chem. Eng., 52(2), 283-6 (1974).

110896 Hamam, S. E. M., Lu, B. C.-Y. Isothermal vapor-liquid equilibria in binary system propane-carbon dioxide. J. Chem. Eng. Data, 21(2), 200-4 (1976).

111245 Hamam, S. E. M., Lu, B. C.-Y. Phase equilibria for the system propane-ethane-carbon dioxide. Can. J. Chem. Eng., 54(4), 333-6 (1976).

150251 Hanson, G. H., Brown, G. G. Vapor-liquid equilibria in mixtures of volatile paraffins. Ind. Eng. Chem., 37(9), 821-5 (1945).

150132 Haufe, S. Contribution ot the investigation of evaporation equilibria at high pressures. (in German) Z. Phys. Chem. (Leipzig), 233(5/6), 353-64 (1966).

150202 Hayduk, W., Malik, V. K. Density, viscosity, and carbon dioxide solubility and diffusivity in aqueous ethylene glycol solutions. J. Chem. Eng. Data, 16(2), 143-6 (1971).

61654 Heck, C. K., Jr. Experimental and theoretical liquid-vapor equilibria in some binary systems. Univ. Colo., Boulder, Ph.D. Thesis, 265 pp (1968).

44762 Heck, C. K., Hiza, M. J. Liquid-vapor equilibrium in the system helium-methane. AIChE J., 13(3), 593-9 (1967).

26297 Hensel, W. E., Jr., Massoth, F. E. Phase equilibria for the ternary system: CH(4)-CO(2)-H(2)S at low temperatures. J. Chem. Eng. Data, 9(3), 352-6 (1964).

150370 Herlihy, J. C., Thodos, G. Vapor-liquid equilibrium constants: ethane-n-butane-n-pentane system at 150 degrees F. J. Chem. Eng. Data, 7(3), 348-51 (1962).

5964 Hill, E. S., Lacey, W. N. Rate of solution of methane in quiescent liquid hydrocarbons. II. Ind. Eng. Chem., 26(12), 1324-7 (1934).

39202 Hipkin, H. Experimental vapor-liquid equilibrium data for propane-isobutane. AIChE J., 12(3), 484-7 (1966).

150142 Hirata, M., Suda, S. Equilibrium measurements by the vapor-liquid flow method. Vapor-liquid equilibrium measurements for three binary mixtures of n-butane at 0 degrees C. Bull. Jpn. Pet. Inst., 10, 20-7 (1968).

150141 Hirata, M., Suda, S., Hakuta, T., Nagahama, K. High pressure vapor-liquid equilibria for binary system containing C(4)-hydrocarbons. (in Japanese) Sekiyu Gakkai Shi, 12(10), 773-7 (1969).

150102 Hirata, M., Suda, S., Hakuta, T., Nagahama, K. Light hydrocarbon vapor-liquid equilibria. Mem. Fac. Technol., Tokyo Metrop. Univ., 19, 103-22 (1969).

150103 Hirata, M., Suda, S., Miyashita, R., Hoshino, T. High pressure vapor-liquid equilibria. Experimental data on the system propane-isobutane at 66.60 degrees C. Mem. Fac. Technol., Tokyo Metrop. Univ., 20, 1811-7 (1970).

150220 Hiza, M. J. Liquid-vapor equilibria in binary systems containing (4)He or (3)He with nH(2) or nD(2). Fluid Phase Equilib., 6(3-4), 203-27 (1981).

51011 Hiza, M. J., Duncan, A. G. Equilibrium gas-phase compositions of ethane and ethylene in binary mixtures with helium and neon below 150 degrees K and a correlation for deviations from the geometric mean combining rule. Adv. Cryog. Eng., 14, 30-40 (1969).

117815 Hiza, M. J., Haynes, W. M. Liquid mixture excess volumes and total vapor pressures using a magnetic suspension densimeter with compositions determined by chromatographic analysis: methane plus ethane. Adv. Cryog. Eng., 23, 594-601 (1978).

45223 Hiza, M. J., Heck, C. K., Kidnay, A. J. Liquid-vapor and solid-vapor equilibrium in the system hydrogen-ethane. Adv. Cryog. Eng., 13, 343-56 (1968).

29397 Hiza, M. J., Kidnay, A. J. Solid-vapor equilibrium in the system helium-methane. Adv. Cryog. Eng., 11, 338-48 (1966).

73945 Hsi, C., Lu, B. C.-Y. Vapor-liquid equilibria in the methane-ethylene-ethane system. Can. J. Chem. Eng., 49(1), 140-3 (1971).

150535 Hudson, J. C. The solubility of sulphur dioxide in water and in aqueous solutions of potassium chloride and sodium sulphate. J. Chem. Soc., 127, 1332-47 (1926).

16075 Hunter, M. A. The molecular aggregation of liquefied gases. J. Phys. Chem., 10, 330-60 (1906).

111705 Hwang, S.-C., Lin, H.-M., Chappelear, P. S., Kobayashi, R. Dew point study in the vapor-liquid region of the methane-carbon dioxide system. J. Chem. Eng. Data, 21(4), 493-7 (1976).

150148 Ipatev, V., Teodorovich, V. P. Solubility of hydrogen in water under pressure at high temperatures. (in Russian) Zh. Obshch. Khim., 4(3), 395-9 (1934).

150135 Ipatiew, W. W., Drushina-Artemowitsch, S. I., Tichomirow, W. I. Solubility of hydrogen in water under pressure. (in German) Ber. Dtsch. Chem. Ges. B, 65, 568-71 (1932).

150387 Johnstone, H. F., Leppla, P. W. The solubility of sulfur dioxide at low partial pressures. The ionization constant and heat of ionization of sulfurous acid. J. Am. Chem. Soc., 56, 2233-8 (1934).

45496 Jones, A. E., Kay, W. B. The phase and volumetric relations in the helium-n-butane system: part I. Phase and volumetric behavior of mixtures of low helium concentration. AIChE J., 13(4), 717-20 (1967).

19414 Jones, I. W., Rowlinson, J. S. Gas-liquid critical temperatures of binary mixtures. Part 2. Trans. Faraday Soc., 59, 1702-8 (1963).

150386 Jones, M. E. Ammonia equilibrium between vapor and liquid aqueous phases at elevated temperatures. J. Phys. Chem., 67, 1113-5 (1963).

150058 Jung, J., Knacke, O., Neuschuetz, D. Solubility of carbon monoxide and hydrogen in water up to 300 degrees C. (in German) Chem.-Ing.-Tech., 43(3), 112-6 (1971).

90467 Kahre, L. C. Low-temperature K data for methane-n-butane. J. Chem. Eng. Data, 19(1), 67-71 (1974).

150275 Kalaida, Yu. A., Katkov, Yu. D., Kuznetsov, V. A., Lostovtsev, A. Yu., Lastochkin, A. P., Sysoev, V. S. Solubility of nitrogen in water. Sov. At. Energy (Engl. Transl.), 48(2), 102-6 (1980); transl. of At. Energ., 48(2), 91-4 (1980).

110898 Kalra, H., Krishnan, T. R., Robinson, D. B. Equilibrium-phase properties of carbon dioxide-n-butane and nitrogen-hydrogen sulfide systems at subambient temperatures. J. Chem. Eng. Data, 21(2), 222-5 (1976).

123897 Kalra, H., Ng, H.-J., Miranda, R. D., Robinson, D. B. Equilibrium phase properties of the nitrogen-isobutane system. J. Chem. Eng. Data, 23(4), 321-4 (1978).

102931 Kalra, H., Robinson, D. B. An apparatus for the simultaneous measurememt of equilibrium phase composition and refractive index data at low temperatures and high pressures. Cryogenics, 15(7), 409-12 (1975).

115116 Kalra, H., Robinson, D. B., Besserer, G. J. The equilibrium phase properties of the nitrogen-n-pentane system. J. Chem. Eng. Data, 22(2), 215-8 (1977).

62196 Kaminishi, G., Arai, Y., Saito, S., Maeda, S. Vapor-liquid equilibria for binary and ternary systems containing carbon dioxide. J. Chem. Eng. Jpn., 1(2), 109-16 (1968).

39337 Kaminishi, G., Toriumi, T. Vapor-liquid phase equilibrium in the CO(2)-H(2), CO(2)-N(2) and CO(2)-O(2) systems. (in Japanese) Kogyo Kagaku Zasshi, 69(2), 175-8 (1966).

62447 Kaminishi, G., Toriumi, T. Vapor-liquid equilibria in the systems: CO(2)-CO, CO(2)-CO-H(2) and CO(2)-CH(4). Rev. Phys. Chem. Jpn., 38(1), 79-84 (1968).

150062 Kay, W. B. Liquid-vapor equilibrium relations in binary systems. The ethane-n-butane system. Ind. Eng. Chem., 32(3), 353-7 (1940).

150203 Kay, W. B. Vapor-liquid equilibrium relations of binary systems. The propane-n-alkane systems. n-butane and n-pentane. J. Chem. Eng. Data, 15(1), 46-52 (1970).

150096 Kay, W. B., Brice, D. B. Liquid-vapor equilibrium relations in ethane-hydrogen sulfide system. Ind. Eng. Chem., 45(3), 615-8 (1953).

150378 Kay, W. B., Fisch, H. A. Phase relations of binary systems that form azeotropes: I. The ammonia-n-butane system. AIChE J., 4(3), 293-6 (1958).

103629 Kay, W. B., Hoffman, R. L., Davies, O. Vapor-liquid equilibrium relationships of binary systems n-butane-n-pentane and n-butane-n-hexane. J. Chem. Eng. Data, 20(3), 333-8 (1975).

150260 Kay, W. B., Rambosek, G. M. Liquid-vapor equilibrium relations in binary systems. Propane-hydrogen sulfide system. Ind. Eng. Chem., 45(1), 221-6 (1953).

150169 Kazaryan, T. S., Ryabtsev, N. I. Solubility of saturated propylene, i-butylene, i-butane and n-butane in water and in aqueous solutions. (in Russian) Neft. Khoz., 47(10), 54-6 (1969).

6361 Kharakhorin, F. F. The phase relations in systems of liquefied gases. The binary mixture nitrogen - helium. Foreign Pet. Technol., 9(11/12), 397-410 (1941); transl. of Zh. Tekh. Fiz., 10(18), 1533-40 (1940).

9643 Kharakhorin, F. F. The liquid-vapor equilibrium in the system helium-methane. (in Russian) Inzh.-Fiz. Zh., 2(5), 55-9 (1959).

51325 Khazanova, N. E., Lesnevskaya, L. S. Phase and volume relations in the system ethane-carbon dioxide. (in Russian) Zh. Fiz. Khim., 41(9), 2373-6 (1967).

42929 Khazanova, N. E., Lesnevskaya, L. S., Zakharova, A. V. Equilibrium of liquid-vapor in the system ethane-carbon dioxide. (in Russian) Khim. Promst. (Moscow), 42(5), 364-5 (1966).

122297 Khazanova, N. E., Sominskaya, E. E., Rozovskii, M. B. Systems with azeotropism at high pressures. IX. Volumetric and thermodynamic behavior of the ethane-carbon dioxide system near specific points on the critical curve. (in Russian) Zh. Fiz. Khim., 52(4), 915-7 (1978).

112414 Khazanova, N. E., Sominskaya, E. E., Zakharova, A. V., Rozovskii, M. B. Thermodynamic properties of the ethane-carbon dioxide system. p,V,T,N data. (in Russian) Teplofiz. Svoistva Veshchestv Mater., 10, 213-9 (1976).

150187 Khitarov, N. I., Malinin, S. D. Experimental characteristics of a part of the system H(2)O-CO(2). Geochemistry (USSR), 3, 246-56 (1956); transl. of Geokhimiia, 3, 18-27 (1956).

150168 Khitarov, N. I., Malinin, S. D. On the equilibrium phase relations in the system H(2)O-CO(2). (in Russian) Geokhimiya, 7, 678-9 (1958).

150191 Khodeeva, S. M. Visual observation of gas-gas equilibrium. Russ. J. Phys. Chem. (Engl. Transl.), 40(8), 1061-3 (1966).

104961 Kidnay, A. J., Miller, R. C., Parrish, W. R., Hiza, M. J. Liquid-vapour phase equilibria in the N(2)-CH(4) system from 130 to 180 K. Cryogenics, 15(9), 531-40 (1975).

24862 Kirk, B. S., Ziegler, W. T. A phase-equilibrium apparatus for gas-liquid systems and the gas phase of gas-solid systems: application to methane-hydrogen from 66.88 degrees to 116.53 degrees K and up to 125 atmospheres. Adv. Cryog. Eng., 10(Sect. M-U), 160-70 (1965).

150159 Klausutis, N. Phase equilibrium in the propane-propylene-water system in the three-phase region. Univ. Tex., Austin, Ph.D. Thesis, 127 pp (1968).

105717 Klink, A. E., Cheh, H. Y., Amick, E. H., Jr. The vapor-liquid equilibrium of the hydrogen-n-butane system at elevated pressures. AIChE J., 21(6), 1142-8 (1975).

20499 Klots, C. E., Benson, B. B. Solubilities of nitrogen, oxygen, and argon in distilled water. J. Mar. Res., 21(1), 48-57 (1963).

108433 Knapp, H., Schmoelling, K., Neumann, A. Measurement of the molal heat capacity of H(2)-N(2) mixtures. Cryogenics, 16(4), 231-7 (1976).

150530 Kobayashi, R., Katz, D. L. Vapor-liquid equilibria for binary hydrocarbon-water systems. Ind. Eng. Chem., 45(2), 440-51 (1953).

47671 Kohn, J. P., Kurata, F. Heterogeneous phase equilibria of the methane-hydrogen sulfide system. AIChE J., 4(2), 211-7 (1958).

150086 Kohn, J. P., Kurata, F. Volumetric behavior of the methane-hydrogen sulfide system at low temperatures and high pressures. J. Chem. Eng. Data, 4(1), 33-52 (1959).

150237 Kosyakov, N. E., Ryabinkin, V. V., Chobotko, L. L. Phase equilibria in the hydrogen-carbon monoxide-methane system. Russ. J. Phys. Chem. (Engl. Transl.), 52(8), 1235 (1978); transl. of Zh. Fiz. Khim., 52(8), 2132 (1978).

150276 Kozintseva, T. N. Solubility of hydrogen sulfide in water and salt solutions at high temperatures. (in Russian) Geokhim. Issled. Obl. Povysh. Davlenii Temp., 121-34 (1965).

150517 Krasheninnikov, S. A., Golubev, S. S., Sabaev, I. Ya. Method and apparatus for the analysis of water-ammonia solutions. (in Russian) Khim. Promst. (Moscow), 6, 76-7 (1960).

150023 Kresheck, G. C., Schneider, H., Scheraga, H. A. The effect of D(2)O on the thermal stability of proteins. Thermodynamic parameters for the transfer of model compounds from H(2)O to D(2)O. J. Phys. Chem., 69(9), 3132-44 (1965).

150514 Krichevskii, I. R., Khazanova, N. E. Content of ammonia in compressed hydrogen and nitrogen in equilibrium with liquid ammonia. (in Russian) Zh. Fiz. Khim., 13(11), 1690-3 (1939).

150270 Krichevskii, I. R., Khazanova, N. E., Lesnevskaya, L. S., Sandalova, L. Yu. Equilibrium of liquid-gas at high pressures in the system nitrogen-carbon dioxide. (in Russian) Khim. Promst. (Moscow), 38(3), 169-71 (1962).

150520 Krichevsky, I., Ziclis, D. Gas-gas equilibrium and phase equilibria in binary systems. Acta Physicochim. URSS, 18(4), 264-74 (1943).

116899 Krishnan, T. R., Kalra, H., Robinson, D. B. The equilibrium phase properties of the nitrogen-isopentane system. J. Chem. Eng. Data, 22(3), 282-5 (1977).

150521 Kritschewsky, I., Bolshakov, P. The heterogeneous equilibria in the ammonia-nitrogen system at high pressures. (in German) Acta Physicochim. URSS, 14(3), 353-64 (1941).

150123 Kritschewsky, I. R., Shaworonkoff, N. M., Aepelbaum, V. A. Mutual solubility of gases in liquids under pressure. I. Solubility of carbon dioxide in water from its mixtures with hydrogen at 20 and 30 degrees C and total pressure to 30 kg/cm(2). (in German) Z. Phys. Chem., Abt. A, 175, 232-8 (1936).

150526 Kueffer, A. New data on the solubility of SO(2) in water. (in Czech) Pap. Celul., 17(6), 125-6 (1962).

150115 Kuenen, J. P. Experiments on the condensation and critical phenomena of some substances and mixtures. Philos. Mag., 44(267), 174-99 (1897).

150512 Kuenen, J. P. On ethane prepared from ethyl iodide, and on the properties of some mixtures of ethane and butane. Proc. R. Soc. Edinburgh, 21, 433-42 (1897).

150540 Kuenen, J. P. Experiments on the condensation and the critical phenomena of mixtures of two materials. (in German) Z. Phys. Chem., Stoechiom. Verwandschaftsl., 24, 667-96 (1897).

150030 Kuenen, J. P., Robson, W. G. Observations on mixtures with maximum or minimum vapour-pressure. Philos. Mag., 4(19), 116-32 (1902).

107564 Kulikov, N. E. Study of phase equilibrium under pressure in the system carbon dioxide (liquid) - nitrogen (gas). (in Russian) Tr. Gork. Politekh. Inst., 25(13), 18-24 (1969).

150034 Kunerth, W. Solubility of CO(2) and N(2)O in certain solvents. Phys. Rev., 19(5), 512-24 (1922).

14706 Lambert, M. Simon, M. Excess thermodynamic properties of the liquid systems A-CH(4) and CO-CH(4). Physica (Utrecht), 28, 1191-6 (1962).

150052 Lannung, A. The solubilities of helium, neon and argon in water and some organic solvents. J. Am. Chem. Soc., 52, 68-80 (1930).

150130 Lannung, A., Gjaldbaek, J. C. The solubility of methane in hydrocarbons, alcohols, water and other solvents. Acta Chem. Scand., 14(5), 1124-8 (1960).

150085 Le Breton, J. G., McKetta, J. J. Low pressure solubility of n-butane in water. Hydrocarbon Process. Pet. Refiner, 43(6), 136-8 (1964).

150273 Lee, J. I., Mather, A. E. Solubility of hydrogen sulfide in water. Ber. Bunsenges. Phys. Chem., 81(10), 1020-3 (1977).

36802 Lehigh, W. R., McKetta, J. J. Vapor-liquid equilibrium in the ethane-n-butane-nitrogen system. J. Chem. Eng. Data, 11(2), 180-2 (1966).

6241 Levitskaya, E. P. Study of the liquid-vapor equilibria of the ternary system ethane-methane-hydrogen. (in Russian) Zh. Tekh. Fiz., 11(3), 197-204 (1941).

150515 Levitskaya, E., Pryannikov, K. Liquid-vapor equilibrium in the binary system hydrogen-ethane. (in Russian) Zh. Tekh. Fiz., 9(20), 1849-53 (1939).

150506 Lhotak, V., Wichterle, I. Vapour-liquid equilibria in the ethane-n-butane system at high pressures. Fluid Phase Equilib., 6, 229-35 (1981).

150160 Liabastre, A. A. Experimental determination of the solubility of small organic molecules in H(2)O and D(2)O and the application of the scaled particle theory to aqueous and nonaqueous solutions. Ga. Inst. Technol., Atlanta, Ph.D. Thesis, 240 pp (1974).

5884 Likhter, A. I., Tikhonovich, N. P. Vapor-liquid equilibrium in the system ethylene-methane-hydrogen. (in Russian) Zh. Tekh. Fiz., 10(14), 1201-6 (1940).

150534 Lindroos, A. E., Dodge, B. F. Phase-equilibria at high pressures. The system: nitrogen-ammonia at pressures above 1000 atm. Chem. Eng. Prog., Symp. Ser., 48(3), 10-7 (1952).

62792 Liu, K. F. Phase equilibria in the helium-carbon dioxide, -argon, -methane, -nitrogen, and -oxygen systems. Ga. Inst. Technol., Atlanta, Ph.D. Thesis, 199 pp (1969).

150176 Loprest, F. J. A method for the rapid determination of the solubility of gases in liquids at various temperatures. J. Phys. Chem., 61(8), 1128-30 (1957).

150138 Lu, B. C.-Y., Chang, S.-D., Elshayal, I. M., Yu, P., Gravelle, D., Poon,D.P.L. Low temperature phase equilibria of natural gas components. Proc. Int. Conf. Calorimetry Thermodyn., 1st, 1969, 755-66 (1969).

69471 Lu, B. C.-Y., Yu, P., Poon, D. P. L. Formation of a third liquid layer in the nitrogen-methane-ethane system. Nature (London), 222(5195), 768-9 (1969).

150241 Luker, J. A., Gniewek, T., Johnson, C. A. Saturation composition of steam-helium-liquid water system and P-V-T data for a superheated steam-helium mixture. Chem. Eng. Data Ser., 3(1), 3-7 (1958).

150033 Maass, O., Mennie, J. H. Aberrations from the ideal gas laws in systems of one and two components. Proc. R. Soc. London, Ser. A, 110, 198-232 (1926).

53324 MacKendrick, R. F., Heck, C. K., Barrick, P. L. Liquid-vapor equilibria of the helium-carbon dioxide system. J. Chem. Eng. Data, 13(3), 352-3 (1968).

11759 Maimoni, A. Liquid-vapor equilibria in the hydrogen-nitrogen and deuterium-nitrogen systems. AIChE J., 7(3), 371-5 (1961).

150177 Makranczy, J., Megyery-Balog, K., Rusz, L., Patyi, L. Solubility of gases in normal-alkanes. Hung. J. Ind. Chem., 4, 269-80 (1976).

150165 Malinin, S. D. The system H(2)O-CO(2) at high temperatures and pressures. (in Russian) Geokhimiya, 3, 235-45 (1959).

150194 Malinin, S. D. Investigation of the solubility of carbon dioxide in water at low partial pressures in conditions of high temperature. (By method of sample interception). (in Russian) Tr. Soveshch. Eksp. Tekh. Mineral. Petrogr., 8th, 1968, 229-34 (1971).

150167 Malinin, S. D., Saveleva, N. I. Experimental investigations of CO(2) solubility in NaCl and CaCl(2) solutions at temperatures of 25, 50 and 75 degrees and elevated CO(2) pressure. (in Russian) Geokhimiya, 6, 643-53 (1972).

150043 Markham, A. E., Kobe, K. A. The solubility of carbon dioxide and nitrous oxide in aqueous salt solutions. J. Am. Chem. Soc., 63, 449-54 (1941).

150204 Martinez-Ortiz, J. A., Manley, D. B. Vapor pressures for the system isobutane-isobutylene-n-butane. J. Chem. Eng. Data, 23(2), 165-7 (1978).

150258 Maslennikova, V. Ya. Solubility of nitrogen in water. (in Russian) Tr. Gos. Nauchno-Issled. Proektn. Inst. Azotn. Promsti. Prod. Org. Sint., (12), 82-7 (1971).

150147 Maslennikova, V. Ya., Goryunova, N. P., Subbotina, L. A., Tsiklis, D. S. The solubility of water in compressed hydrogen. Russ. J. Phys. Chem. (Engl. Transl.), 50(2), 240-3 (1976); transl. of Zh. Fiz. Khim., 50(2), 411-4 (1976).

150259 Maslennikova, V. Ya., Vdovina, N. A., Tsiklis, D. S. Equilibrium of gas-gas in the helium-ethane system. (in Russian) Tr. Gos. Nauchno-Issled. Proektn. Inst. Azotn. Promsti. Prod. Org. Sint., (12), 143-6 (1971).

83825 Maslennikova, V. Ya., Vdovina, N. A., Tsiklis,D.S. Solubility of water in compressed nitrogen. (in Russian) Zh. Fiz. Khim., 45(9), 2384 (1971).

87946 Massoudi, R., King, A. D., Jr. Solubility of alcohols in compressed gases. A comparison of vapor-phase interactions of alcohols and homomorphic compounds with various gases. II. 1-butanol, diethyl ether, and n-pentane in compressed nitrogen, argon, methane, ethane, and carbon dioxide at 25 degrees. J. Phys. Chem., 77(16), 2016-8 (1973).

150268 Mathot, V. Thermodynamic properties of the carbon monoxide-methane system at 90.67 degrees K. (in French) Bull. Inst. Int. Froid, Annexe, 342-3 (1955).

19707 Mathot, V. Thermodynamic properties of solutions of liquefied gases. (in French) Mem. Cl. Sci., Acad. R. Belg., Collect. 8, 33(6), 33 pp (1963).

17785 Mathot, V., Staveley, L. A. K., Young, J. A., Parsonage, N. G. Thermodynamic properties of the system methane + carbon monoxide at 90.67 degrees K. Trans. Faraday Soc., 52, 1488-500 (1956).

150128 Matous, J., Sobr, J., Novak, J. P., Pick, J. Solubility of carbon dioxide in water at pressures up to 40 atm. Collect. Czech. Chem. Commun., 34(12), 3982-5 (1969).

13495 Matschke, D. E., Thodos, G. Vapor-liquid equilibria for the ethane-propane system. J. Chem. Eng. Data, 7(2), 232-4 (1962).

39627 Matyash, I. V., Mank, V. V., Starkov, M. G. Dissolubility of hydrogen in liquid nitrogen and of helium in liquid hydrogen. (in Ukrainian) Ukr. Fiz. Zh. (Ukr. Ed.), 11(5), 497-501 (1966).

150029 McAuliffe, C. Solubility in water of C(1)-C(9) hydrocarbons. Nature (London), 200, 1092-3 (1963).

150278 McClain, R. A. K. W. Isothermal P-x data and phase equilibrium behaviour in the isopentane-n-pentane-isoprene system (100 degrees F-120 degrees F). Univ. Kans., Lawrence, Ph.D. Thesis, 256 pp (1977).

111233 McClure, D. W., Lewis, K. L., Miller, R. C., Staveley, L. A. K. Excess enthalpies and Gibbs free energies for nitrogen + methane at temperatures below the critical point of nitrogen. J. Chem. Thermodyn., 8(8), 785-92 (1976).

150205 McCormick, R. H., Walsh, W. H., Hetrick, S. S., Zudkevitch, D. Relative volatility data for isopentane: n-pentane mixtures. J. Chem. Eng. Data, 8(4), 504-8 (1963).

29935 McTaggart, H. A., Edwards, E. Composition of the vapour and liquid phases of the system methane-nitrogen. Proc. Trans. R. Soc. Can., 13, 57-66 (1919).

150152 Meadows, R. W., Spedding, D. J. The solubility of very low concentrations of carbon monoxide in aqueous solution. Tellus, 26(102), 143-50 (1974).

150215 Mehra, V. S., Thodos, G. Vapor-liquid equilibrium constants for the ethane-n-butane-n-pentane system at 200 degrees, 250 degrees, and 300 degrees F. J. Chem. Eng. Data, 8(1), 1-8 (1963).

150206 Mehra, V. S., Thodos, G. Vapor-liquid equilibrium in the ethane-n-butane system. J. Chem. Eng. Data, 10(4), 307-9 (1965).

150028 Michels, A., Gerver, J., Bijl, A. The influence of pressure on the solubility of gases. Physica (Utrecht), 3(8), 797-808 (1936).

26757 Michels, A.,Nederbragt, G. W. Isotherms of methane-aethane mixtures at 0 degrees, 25 degrees and 50 degrees C up to 60 atmospheres. Physica (Utrecht), 6(7), 656-62 (1939).

150137 Miksovsky, J., Wichterle, I. High pressure vapor-liquid equilibrium in the ethane-propane system. Int. Congr. Chem. Eng., Chem. Equip. Des. Automat., 5th, 1975, Pap., (F2.15), 12 pp (1975).

150139 Miksovsky, J., Wichterle, I. Vapour-liquid equilibria in the ethane-propane system at high pressures. Collect. Czech. Chem. Commun., 40, 365-70 (1975).

83757 Miller, R. C., Kidnay, A. J., Hiza, M. J. Liquid-vapor equilibria at 112.00 K for systems containing nitrogen, argon, and methane. AIChE J., 19(1), 145-51 (1973).

114006 Miller, R. C., Kidnay, A. J., Hiza, M. J. Liquid + vapor equilibria in methane + ethene and in methane + ethane from 150.00 to 190.00 K. J. Chem. Thermodyn., 9(2), 167-78 (1977).

104717 Miller, R. C., Staveley, L. A. K. Excess enthalpies for some binary liquid mixtures of low-molecular-weight alkanes. Adv. Cryog. Eng., 21, 493-500 (1976).

150109 Mills, J. R., Miller, F. J. L. Liquefaction of carbon dioxide. Can. Chem. Process Ind., 29, 651-3 (1945).

91853 Miniovich, V. M., Sorina, G. A. P-V-T-N relations in the system ethane-propane. (in Russian) Tr. Gos. Nauchno-Issled. Proektn. Inst. Azotn. Promsti. Prod. Org. Sint., 12, 125-32 (1971).

108496 Miniovich, V. M., Sorina, G. A. Initial section of the critical liquid-gas equilibrium curve for the ethane-propane system in p-V-T-N space. Russ. J. Phys. Chem. (Engl. Transl.), 47(4), 586 (1973); transl. of Zh. Fiz. Khim., 47(4), 1032 (1973).

108496 Miniovich, V. M., Sorina, G. A. p-V-T-N relations for dilute solutions of propane in ethane near the critical point of ethane. II. Rosen's equation of state. Partial molar volumes of ethane and propane. Russ. J. Phys. Chem. (Engl. Transl.), 47(4), 586-7 (1973).

108496 Miniovich, V. M., Sorina, G. A. p-V-T-N relations for dilute solutions of propane in ethane near the critical point of ethane. III. Phase diagram for the ethane-propane system near the critical point of ethane. Russ. J. Phys. Chem. (Engl. Transl.), 47(4), 587 (1973).

150374 Miranda, R. D., Robinson, D. B., Kalra, H. Equilibrium-phase properties of propane-carbonyl sulfide system. J. Chem. Eng. Data, 21(1), 62-5 (1976).

150538 Mittasch, A., Kuss, E., Schlueter, H. Densities and vapor pressures of aqueous ammonia solutions and of liquid nitrogen tetroxide for the temperature range 0 degrees to 60 degrees. (in German) Z. Anorg. Allg. Chem., 159, 1-36 (1926).

.8793 Moran, D. W. Low temperature equilibria in binary systems, including the solid phase. Univ. London, Ph.D. Thesis, 197 pp (1959).

150384 Morgan, O. M., Maass, O. An investigation of the equilibria existing in gas-water systems forming electrolytes. Can. J. Res., 5, 162-99 (1931).

150091 Morrison, T. J., Billett, F. The salting-out of non-electrolytes. Part II. The effect of variation in non-electrolyte. J. Chem. Soc., 3819-22 (1952).

150114 Morrison, T. J., Johnstone, N. B. Solubilities of the inert gases in water. J. Chem. Soc., 3441-6 (1954).

120924 Mraw, S. C., Hwang, S.-C., Kobayashi, R. Vapor-liquid equilibrium of the CH(4)-CO(2) system at low temperatures. J. Chem. Eng. Data, 23(2), 135-9 (1978).

35303 Muirbrook, N. K., Prausnitz, J. M. Multicomponent vapor-liquid equilibria at high pressures: Part I. Experimental study of the nitrogen-oxygen-carbon dioxide system at 0 degrees C. AIChE J., 11(6), 1092-6 (1965).

91294 Mulholland, K. L. An empirical study of the Benedict, Webb and Rubin mixture rules and experimental vapor-liquid data for the binary methane-n-butane. Univ. Kans., Lawrence, Ph.D. Thesis, 223 pp (1970).

150179 Murray, C. N., Riley, J. P. The solubility of gases in distilled water and sea water - IV. Carbon dioxide. Deep-Sea Res. Oceanogr. Abstr., 18(5), 533-41 (1971).

150178 Murray, C. N., Riley, J. P., Wilson, T. R. S. The solubility of gases in distilled water and sea water - I. Nitrogen. Deep-Sea Res. Oceanogr. Abstr., 16(3), 297-310 (1969).

150161 Namiot, A. Yu., Beider, S. Ya. Solubility in water of n-pentane and n-hexane. (in Russian) Khim. Tekhnol. Topl. Masel, 5, 52-5 (1960).

150282 Namiot, A. Yu., Bondareva, M. M. Solubility in water at high pressures of mixtures of helium and methane. (in Russian) Nauchno-Tekh. Sb. Dobyche Nefti, 18, 82-91 (1962).

150065 Nederbragt, G. W. Gas-liquid equilibria for the system methane-butane. Ind. Eng. Chem., 30(5), 587-8 (1938).

30143 Nelson, E. E., Bonnell, W. S. Solubility of hydrogen in n-butane. Ind. Eng. Chem., 35(2), 204-6 (1943).

150508 Neuhausen, B. S., Patrick, W. A. A study of the system ammonia-water as a basis for a theory of the solution of gases in liquids. J. Phys. Chem., 25, 693-720 (1921).

53074 Neumann, A., Walch, W. Vapor/liquid equilibrium of CO(2)/CH(4) in the region of low temperatures and small CO(2) mole fractions. (in German) Chem.-Ing.-Tech., 40(5), 241-4 (1968).

150166 Nezdoiminoga, N. A. To the question of solubility of carbon dioxide in water. (in Russian) Izv. Akad. Nauk Arm. SSR, Ser. Tekh. Nauk, 21(3), 11-7 (1968).

68441 Nikitina, I. E., Skripka, V. G., Gubkina, G. F., Benyaminovich, O. A. Solubility of helium in iso- and n-butane at low temperatures and pressures. (in Russian) Gazov. Promst., 14(12), 35-7 (1969).

70002 Nikitina, I. E., Skripka, V. G., Gubkina, G. F., Sirotin, A. G., Benyaminovich, O. A. Solubility of helium in liquid ethane at low temperatures and pressures up to 120 kg/cm(2). (in Russian) Gazov. Promst., 15(6), 35-7 (1970).

150261 Nikitina, I. E., Zhdanovich, L. A., Sirotin, A. G., Benyaminovich, O. A. Study of liquid-vapor phase equilibria of Orenburg deposit gas. (in Russian) Gazov. Promst., 17(3), 41-3 (1972).

150154 Nosov, E. F., Barlyaev, E. V. Solubility of hexafluoropropylene and isobutane in water. (in Russian) Zh. Obshch. Khim., 38(2), 211-2 (1968).

150061 Nysewander, C. N., Sage, B. H., Lacey, W. N. Phase equilibria in hydrocarbon systems. The propane-n-butane system in the critical region. Ind. Eng. Chem., 32(1), 118-23 (1940).

118307 Ohgaki, K., Katayama, T. Isothermal vapor-liquid equilibrium data for the ethane-carbon dioxide system at high pressures. Fluid Phase Equilib., 1(1), 27-32 (1977).

150073 Olds, R. H., Reamer, H. H., Sage, B. H., Lacey, W. N. Phase equilibria in hydrocarbon systems. The n-butane-carbon dioxide system. Ind. Eng. Chem., 41(3), 475-82 (1949).

150070 Olds, R. H., Sage, B. H., Lacey, W. N. Methane-isobutane system. Ind. Eng. Chem., 34(8), 1008-13 (1942).

150071 Olds, R. H., Sage, B. H., Lacey, W. N. Phase equilibria in hydrocarbon systems. Composition of the dew-point gas of the methane-water system. Ind. Eng. Chem., 34(10), 1223-7 (1942).

14286 Omar, M. H., Dokoupil, Z. Some supplementary measurements on the vapour-liquid equilibrium of the system hydrogen-nitrogen at temperatures higher than the triple point of nitrogen. Commun. Kamerlingh Onnes Lab. Univ. Leiden, 330a, 11 pp (1962); reprinted from Physica (Utrecht), 28, 33-43 (1962).

64489 O'Sullivan, T. D., Smith, N. O. The solubility and partial molar volume of nitrogen and methane in water and in aqueous sodium chloride from 50 to 125 degrees and 100 to 600 atm. J. Phys. Chem., 74(7), 1460-6 (1970).

150180 Paratella, A., Sagramora, G. Solubility of liquids in gases. (in Italian) Ric. Sci., 29(12), 2605-13 (1959).

100275 Parrish, W. R., Hiza, M. J. Liquid-vapor equilibria in the nitrogen-methane system between 95 and 120 K. Adv. Cryog. Eng., 19, 300-8 (1974).

105282 Parrish, W. R., Steward, W. G. Vapor-liquid equilibria data for helium-carbon monoxide and helium-nitrous oxide systems. J. Chem. Eng. Data, 20(4), 412-6 (1975).

150078 Partington, E. J., Rowlinson, J. S., Weston, J. F. The gas-liquid critical temperatures of binary mixtures. Part I. Trans. Faraday Soc., 56, 479-85 (1960).

9443 Pikaar, M. J. A study of phase equilibria in hydrocarbon-CO(2) systems. Univ. London, Ph.D. Thesis, 196 pp (1959).

150110 Poettmann, F. H., Dean, M. R. Water content of propane. Pet. Refiner, 25(12), 635-8 (1946).

150059 Poettmann, F. H., Katz, D. L. Phase behavior of binary carbon dioxide-paraffin systems. Ind. Eng. Chem., 37(9), 847-53 (1945).

150375 Polak, J., Lu, B. C.-Y. Vapor-liquid equilibria in system ammonia-water at 14.69 and 65 psia. J. Chem. Eng. Data, 20(2), 182-3 (1975).

150090 Pollitzer, F., Strebel, E. On the influence of an indifferent gas on the saturation vapor concentration of a liquid. Z. Phys. Chem., Stoechiom. Verwandschaftsl., 110, 768-85 (1924).

16067 Pool, R. A. H., Saville, G., Herrington, T. M., Shields, B. D. C., Staveley, L. A. K. Some excess thermodynamic functions for the liquid systems argon + oxygen, argon + nitrogen, nitrogen + oxygen, nitrogen + carbon monoxide, and argon + carbon monoxide. Trans. Faraday Soc., 58(9), 1692-704 (1962).

88753 Poon, D. P. L., Lu, B. C.-Y. Phase equilibria for systems containing nitrogen, methane, and propane. Adv. Cryog. Eng., 19, 292-9 (1974).

125573 Potter, R. W., II, Clynne, M. A. The solubility of the noble gases He, Ne, Ar, Kr, and Xe in water up to the critical point. J. Solution Chem., 7(11), 837-44 (1978).

150097 Pray, H. A., Schweickert, C. E., Minnich, B. H. Solubility of hydrogen, oxygen, nitrogen, and helium in water at elevated temperatures. Ind. Eng. Chem., 44(5), 1146-51 (1952).

150116 Price, A. R., Kobayashi, R. Low temperature vapor-liquid equilibrium in light hydrocarbon mixtures: methane-ethane-propane system. J. Chem. Eng. Data, 4(1), 40-52 (1959).

150371 Rabe, A. E., Harris, J. F. Vapor liquid equilibrium data for the binary system, sulfur dioxide and water. J. Chem. Eng. Data, 8(3), 333-6 (1963).

36403 Ramsay, W., Collie, J. N., Travers, M. Helium, a constituent of certain minerals. J. Chem. Soc., Trans., 67, 684-701 (1895).

150057 Reamer, H. H., Olds, R. H., Sage, B. H., Lacey, W. N. Phase equilibria in hydrocarbon systems. Composition of dew-point gas in ethane-water system. Ind. Eng. Chem., 35(7), 790-3 (1943).

150545 Reamer, H. H., Olds, R. H., Sage, B. H., Lacey, W. N. Phase equilibria in hydrocarbon systems. Compositions of the coexisting phases of n-butane-water system in the three-phase region. Ind. Eng. Chem., 36(4), 381-3 (1944).

150077 Reamer, H. H., Sage, B. H. Demonstration of critical phenomena for pure substances and mixtures. Am. J. Phys., 25, 58-63 (1957).

150544 Reamer, H. H., Sage, B. H. Phase behavior in the hydrogen-ammonia system. J. Chem. Eng. Data, 4(2), 152-4 (1959).

150543 Reamer, H. H., Sage, B. H. Phase behavior in the nitrogen-ammonia system. J. Chem. Eng. Data, 4(4), 303-5 (1959).

150083 Reamer, H. H., Sage, B. H., Lacey, W. N. Phase equilibria in hydrocarbon systems. Volumetric and phase behavior of the methane-propane system. Ind. Eng. Chem., 42(3), 534-9 (1950).

150099 Reamer, H. H., Sage, B. H., Lacey, W. N. Phase equilibria in hydrocarbon systems. Volumetric and phase behavior of the propane-carbon dioxide system. Ind. Eng. Chem., 43(11), 2515-20 (1951).

150098 Reamer, H. H., Sage, B. H., Lacey, W. N. Phase equilibria in hydrocarbon systems. Volumetric and phase behavior of the methane-hydrogen sulfide system. Ind. Eng. Chem., 43(4), 976-81 (1951).

150531 Reamer, H. H., Sage, B. H., Lacey, W. N. Phase equilibria in hydrocarbon systems. n-butane-water system in the two-phase region. Ind. Eng. Chem., 44(3), 609-15 (1952).

150093 Reamer, H. H., Sage, B. H., Lacey, W. N. Phase equilibria in hydrocarbon systems. Volumetric and phase behavior of n-pentane-hydrogen sulfide system. Ind. Eng. Chem., 45(8), 1805-9 (1953).

150119 Reamer, H. H., Sage, B. H., Lacey, W. N. Phase equilibria in hydrocarbon systems. Volumetric and phase behavior of ethane-n-pentane system. J. Chem. Eng. Data, 5(1), 44-50 (1960).

150207 Reed, C. D., McKetta, J. J. The solubility of i-butane in water. Pet. Refiner, 38(4), 159-60 (1959).

69667 Rhodes, H. L., DeVaney, W. E., Tully, P. C. Phase equilibria data for helium-methane in the vapor-liquid and fluid-fluid region. J. Chem. Eng. Data, 16(1), 19-23 (1971).

91184 Rhodes, H. L., Stroud, L., Tully, P. C. Vapor-liquid equilibria data for two helium-nitrogen-methane mixtures from 76.5 degrees to 164 degrees K and pressures to 1,200 psia. Rep. Invest. - U. S., Bur. Mines, 7598, 34 pp (1972).

150208 Rice, P. A., Gale, R. P., Barduhn, A. J. Solubility of butane in water and salt solutions at low temperatures. J. Chem. Eng. Data, 21(2), 204-6 (1976).

150068 Rigas, T. J., Mason, D. F., Thodos, G. Vapor-liquid equilibria. Microsampling technique applied to a new variable-volume cell. Ind. Eng. Chem., 50(9), 1297-300 (1958).

150523 Rigas, T. J., Mason, D. F., Thodos, G. Vapor-liquid equilibria: microsampling technique for multicomponent systems. Prepr., Div. Pet. Chem., Am. Chem. Soc., 3(1), 291-300 (1958).

150242 Rigas, T. J., Mason, D. F., Thodos, G. Vapor-liquid equilibria. The system methane-propane-n-butane at 100 degrees F. J. Chem. Eng. Data, 4(3), 201-4 (1959).

49148 Rigby, M., Prausnitz, J. M. Solubility of water in compressed nitrogen, argon, and methane. J. Phys. Chem., 72(1), 330-4 (1968).

150209 Roberts, L. R., McKetta, J. J. Vapor-liquid equilibrium in the n-butane-nitrogen system. AIChE J., 7(1), 173-4 (1961).

19027 Roberts, L. R., McKetta, J. J. Vapor-liquid equilibrium in the n-butane-methane-nitrogen system. J. Chem. Eng. Data, 8(3), 161-3 (1963).

14027 Roberts, L. R., Wang, R. H., Azarnoosh, A., McKetta, J. J. Methane-n-butane system in the two-phase region. J. Chem. Eng. Data, 7(4), 484-5 (1962).

150513 Roberts, O. L., Brownscombe, E. R., Howe, L. S., Ramser, H. Phase diagrams of methane and ethane hydrates. Pet. Manage., 13(3), 56-62 (1941).

150040 Robinson, D. B., Bailey, J. A. The carbon dioxide-hydrogen sulphide-methane system. Part I: phase behaviour at 100 degrees F. Can. J. Chem. Eng., 35, 151-8 (1957).

150522 Robinson, D. B., Besserer, G. J. The equilibrium phase properties of the binary systems: nitrogen-hydrogen sulfide, isobutane-hydrogen sulfide, isobutane-carbon dioxide, isobutane-ethane. Nat. Gas Process. Assoc., Tulsa, Res. Rep., RR-7, 32 pp (1972).

150041 Robinson, D. B., Hughes, R. E., Sandercock, J. A. W. Phase behavior of the n-butane-hydrogen sulphide system. Can. J. Chem. Eng., 42, 143-6 (1964).

150181 Robinson, D. B., Kalra, H. The phase behavior of selected hydrocarbon - non-hydrocarbon systems. Proc., Annu. Conv., Gas Process. Assoc., Tech. Pap., 53, 14-20 (1974).

119280 Robinson, D. B., Kalra, H., Krishnan, T., Miranda, R. D. The phase behavior of selected hydrocarbon - non hydrocarbon binary systems: C(2)-H(2)S and N(2)-iC(4) systems. Proc., Annu. Conv., Gas Process. Assoc., Tech. Pap., 54, 25-31 (1975).

150042 Robinson, D. B., Lorenzo, A. P., Macrygeorgos, C. A. The carbon dioxide-hydrogen sulphide-methane system. Part II. Phase behavior at 40 degrees F. and 160 degrees F. Can. J. Chem. Eng., 37, 212-7 (1959).

60917 Robinson, D. B., Saxena, A. C. Hydrocarbon K-ratios in the presence of hydrogen sulfide and carbon dioxide. Proc., Annu. Conv., Nat. Gas Process. Assoc., Tech. Pap., 45, 58-63 (1966).

26156 Rodewald, N. C., Davis, J. A., Kurata, F. The heterogeneous phase behavior of the helium-nitrogen system. AIChE J., 10(6), 937-43 (1965).

150026 Roellig, L. O., Giese, C. Solubility of helium in liquid hydrogen. J. Chem. Phys., 37(1), 114-6 (1962).

71134 Rogers, B. L., Prausnitz, J. M. High pressure vapor-liquid equilibria for argon + neopentane and methane + neopentane. J. Chem. Thermodyn., 3(2), 211-6 (1971).

45574 Roof, J. G., Baron, J. D. Critical loci of binary mixtures of propane with methane, carbon dioxide, and nitrogen. J. Chem. Eng. Data, 12(3), 292-3 (1967).

24301 Rowlinson, J. S., Sutton, J. R., Weston, J. F. Liquid-vapour equilibrium in the ternary system carbon dioxide-nitrous oxide-ethylene. Proc. Jt. Conf. Thermodyn. Transp. Prop. Fluids, 1957, 10-4 (1958).

25920 Ruemann, R. M., Fedoritenko, A. Physical basis of separating helium and nitrogen. Redstone Sci. Inform. Center, Redstone Arsenal, Ala., Transl., RSIC-226, 15 pp (1964); transl. of Zh. Tekh. Fiz., 7(4), 335-42 (1937).

150024 Ruetschi, P., Amlie, R. F. Solubility of hydrogen in potassium hydroxide and sulfuric acid. Salting-out and hydration. J. Phys. Chem., 70(3), 718-23 (1966).

6249 Ruhemann, M. Two-phase equilibrium in binary and ternary systems. I. The system methane-ethane. Proc. R. Soc. London, Ser. A, 171, 121-36 (1939).

5732 Ruhemann, M., Zinn, N. The system hydrogen-nitrogen-carbon monoxide and the carbon monoxide wash. (in German) Phys. Z. Sowjetunion, 12(4), 389-403 (1937).

150182 Rutherford, W. M. Miscibility relationships in the displacement of oil by light hydrocarbons. Soc. Pet. Eng. J., 2(4), 340-6 (1962).

150162 Ryabtsev, N. I., Khuchua, R. S. Solubility of nitrogen in components of compressed hydrocarbon gases. (in Russian) Gazov. Delo, 6, 25-8 (1970).

46672 Saddington, A. W., Krase, N. W. Vapor-liquid equilibria in the system nitrogen-water. J. Am. Chem. Soc., 56, 353-61 (1934).

94700 Sagara, H., Arai, Y., Saito, S. Vapor-liquid equilibria of binary and ternary systems containing hydrogen and light hydrocarbons. J. Chem. Eng. Jpn., 5(4), 339-48 (1972).

150533 Sage, B. H., Backus, H. S., Vermeulen, T. Phase equilibria in hydrocarbon systems. XII. Specific heats of some mixtures of propane, n-butane, and n-pentane. Ind. Eng. Chem., 28(4), 489-93 (1936).

48068 Sage, B. H., Budenholzer, R. A., Lacey, W. N. Phase equilibria in hydrocarbon systems. Methane-n-butane system in the gaseous and liquid regions. Ind. Eng. Chem., 32(9), 1262-77 (1940).

150064 Sage, B. H., Hicks, B. L., Lacey, W. N. Phase equilibria in hydrocarbon systems. The methane-n-butane system in the two-phase region. Ind. Eng. Chem., 32(8), 1085-92 (1940).

150063 Sage, B. H., Lacey, W. N. Phase equilibria in hydrocarbon systems. Propane-n-pentane system. Ind. Eng. Chem., 32(7), 992-6 (1940).

5730 Sage, B. H., Lacey, W. N., Schaafsma, J. G. Phase equilibria in hydrocarbon systems. II. Methane-propane system. Ind. Eng. Chem., 26(2), 214-7 (1934).

150072 Sage, B. H., Reamer, H. H., Olds, R. H., Lacey, W. N. Phase equilibria in hydrocarbon systems. Volumetric and phase behavior of methane-n-pentane system. Ind. Eng. Chem., 34(9), 1108-17 (1942).

150066 Sage, B. H., Webster, D. C., Lacey, W. N. Phase equilibria in hydrocarbon systems. XVI. Solubility of methane in four light hydrocarbons. Ind. Eng. Chem., 28(9), 1045-7 (1936).

150255 Sanchez, M., Coll, R. System propane-water at high pressures and temperatures. I. Region of two phases. (in Spanish) An. Quim., 74(11), 1329-35 (1978).

150117 Sander, W. On the solubility of carbon dioxide in water and some other solvents under high pressures. (in German) Z. Phys. Chem., Stoechiom. Verwandschaftsl., 78, 513-49 (1912).

80644 Sarashina, E., Arai, Y., Saito, S. Vapor-liquid equilibria for the nitrogen-methane-carbon dioxide system. J. Chem. Eng. Jpn., 4(4), 377-8 (1971).

13445 Sauer, R. N. Vapor-liquid equilibria in the nitrogen-methane-n-butane system. Tex. Univ., Austin, Ph.D. Thesis, 57 pp (1959).

62117 Saxena, A. C., Robinson, D. B. Phase behavior of the methane-carbon dioxide-n-butane and methane-hydrogen sulphide-n-butane systems. Can. J. Chem. Eng., 47(1), 69-75 (1969).

40036 Schindler, D. L., Swift, G. W., Kurata, F. More low temperature V-L design data. Hydrocarbon Process., 45(11), 205-10 (1966).

150183 Schroeder, W. Observations on solutions of gases in liquids. (in German) Z. Naturforsch., Teil B, 24, 500-8 (1969).

150082 Schroeder, W. Research on the temperature dependence of gas solubility in water. (in German) Chem.-Ing.-Tech., 45(9+10), 603-8 (1973).

150250 Selleck, F. T., Carmichael, L. T., Sage, B. H. Phase behavior in the hydrogen sulfide-water system. Ind. Eng. Chem., 44(9), 2219-26 (1952).

150529 Selleck, F. T., Reamer, H. H., Sage, B. H. Volumetric and phase behavior of mixtures of nitric oxide and nitrogen dioxide. Ind. Eng. Chem., 45(4), 814-9 (1953).

150262 Seward, T. M., Franck, E. U. The system hydrogen - water up to 440 degrees C and 2500 bar pressure. Ber. Bunsenges. Phys. Chem., 85(1), 2-7 (1981).

150021 Shoor, S. K., Walker, R. D., Jr., Gubbins, K. E. Salting out of nonpolar gases in aqueous potassium hydroxide solutions. J. Phys. Chem., 73(2), 312-7 (1969).

35926 Shtekkel, F. A., Tsin, N. M. Determination of the liquid-vapor composition diagram of the methane-nitrogen-hydrogen system. (in Russian) Zh. Khim. Promsti., 16(8), 24-8 (1939).

40404 Sinor, J. E., Kurata, F. Solubility of helium in liquid argon, oxygen, and carbon monoxide. J. Chem. Eng. Data, 11(4), 537-9 (1966).

36006 Sinor, J. E., Schindler, D. L., Kurata, F. Vapor-liquid phase behavior of the helium-methane system. AIChE J., 12(2), 353-7 (1966).

13188 Sister, G. A., Sokolov, P. P. Obtaining technical hydrogen from coke-oven gas at low temperatures. U. S. Dep. Commer., Off. Tech. Serv., Transl., 63-24285, 5 pp (1963); transl. of Zh. Khim. Promsti., 17(4/5), 44-5 (1940).

61574 Skripka, V. G., Barsuk, S. D., Nikitina, I. E., Gubkina, G. F., Benyaminovich, O. A. Investigation of liquid-vapor equilibrium in the nitrogen-n-butane system. (in Russian) Gazov. Promst., 14(4), 41-5 (1969).

40179 Skripka, V. G., Dykhno, N. M. Solubility of helium and neon in liquid oxygen, nitrogen and argon (in the temperature range from 67 to 90 degrees K and pressures from 6 to 26 ata). (in Russian) Tr., Vses. Nauchno-Issled. Inst. Kislorodn. Mashinostr., 8, 163-79 (1964).

84579 Skripka, V. G., Nikitina, I. E., Zhdanovich, L. A., Sirotin, A. G., Benyaminovich, O. A. Phase equilibria of liquid-vapor at low temperatures in binary systems, formed by components of natural gas. (in Russian) Gazov. Promst., 15(12), 35-6 (1970).

150144 Smith, N. O., Kelemen, S., Nagy, B. Solubility of natural gases in aqueous salt solutions - II. Nitrogen in aqueous NaCl, CaCl(2), Na(2)SO(4) and MgSO(4) at room temperatures and at pressures below 1000 psia. Geochim. Cosmochim. Acta, 26, 921-6 (1962).

3728 Smith, S. R. I. Gas-liquid phase equilibrium in the system He-H(2). II. Development of mass spectrograph techniques for analysis of He-H(2) and their isotopes. Ohio State Univ., Columbus, Ph.D. Thesis, 136 pp (1952).

54119 Sneed, C. M., Sonntag, R. E., Van Wylen, G. J. Helium-hydrogen liquid-vapor equilibrium to 100 atm. J. Chem. Phys., 49(5), 2410-4 (1968).

2201 Sobocinski, D. P., Kurata, F. Heterogeneous phase equilibria of the hydrogen sulfide-carbon dioxide system. AIChE J., 5(4), 545-51 (1959).

123894 Somait, F. A., Kidnay, A. J. Liquid-vapor equilibria at 270.00 K for systems containing nitrogen, ethane, and carbon dioxide. J. Chem. Eng. Data, 23(4), 301-5 (1978).

28623 Sonntag, R. E., Crain, R. W., Jr., Streett, W. B., Van Wylen, G. J. Liquid-vapor equilibrium in the system hydrogen-helium. Final report. Univ. Mich., Ann Arbor, Coll. Eng., Rep., 05664-2-F, 72 pp (1964).

25053 Sonntag, R. E., Van Wylen, G. J., Crain, R. W., Jr. Liquid-vapor equilibrium in the system equilibrium hydrogen-helium. J. Chem. Phys., 41(8), 2399-402 (1964).

150382 Spall, B. C. Phase equilibria in the system sulphur dioxide-water from 25-300 degrees C. Can. J. Chem. Eng., 41, 79-83 (1963).

50699 Spano, J. O., Heck, C. K., Barrick, P. L. Liquid-vapor equilibria of the hydrogen-carbon dioxide system. J. Chem. Eng. Data, 13(2), 168-71 (1968).

39204 Sprow, F. B., Prausnitz, J. M. Vapor-liquid equilibria for five cryogenic mixtures. AIChE J., 12(4), 780-4 (1966).

6240 Steckel, F. Dew and boiling curves of nitrogen-carbon monoxide mixtures up to 17 atmospheres. (in German) Phys. Z. Sowjetunion, 8, 337-41 (1935).

150184 Steckel, F. Vapor-liquid equilibria of some binary, hydrogen sulfide containing systems under pressure. (in German) Sven. Kem. Tidskr., 57(9), 209-16 (1945).

11157 Stein, F. P., Claitor, L. C., Geist, J. M. A study of the phase equilibria of the hydrogen-carbon monoxide-propane system at low temperatures. Adv. Cryog. Eng., 7, 106-13 (1962).

41049 Steinbach, H.-G., Steinbrecher, M. Solubility of nitrogen in C(4) liquefied gases. (in German) Chem. Tech. (Leipzig), 18(10), 633 (1966).

150229 Stephan, E. F., Hatfield, N. S., Peoples, R. S., Pray, H. A. H. The solubility of gases in water and in aqueous uranyl salt solutions at elevated temperatures and pressures. Battelle Mem. Inst., Columbus, Ohio, Rep., BMI-1067, 63 pp (1956).

11348 Sterner, C. J. Phase equilibria in CO(2)-methane systems. Adv. Cryog. Eng., 6, 467-74 (1961).

150188 Stewart, P. B., Munjal, P. K. The solubility of carbon dioxide in distilled water, synthetic sea water and synthetic sea-water concentrates. Calif. Univ., Richmond, Sea Water Convers. Lab., Rep., 69-2, 49 pp (1969).

150210 Stewart, P. B., Munjal, P. Solubility of carbon dioxide in pure water, synthetic sea water, and synthetic sea water concentrates at -5 degrees to 25 degrees C. and 10- to 45-atm. pressure. J. Chem. Eng. Data, 15(1), 67-71 (1970).

71490 Stoeckli, H. F., Staveley, L. A. K. The excess Gibbs function and the volumes of mixing for the system methane + propane at 90.68 K. Helv. Chim. Acta, 53(8), 1961-4 (1970).

150532 Stone, H. W. Solubility of water in liquid carbon dioxide. Ind. Eng. Chem., 35(12), 1284-6 (1943).

50612 Streett, W. B. Gas-liquid and fluid-fluid phase separation in the system helium-nitrogen near the critical temperature of nitrogen. Chem. Eng. Prog., Symp. Ser., 63(81), 37-42 (1967).

95426 Streett, W. B. Phase equilibria in molecular hydrogen-helium mixtures at high pressures. Astrophys. J., 186(3), 1107-25 (1973).

124829 Streett, W. B., Calado, J. C. G. Liquid-vapour equilibrium for hydrogen + nitrogen at temperatures from 63 to 110 K and pressures to 57 MPa. J. Chem. Thermodyn., 10(11), 1089-100 (1978).

92174 Streett, W. B., Erickson, A.L. Phase equilibria in gas mixtures at high pressures: implications for planetary structures. Phys. Earth Planet. Inter., 5, 357-66 (1972).

94794 Streett, W. B., Erickson, A. L., Hill, J. L. E. Phase equilibria in fluid mixtures at high pressures: the He-CH(4) system. Phys. Earth Planet. Inter., 6(1-3), 69-77 (1972).

65038 Streett, W. B., Hill, J. L. E. Phase equilibria in fluid mixtures at high pressures: the helium-nitrogen system. J. Chem. Phys., 52(3), 1402-6 (1970).

21933 Streett, W. B., Sonntag, R. E., Van Wylen, G. J. Liquid-vapor equilibrium in the system normal hydrogen-helium. J. Chem. Phys., 40(5), 1390-5 (1964).

97331 Stryjek, R., Chappelear, P. S., Kobayashi, R. Low-temperature vapor-liquid equilibria of nitrogen-methane system. J. Chem. Eng. Data, 19(4), 334-9 (1974).

97332 Stryjek, R., Chappelear, P. S., Kobayashi, R. Low-temperature vapor-liquid equilibria of nitrogen-ethane system. J. Chem. Eng. Data, 19(4), 340-3 (1974).

150247 Stutzman, L. F., Brown, G. M. Low temperature vapor-liquid equilibria. Part I - Phase equilibria in natural gas at low temperatures. Chem. Eng. Prog., 45(2), 139-42 (1949).

150189 Suciu, S., Sibbitt, W. L. A study of the nitrogen and water and hydrogen and water systems at elevated temperatures and pressures. Purdue Univ., Lafayette, Ind., Eng. Exp. Sta., Rep., ANL-4603, Pt. II, 23 pp (1951).

150163 Sultanov, R. G., Skripka, V. G., Namiot, A. Yu. Moisture content of methane at high temperatures and pressures. (in Russian) Gazov. Promst., 16(4), 6-8 (1971).

150146 Sultanov, R. G., Skripka, V. G., Namiot, A. Yu. Phase equilibria and critical phenomena in the water-methane system at elevated temperatures and pressures. Russ. J. Phys. Chem. (Engl. Transl.), 46(8), 1238 (1972); transl. of Zh. Fiz. Khim., 46(8), 2160 (1972).

150164 Sultanov, R. G., Skripka, V. G., Namiot, A. Yu. Solubility of methane in water at increased temperatures and pressures. (in Russian) Gazov. Promst., 17(5), 6-7 (1972).

150157 Takenouchi, S., Kennedy, G. C. The binary system H(2)O-CO(2) at high temperatures and pressures. Am. J. Sci., 262, 1055-74 (1964).

150140 Taylor, H. S., Wald, G. W., Sage, B. H., Lacey, W. N. Phase behavior of the methane-n-pentane system. Oil Gas J., 38(13), 46-50 (1939).

76312 Tiwari, K. K., Robinson, D. B. Volumetric behavior of the ethane-hydrogen sulphide system. Can. J. Chem. Eng., 49, 637-41 (1971).

150100 Toedheide, K., Franck, E. U. The two-phase region and the critical curve in the carbon dioxide-water system up to a pressure of 3500 bar. (in German) Z. Phys. Chem. (Frankfurt am Main), 37, 387-401 (1963).

150283 Toriumi, T., Kaminishi, G. Studies on the vapor-liquid equilibria at high pressures. (in Japanese) Asahi Garasu Kogyo Gijutsu Shoreikai Kenkyu Hokoku, 14, 67-79 (1968).

29934 Torocheshnikov, N. S. Isotherms and isobars of the nitrogen-carbon monoxide system. (in Russian) Zh. Tekh. Fiz., 7(10), 1107-10 (1937).

5717 Torocheshnikov, N. S., Levius, L. A. Liquid-vapor equilibrium in the nitrogen-methane system. (in Russian) Zh. Khim. Promsti., 16(1), 19-22 (1939).

150281 Torocheshnikov, N. S., Semenova, V. A. Equilibrium of liquid-vapor in the system hydrogen-methane-nitrogen-carbon monoxide at a temperature of 78 degrees K. (in Russian) Tr. Mosk. Khim.-Tekhnol. Inst., 18, 115-7 (1954).

11381 Toyama, A., Chappelear, P. S., Leland, T. W., Kobayashi, R. Vapor-liquid equilibria at low temperatures: the carbon monoxide-methane system. Adv. Cryog. Eng., 7, 125-36 (1962).

69775 Trust, D. B., Kurata, F. Vapor-liquid phase behavior of the hydrogen-propane and hydrogen-carbon monoxide-propane systems. AIChE J., 17(1), 86-91 (1971).

73928 Trust, D. B., Kurata, F. Vapor-liquid and liquid-liquid vapor phase behavior of the carbon monoxide-propane and the carbon monoxide-ethane systems. AIChE J., 17(2), 415-9 (1971).

150236 Tsang, C. Y., Clancy, P., Calado, J. C. G., Streett, W. B. Phase equilibria in the H(2)/CH(4) system at temperatures from 92.3 to 180.0 K and pressures to 140 MPa. Chem. Eng. Commun., 6, 365-83 (1980).

150505 Tsang, C. Y., Streett, W. B. Phase equilibria in the H(2)/CO(2) system at temperatures from 220 to 290 K and pressures to 172 MPa. Chem. Eng. Sci., 36, 993-1000 (1981).

150221 Tsang, C. Y., Streett, W. B. Phase equilibria in the H(2)-CO system at temperatures from 70 to 125 K and pressures to 53 MPa. Fluid Phase Equilib., 6, 261-73 (1981).

13359 Tsiklis, D. S. Limited mutual solubility of gases at high pressures in the systems helium-ammonia and helium-carbon dioxide. (in Russian) Dokl. Akad. Nauk SSSR, 86(6), 1159-61 (1952).

7961 Tsiklis, D. S. Limited mutual solubility of gases in the helium-propane system at high pressures. (in Russian) Dokl. Akad. Nauk SSSR, 101(1), 129-30 (1955).

150012 Tsiklis, D. S., Maslennikova, V. Ya. Mutual limited solubility of gases in the water-butane system. (in Russian) Dokl. Akad. Nauk SSSR, 157(2), 426-9 (1964).

150013 Tsiklis, D. S., Maslennikova, V. Ya. Mutual limited solubility of gases in the water-nitrogen system. (in Russian) Dokl. Akad. Nauk SSSR, 161(3), 645-7 (1965).

67034 Tully, P. C., DeVaney, W. E., Rhodes, H. L. Phase equilibria of the helium-nitrogen system from 122 to 126 degrees K. Adv. Cryog. Eng., 16, 88-95 (1971).

120297 Tully, P. C., Stroud, L. Vapor-liquid equilibria data for a helium-nitrogen-methane mixture from 80 to 144 K and pressures to 1,200 psia. Rep. Invest. - U. S., Bur. Mines, 8181, 20 pp (1976).

639 Uehara, K. Research on gas mixturs of low hydrocarbons. Part 2. Solubilities of hydrogen and methane in liquid ethane. (in Japanese) Nippon Kagaku Kaishi (1921-47), 53, 931-2 (1932).

150069 Vaughan, W. E., Collins, F. C. P-V-T-x relations of the system propane-isopentane. Ind. Eng. Chem., 34(7), 885-90 (1942).

99841 Vejrosta, J., Wichterle, I. The propane-pentane system at high pressures. Collect. Czech. Chem. Commun., 39(5), 1246-8 (1974).

150516 Velikovskii, A. S., Stepanova, G. S., Vybornova, Ya. I. Phase equilibria of binary mixtures of methane with hydrocarbons of the normal paraffin series. (in Russian) Gazov. Promst., 9(2), 1-6 (1964).

6255 Vellinger, E., Pons, E. On the solubility of nitrogen in liquid methane and liquid propane. (in French) C. R. Hebd. Seances Acad. Sci., 217, 689-91 (1943).

150211 Verschaffelt, J. Measurements on the system of isothermal lines near the plaitpoint, and especially on the process of the retrograde condensation of a mixture of carbonic acid and hydrogen. Commun. Kamerlingh Onnes Lab. Univ. Leiden, 45, 15 pp (1898); transl. from Versl. Gewone Vergad. Afd. Natuurkd., K. Ned. Akad. Wet., 7, 281-9 (1898).

150212 Verschaffelt, J. Measurements on the system of isothermal lines near the plaitpoint, and especially on the process of the retrograde condensation of a mixture of carbonic acid and hydrogen (continued). Measurements on the change of pressure by substitution of one component by the other in mixtures of carbonic acid and hydrogen (continued). Commun. Kamerlingh Onnes Lab. Univ. Leiden, 47, 19 pp (1899); transl. from Versl. Gewone Vergad. Afd. Natuurkd., K. Ned. Akad. Wet., 8, 389-400 (1899).

6216 Verschoyle, T. T. H. The ternary system carbon monoxide-nitrogen-hydrogen and the component binary systems between temperatures of -185 degrees and -215 degrees C., and between pressures of 0 and 225 atm. Philos. Trans. R. Soc. London, Ser. A, 230, 189-220 (1931).

150101 Vilcu, R., Gainar, I. Solubility of gases under pressure in liquids. I. The carbon dioxide-water system. (in German) Rev. Roum. Chim., 12(2), 181-9 (1967).

150032 von Antropoff, A. The solubility of xenon, krypton, argon, neon, and helium in water. Proc. R. Soc. London, Ser. A, 83, 474-82 (1910).

150510 Vosolsobe, J., Simecek, A., Michalek, J., Kadlec, B. Solubility of sulphur dioxide in water. (in Czech) Chem. Prum., 15(7), 401-4 (1965).

21434 Wang, R. H., McKetta, J. J. Vapor-liquid equilibrium of the methane-n-butane-carbon dioxide system at low temperatures and elevated pressures. J. Chem. Eng. Data, 9(1), 30-5 (1964).

63416 Watanabe, K., Kuriki, M., Ogura, M., Saito, I. Vapour-liquid-equilibrium of LNG. Cryog. Eng., 4(6), 292-301 (1969).

150525 Wehe, A. H., McKetta, J. J. n-butane-1-butene-water system in the three-phase region. J. Chem. Eng. Data, 6(2), 167-72 (1961).

64484 Weiss, R. F. Helium isotope effect in solution in water and seawater. Science, 168, 247-8 (1970).

70831 Weiss, R. F. Solubility of helium and neon in water and seawater. J. Chem. Eng. Data, 16(2), 235-41 (1971).

150186 Weiss, R. F. Carbon dioxide in water and seawater: the solubility of a non-ideal gas. Mar. Chem., 2(3), 203-15 (1974).

150509 Wells, F. L., MacClaren, R. H. Total pressures for the system: sulphur dioxide-water. Tappi, 38(11), 668-71 (1955).

150020 Wen, W.-Y., Hung, J. H. Thermodynamics of hydrocarbon gases in aqueous tetraalkylammonium salt solutions. J. Phys. Chem., 74(1), 170-80 (1970).

150050 Wetlaufer, D. B., Malik, S. K., Stoller, L., Coffin, R. L. Nonpolar group participation in the denaturation of proteins by urea and guanidinium salts. Model compound studies. J. Am. Chem. Soc., 86, 508-14 (1964).

74084 Wichterle, I., Chappelear, P. S., Kobayashi, R. Determination of critical exponents from measurements of binary vapor-liquid equilibrium in the neighborhood of the critical line. J. Comput. Phys., 7(3), 606-20 (1971).

75233 Wichterle, I., Kobayashi, R. Vapor-liquid equilibrium of methane-propane system at low temperatures and high pressures. J. Chem. Eng. Data, 17(1), 4-9 (1972).

75234 Wichterle, I., Kobayashi, R. Vapor-liquid equilibrium of methane-ethane system at low temperatures and high pressures. J. Chem. Eng. Data, 17(1), 9-12 (1972).

75235 Wichterle, I., Kobayashi, R. Vapor-liquid equilibrium of methane-ethane-propane system at low temperatures and high pressures. J. Chem. Eng. Data, 17(1), 13-8 (1972).

3616 Widdoes, L. C., Katz, D. L. Vapor-liquid equilibrium constants for carbon monoxide. Ind. Eng. Chem., 40(9), 1742-6 (1948).

150046 Wiebe, R., Gaddy, V. L. The solubility of hydrogen in water at 0, 50, 75 and 100 degrees from 25 to 1000 atmospheres. J. Am. Chem. Soc., 56, 76-9 (1934).

150047 Wiebe, R., Gaddy, V. L. The solubility of helium in water at 0, 25, 50 and 75 degrees and at pressures to 1000 atmospheres. J. Am. Chem. Soc., 57, 847-51 (1935).

150391 Wiebe, R., Gaddy, V. L. The solubility in liquid ammonia of hydrogen at 0 degrees and of nitrogen at 0, 50, 75, 90 and 100 degrees at pressures to 1000 atmospheres. Critical phenomena of ammonia-nitrogen mixtures. J. Am. Chem. Soc, 59, 1984-7 (1937).

150045 Wiebe, R., Gaddy, V. L. The solubility in water of carbon dioxide at 50, 75 and 100 degrees, at pressures to 700 atmospheres. J. Am. Chem. Soc., 61, 315-8 (1939).

150044 Wiebe, R., Gaddy, V. L. The solubility of carbon dioxide in water at various temperatures from 12 to 40 degrees and at pressures to 500 atmospheres. Critical phenomena. J. Am. Chem. Soc., 62, 815-7 (1940).

150054 Wiebe, R., Gaddy, V. L. Vapor phase composition of carbon dioxide-water mixtures at various temperatures and at pressures to 700 atmospheres. J. Am. Chem. Soc., 63, 475-7 (1941).

150527 Wiebe, R., Gaddy, V. L., Heins, C., Jr. Solubility of hydrogen in water at 25 degrees C. from 25 to 1000 atmospheres. Ind. Eng. Chem., 24(7), 823-5 (1932).

150076 Wiebe, R., Gaddy, V. L, Heins, C., Jr. Solubility of nitrogen in water at 25 degrees C. from 25 to 1000 atmospheres. Ind. Eng. Chem., 24, 927 (1932).

150053 Wiebe, R., Gaddy, V. L., Heins, C., Jr. The solubility of nitrogen in water at 50, 75 and 100 degrees from 25 to 1000 atmospheres. J. Am. Chem. Soc., 55, 947-53 (1933).

150390 Wiebe, R., Tremearne, T. H. Solubility of nitrogen in liquid ammonia at 25 degrees from 25 to 1000 atmospheres. J. Am. Chem. Soc., 55, 975-8 (1933).

150389 Wiebe, R., Tremearne, T. H. The solubility of hydrogen in liquid ammonia at 25, 50, 75 and 100 degrees and at pressures to 1000 atmospheres. J. Am. Chem. Soc., 56, 2357-60 (1934).

64379 Wiese, H. C., Jacobs, J., Sage, B. H. Phase equilibria in the hydrocarbon systems. Phase behavior in the methane-propane-n-butane system. J. Chem. Eng. Data, 15(1), 82-91 (1970).

64378 Wiese, H. C., Reamer, H. H., Sage, B. H. Phase equilibria in hydrocarbon systems. Phase behavior in the methane-propane-n-decane system. J. Chem. Eng. Data, 15(1), 75-82 (1970).

150031 Wilcock, R. J., Battino, R. Solubility of oxygen-nitrogen mixture in water. Nature (London), 252(5484), 614-5 (1974).

6369 Williams, R. B., Katz, D. L. Vapor liquid equilibria in binary systems. Hydrogen with ethylene, ethane, propylene, and propane. Ind. Eng. Chem., 46(12), 2512-20 (1954).

88754 Wilson, G. M. Vapor-liquid equilibria of nitrogen, methane, ethane, and propane binary mixtures at LNG temperatures from total pressure measurements. Adv. Cryog. Eng., 20, 164-71 (1975).

150536 Wilson, T. A. The total and partial vapor pressures of aqueous ammonia solutions. Ill., Univ., Eng. Exp. Stn., Bull., 146, 48 pp (1925).

150126 Winkler, L. W. The solubility of gases in water. (Part 1.). (in German) Ber. Dtsch. Chem. Ges., 24, 89-101 (1891).

150121 Winkler, L. W. The solubility of gases in water. (Part 2). (in German) Ber. Dtsch. Chem. Ges., 24, 3602-10 (1891).

150127 Winkler, L. W. Regularity with the absorption of gases in liquids. (in German) Z. Phys. Chem., Stoechiom. Verwandschaftsl., 9, 171-5 (1892).

150125 Winkler, L. W. The solubility of gases in water. (in German) Ber. Dtsch. Chem. Ges., 34, 1408-22 (1901).

150539 Wrewsky, M. On the equilibrium between vapor and liquid aqueous solutions of ammonia. (in German) Z. Phys. Chem., Stoechiom. Verwandschaftsl., 112, 117-27 (1924).

150222 Wright, R. H., Maass, O. The solubility of hydrogen sulphide in water from the vapor pressures of the solutions. Can. J. Res., 6, 94-101 (1932).

150519 Wucherer, J. Measurements of pressure, temperature and composition of the liquid and vapor phases of ammonia-water mixtures in the saturated state. (in German) Z. Gesamte Kaelte-Ind., 39(6), 97-104 (1932); 39(7), 136-40 (1932).

150213 Yamamoto, S., Alcauskas, J. B., Crozier, T. E. Solubility of methane in distilled water and seawater. J. Chem. Eng. Data, 21(1), 78-80 (1976).

150120 Yeh, S.-Y., Peterson, R. E. Solubility of carbon dioxide, krypton, and xenon in aqueous solution. J. Pharm. Sci., 53(7), 822-4 (1964).

150214 Yen, L. C., McKetta, J. J., Jr. Solubility of nitrous oxide in some nonpolar solvents. J. Chem. Eng. Data, 7(2), 288-9 (1962).

59455 Yesavage, V. F., Katz, D. L., Powers, J. E. Experimental determinations of several thermal properties of a mixture containing 77 mole % propane in methane. J. Chem. Eng. Data, 14(2), 137-49 (1969).

67016 Yesavage, V. F., Katz, D. L., Powers, J. E. Experimental determinations of several thermal properties of a mixture containing 51 mole percent propane in methane. AIChE J., 16(5), 867-75 (1970).

150266 Yokoyama, K., Ohe, S. Studies on apparatus for measuring vapor-liquid equilibrium at high pressures. (in Japanese) Ishikawajima-Harima Giho, 11(1), 5-11 (1971).

90120 Yorizane, M. The determination of vapor-liquid equilibrium data at high pressure and low temperature. (in Japanese) Asahi Garasu Kogyo Gijutsu Shoreikai Kenkyu Hokoku, 18, 61-76 (1971).

55395 Yorizane, M., Sadamoto, S., Yoshimura, S., Masuoka, H., Shiki, N., Kimura, T., Toyama, A. Vapor-liquid equilibria at low temperature. (in Japanese) Kagaku Kogaku, 32(3), 257-64 (1968).

76576 Yorizane, M., Yoshimura, S., Masuoka, H. Vapor liquid equilibrium at high pressure (N(2)-CO(2), H(2)-CO(2) system). (in Japanese) Kagaku Kogaku, 34(9), 953-7 (1970).

150264 Yorizane, M., Yoshimura, S., Masuoka, H. Measurements and predictions of multicomponent vapor-liquid equilibria. Bull. Jpn. Pet. Inst., 14(1), 105-13 (1972).

76577 Yorizane, M., Yoshimura, S., Masuoka, H., Naka, T. The measurement and prediction of the vapor-liquid equilibrium relation at low temperature and high pressure for the H(2)-N(2) system. (in Japanese) Kagaku Kogaku, 35(6), 691-3 (1971).

50157 Yorizane, M., Yoshimura, S., Masuoka, H., Toyama, A. Low temperature vapour-liquid equilibria of hydrogen-containing binaries. Proc. Int. Cryog. Eng. Conf., 1st, 1967, 57-62 (1968).

64158 Yu, P., Elshayal, I. M., Lu, B. C.-Y. Liquid-liquid-vapor equilibrium in the nitrogen-methane-ethane system. Can. J. Chem. Eng., 47(5), 495-8 (1969).

13187 Yushkevich, N. F., Torocheshnikov, N. S. Study of the coexistence of liquid and vapor phases of solutions of nitrogen and carbon monoxide. (in Russian) Zh. Khim. Promsti., 13(21), 1273-83 (1936).

79086 Zeininger, H. Liquid/vapor equilibria of the binary systems N(2)O/N(2), N(2)O/O(2) and N(2)O/CH(4) at low temperatures and high pressures. (in German) Chem.-Ing.-Tech., 44(9), 607-12 (1972).

88684 Zeininger, H. Liquid/vapor equilibria of the systems N(2)/H(2)/CH(4)/NH(3) at 25 degrees C and pressures up to 500 bar. (in German) Chem.-Ing.-Tech., 45(17), 1067-70 (1973).

150269 Zelvenskii, Ya. D. Solubility of carbon dioxide in water under pressure. (in Russian) Zh. Fiz. Khim., 14(17-18), 1250-7 (1937).

19620 Zenner, G. H., Dana, L. I. Liquid-vapor equilibrium compositions of carbon dioxide-oxygen-nitrogen mixtures. Chem. Eng. Prog., Symp. Ser., 59(44), 36-41 (1963).

16067 Pool,R.A.H., Saville,G., Herrington,T.M., Sh... (1962)
16075 Hunter,M.A. (1906)
17059 Boone,W.J.,Jr., DeVaney,W.E., Stroud.,L. (1963)
17785 Mathot,V., Staveley,L.A.K., Young,J.A., Pars... (1956)
18927 Buzyna,G., Macriss,R.A., Ellington,R.T. (1963)
19027 Roberts,L.R., McKetta,J.J. (1963)
19414 Jones,I.W., Rowlinson,J.S. (1963)
19620 Zenner,G.H., Dana,L.I. (1963)
19707 Mathot,V. (1963)
20429 DeVaney,W.E., Dalton,B.J., Meeks,J.C.,Jr. (1963)
20499 Klots,C.E., Benson,B.B. (1963)
21414 Davis,J.A., Rodewald,N., Kurata,F. (1963)
21434 Wang,R.H., McKetta,J.J. (1964)
21435 Burch,R.J. (1964)
21436 Douglas,E. (1964)
21933 Streett,W.B., Sonntag,R.E., Van Wylen,G.J. (1964)
24301 Rowlinson,J.S., Sutton,J.R., Weston,J.F. (1958)
24862 Kirk,B.S., Ziegler,W.T. (1965)
25053 Sonntag,R.E., Van Wylen,G.J., Crain,R.W.,Jr. (1964)
25304 Cheung,H., Wang,D.I.-J. (1964)
25920 Ruemann,R.M., Fedoritenko,A. (1937)
26156 Rodewald,N.C., Davis,J.A., Kurata,F. (1965)
26297 Hensel,W.E.,Jr., Massoth,F.E. (1964)
26757 Michels,A.,Nederbragt,G.W. (1939)
28623 Sonntag,R.E., Crain,R.W.,Jr., Streett,W.B., ... (1964)
28799 Cutler,A.J.B., Morrison,J.A. (1965)
29397 Hiza,M.J., Kidnay,A.J. (1966)
29934 Torocheshnikov,N.S. (1937)
29935 McTaggart,H.A., Edwards,E. (1919)
29966 Fastovskii,V.G., Petrovskii,Yu.V. (1957)
30143 Nelson,E.E., Bonnell,W.S. (1943)
35303 Muirbrook,N.K., Prausnitz,J.M. (1965)
35926 Shtekkel,F.A., Tsin,N.M. (1939)
36006 Sinor,J.E., Schindler,D.L., Kurata,F. (1966)
36403 Ramsay,W., Collie,J.N., Travers,M. (1895)
36802 Lehigh,W.R., McKetta,J.J. (1966)
37444 Duncan,A.G., Staveley,L.A.K. (1966)
39075 Charlesworth,P.L., Ruhemann,M. (1965)
39202 Hipkin,H. (1966)
39204 Sprow,F.B., Prausnitz,J.M. (1966)
39337 Kaminishi,G., Toriumi,T. (1966)
39627 Matyash,I.V., Mank,V.V., Starkov,M.G. (1966)
40036 Schindler,D.L., Swift,G.W., Kurata,F. (1966)
40179 Skripka,V.G., Dykhno,N.M. (1964)
40404 Sinor,J.E., Kurata,F. (1966)
41049 Steinbach,H.-G., Steinbrecher,M. (1966)
42929 Khazanova,N.E., Lesnevskaya,L.S., Zakharova,... (1966)
44762 Heck,C.K., Hiza,M.J. (1967)
45223 Hiza,M.J., Heck,C.K., Kidnay,A.J. (1968)
45392 Fuks,S., Bellemans,A. (1967)
45496 Jones,A.E., Kay,W.B. (1967)
45574 Roof,J.G., Baron,J.D. (1967)
46018 Greene,N.E., Sonntag,R.E. (1968)
46672 Saddington,A.W., Krase,N.W. (1934)

47558 Donnelly,H.G., Katz,D.L. (1954)
47671 Kohn,J.P., Kurata,F. (1958)
48068 Sage,B.H., Budenholzer,R.A., Lacey,W.N. (1940)
49148 Rigby,M., Prausnitz,J.M. (1968)
50157 Yorizane,M., Yoshimura,S., Masuoka,H., Toyam... (1968)
50609 Cohen,A.E., Hipkin,H.G., Koppany,C.R. (1967)
50610 Chang,S.-D., Lu,B.C.-Y. (1967)
50612 Streett,W.B. (1967)
50699 Spano,J.O., Heck,C.K., Barrick,P.L. (1968)
50700 Gonzalez,M.H., Lee,A.L. (1968)
51011 Hiza,M.J., Duncan,A.G. (1969)
51325 Khazanova,N.E., Lesnevskaya,L.S. (1967)
53074 Neumann,A., Walch,W. (1968)
53324 MacKendrick,R.F., Heck,C.K., Barrick,P.L. (1968)
54087 Cannon,W.A., Robson,J.H., English,W.D. (1968)
54119 Sneed,C.M., Sonntag,R.E., Van Wylen,G.J. (1968)
55395 Yorizane,M., Sadamoto,S., Yoshimura,S., Masu... (1968)
59300 Banks,R., Haselden,G.G. (1969)
59455 Yesavage,V.F., Katz,D.L., Powers,J.E. (1969)
60917 Robinson,D.B., Saxena,A.C. (1966)
61574 Skripka,V.G., Barsuk,S.D., Nikitina,I.E., Gu... (1969)
61654 Heck,C.K.,Jr. (1968)
62117 Saxena,A.C., Robinson,D.B. (1969)
62196 Kaminishi,G., Arai,Y., Saito,S., Maeda,S. (1968)
62447 Kaminishi,G., Toriumi,T. (1968)
62792 Liu,K.F. (1969)
63416 Watanabe,K., Kuriki,M., Ogura,M., Saito,I. (1969)
63709 Burfield,D.W., Richardson,H.P., Guereca,R.A. (1970)
64158 Yu,P., Elshayal,I.M., Lu,B.C.-Y. (1969)
64372 Djordjevich,L., Budenholzer,R.A. (1970)
64378 Wiese,H.C., Reamer,H.H., Sage,B.H. (1970)
64379 Wiese,H.C., Jacobs,J., Sage,B.H. (1970)
64484 Weiss,R.F. (1970)
64489 O'Sullivan,T.D., Smith,N.O. (1970)
65038 Streett,W.B., Hill,J.L.E. (1970)
66179 Hakuta,T., Nagahama,K., Suda,S. (1969)
67016 Yesavage,V.F., Katz,D.L., Powers,J.E. (1970)
67034 Tully,P.C., DeVaney,W.E., Rhodes,H.L. (1971)
68441 Nikitina,I.E., Skripka,V.G., Gubkina,G.F., B... (1969)
69471 Lu,B.C.-Y., Yu,P., Poon,D.P.L. (1969)
69667 Rhodes,H.L., DeVaney,W.E., Tully,P.C. (1971)
69775 Trust,D.B., Kurata,F. (1971)
70002 Nikitina,I.E., Skripka,V.G., Gubkina,G.F., S... (1970)
70550 Foerg,W., Wirtz,P. (1970)
70826 DeVaney,W.E., Rhodes,H.L., Tully,P.C. (1971)
70831 Weiss,R.F. (1971)
71134 Rogers,B.L., Prausnitz,J.M. (1971)
71490 Stoeckli,H.F., Staveley,L.A.K. (1970)
73928 Trust,D.B., Kurata,F. (1971)
73945 Hsi,C., Lu,B.C.-Y. (1971)
74084 Wichterle,I., Chappelear,P.S., Kobayashi,R. (1971)
75233 Wichterle,I., Kobayashi,R. (1972)
75234 Wichterle,I., Kobayashi,R. (1972)
75235 Wichterle,I., Kobayashi,R. (1972)

76312 Tiwari,K.K., Robinson,D.B. (1971)
76314 Besserer,G.J., Robinson,D.B. (1971)
76499 Arai,Y., Kaminishi,G., Saito,S. (1971)
76576 Yorizane,M., Yoshimura,S., Masuoka,H. (1970)
76577 Yorizane,M., Yoshimura,S., Masuoka,H., Naka,T. (1971)
79086 Zeininger,H. (1972)
80644 Sarashina,E., Arai,Y., Saito,S. (1971)
82412 Chen,R.J.J., Ruska,W.E.A., Chappelear,P.S., ... (1973)
83757 Miller,R.C., Kidnay,A.J., Hiza,M.J. (1973)
83825 Maslennikova,V.Ya., Vdovina,N.A., Tsiklis,D.S. (1971)
84578 Barsuk,S.D., Skripka,V.G., Benyaminovich,O.A. (1970)
84579 Skripka,V.G., Nikitina,I.E., Zhdanovich,L.A.... (1970)
86467 Davydov,I.A., Budnevich,S.S. (1971)
87419 Besserer,G.J., Robinson,D.B. (1973)
87420 Besserer,G.J., Robinson,D.B. (1973)
87946 Massoudi,R., King,A.D.,Jr. (1973)
88244 Christiansen,L.J., Fredenslund,A., Mollerup,J. (1973)
88424 Gugnoni,R.J., Eldridge,J.W., Okay,V.G., Lee,... (1973)
88684 Zeininger,H. (1973)
88751 Christiansen,L.J., Fredenslund,A., Gardner,N. (1974)
88753 Poon,D.P.L., Lu,B.C.-Y. (1974)
88754 Wilson,G.M. (1975)
90120 Yorizane,M. (1971)
90465 Chen,R.J.J., Chappelear,P.S., Kobayashi,R. (1974)
90466 Chen,R.J.J., Chappelear,P.S., Kobayashi,R. (1974)
90467 Kahre,L.C. (1974)
90468 Elliot,D.G., Chen,R.J.J., Chappelear,P.S., K... (1974)
91184 Rhodes,H.L., Stroud,L., Tully,P.C. (1972)
91294 Mulholland,K.L. (1970)
91853 Miniovich,V.M., Sorina,G.A. (1971)
92174 Streett,W.B., Erickson,A.L. (1972)
94543 Crozier,T.E., Yamamoto,S. (1974)
94700 Sagara,H., Arai,Y., Saito,S. (1972)
94794 Streett,W.B., Erickson,A.L., Hill,J.L.E. (1972)
95426 Streett,W.B. (1973)
97331 Stryjek,R., Chappelear,P.S., Kobayashi,R. (1974)
97332 Stryjek,R., Chappelear,P.S., Kobayashi,R. (1974)
98719 Hamam,S.E.M., Lu,B.C.-Y. (1974)
98955 Calado,J.C.G., Garcia,G.A., Staveley,L.A.K. (1974)
98958 Fredenslund,A., Mollerup,J. (1974)
99626 Gugnoni,R.J., Eldridge,J.W., Okay,V.C., Lee,... (1974)
99841 Vejrosta,J., Wichterle,I. (1974)
100275 Parrish,W.R., Hiza,M.J. (1974)
101683 Besserer,G.J., Robinson,D.B. (1975)
102912 Fredenslund,A., Mollerup,J. (1975)
102931 Kalra,H., Robinson,D.B. (1975)
103328 Abrosimov,V.K., Strakhov,A.N., Krestov,G.A. (1974)
103629 Kay,W.B., Hoffman,R.L., Davies,O. (1975)
104717 Miller,R.C., Staveley,L.A.K. (1976)
104961 Kidnay,A.J., Miller,R.C., Parrish,W.R., Hiza... (1975)
105282 Parrish,W.R., Steward,W.G. (1975)
105715 Hall,K.R., Eubank,P.T., Myerson,A.S., Nixon,... (1975)
105717 Klink,A.E., Cheh,H.Y., Amick,E.H.,Jr. (1975)
106980 Benson,B.B., Krause,D.,Jr. (1976)

107051 Chu,T.-C., Chen,R.J.J., Chappelear,P.S., Kob... (1976)
107053 Davalos,J., Anderson,W.R., Phelps,R.E., Kidn... (1976)
107564 Kulikov,N.E. (1969)
108433 Knapp,H., Schmoelling,K., Neumann,A. (1976)
108496 Miniovich,V.M., Sorina,G.A. (1973)
108496 Miniovich,V.M., Sorina,G.A. (1973)
108496 Miniovich,V.M., Sorina,G.A. (1973)
110896 Hamam,S.E.M., Lu,B.C.-Y. (1976)
110898 Kalra,H., Krishnan,T.R., Robinson,D.B. (1976)
111233 McClure,D.W., Lewis,K.L., Miller,R.C., Stave... (1976)
111245 Hamam,S.E.M., Lu,B.C.-Y. (1976)
111705 Hwang,S.-C., Lin,H.-M., Chappelear,P.S., Kob... (1976)
112414 Khazanova,N.E., Sominskaya,E.E., Zakharova,A... (1976)
114006 Miller,R.C., Kidnay,A.J., Hiza,M.J. (1977)
115116 Kalra,H., Robinson,D.B., Besserer,G.J. (1977)
116899 Krishnan,T.R., Kalra,H., Robinson,D.B. (1977)
117815 Hiza,M.J., Haynes,W.M. (1978)
118306 Grauso,L., Fredenslund,A., Mollerup,J. (1977)
118307 Ohgaki,K., Katayama,T. (1977)
119280 Robinson,D.B., Kalra,H., Krishnan,T., Mirand... (1975)
120297 Tully,P.C., Stroud,L. (1976)
120924 Mraw,S.C., Hwang,S.-C., Kobayashi,R. (1978)
122297 Khazanova,N.E., Sominskaya,E.E., Rozovskii,M.B. (1978)
123894 Somait,F.A., Kidnay,A.J. (1978)
123897 Kalra,H., Ng,H.-J., Miranda,R.D., Robinson,D.B. (1978)
124829 Streett,W.B., Calado,J.C.G. (1978)
125467 Dingrani,J.G., Thodos,G. (1978)
125573 Potter,R.W.,II, Clynne,M.A. (1978)
131999 de Loos,T.W., Wijen,A.J.M, Diepen,G.A.M. (1980)
133074 Calado,J.C.G., Gomes de Azevedo,E.J.S., Soar... (1980)
150002 Clarke,E.C.W., Glew,D.N. (1971)
150012 Tsiklis,D.S., Maslennikova,V.Ya. (1964)
150013 Tsiklis,D.S., Maslennikova,V.Ya. (1965)
150014 Culberson,O.L., McKetta,J.J.,Jr. (1951)
150015 Culberson,O.L., McKetta,J.J.,Jr. (1951)
150017 Eucken,A., Hertzberg,G. (1950)
150018 Bloomer,O.T., Gami,D.C., Parent,J.D. (1953)
150020 Wen,W.-Y., Hung,J.H. (1970)
150021 Shoor,S.K., Walker,R.D.,Jr., Gubbins,K.E. (1969)
150022 Enns,T., Scholander,P.F., Bradstreet,E.D. (1965)
150023 Kresheck,G.C., Schneider,H., Scheraga,H.A. (1965)
150024 Ruetschi,P., Amlie,R.F. (1966)
150025 Benson,B.B., Parker,P.D.M. (1961)
150026 Roellig,L.O., Giese,C. (1962)
150027 Black,C., Joris,G.G., Taylor,H.S. (1948)
150028 Michels,A., Gerver,J., Bijl,A. (1936)
150029 McAuliffe,C. (1963)
150030 Kuenen,J.P., Robson,W.G. (1902)
150031 Wilcock,R.J., Battino,R. (1974)
150032 von Antropoff,A. (1910)
150033 Maass,O., Mennie,J.H. (1926)
150034 Kunerth,W. (1922)
150035 Ben-Naim,A., Wilf,J., Yaacobi,M. (1973)
150036 Ben-Naim,A., Yaacobi,M. (1974)

150037 Feillolay,A., Lucas,M. (1972)
150038 Gardiner,G.E., Smith,N.O. (1972)
150040 Robinson,D.B., Bailey,J.A. (1957)
150041 Robinson,D.B., Hughes,R.E., Sandercock,J.A.W. (1964)
150042 Robinson,D.B., Lorenzo,A.P., Macrygeorgos,C.A. (1959)
150043 Markham,A.E., Kobe,K.A. (1941)
150044 Wiebe,R., Gaddy,V.L. (1940)
150045 Wiebe,R., Gaddy,V.L. (1939)
150046 Wiebe,R., Gaddy,V.L. (1934)
150047 Wiebe,R., Gaddy,V.L. (1935)
150048 Akerloef,G. (1935)
150049 Friedman,H.L. (1954)
150050 Wetlaufer,D.B., Malik,S.K., Stoller,L., Coff... (1964)
150051 Coan,C.R., King,A.D.,Jr. (1971)
150052 Lannung,A. (1930)
150053 Wiebe,R., Gaddy,V.L., Heins,C.,Jr. (1933)
150054 Wiebe,R., Gaddy,V.L. (1941)
150055 Claussen,W.F., Polglase,M.F. (1952)
150056 Grieves,R.B., Thodos,G. (1963)
150057 Reamer,H.H., Olds,R.H., Sage,B.H., Lacey,W.N. (1943)
150058 Jung,J., Knacke,O., Neuschuetz,D. (1971)
150059 Poettmann,F.H., Katz,D.L. (1945)
150060 Dean,M.R., Tooke,J.W. (1946)
150061 Nysewander,C.N., Sage,B.H., Lacey,W.N. (1940)
150062 Kay,W.B. (1940)
150063 Sage,B.H., Lacey,W.N. (1940)
150064 Sage,B.H., Hicks,B.L., Lacey,W.N. (1940)
150065 Nederbragt,G.W. (1938)
150066 Sage,B.H., Webster,D.C., Lacey,W.N. (1936)
150067 Frolich,P.K., Tauch,E.J., Hogan,J.J., Peer,A.A. (1931)
150068 Rigas,T.J., Mason,D.F., Thodos,G. (1958)
150069 Vaughan,W.E., Collins,F.C. (1942)
150070 Olds,R.H., Sage,B.H., Lacey,W.N. (1942)
150071 Olds,R.H., Sage,B.H., Lacey,W.N. (1942)
150072 Sage,B.H., Reamer,H.H., Olds,R.H., Lacey,W.N. (1942)
150073 Olds,R.H., Reamer,H.H., Sage,B.H., Lacey,W.N. (1949)
150074 Goodman,J.B., Krase,N.W. (1931)
150075 Akers,W.W., Attwell,L.L., Robinson,J.A. (1954)
150076 Wiebe,R., Gaddy,V.L, Heins,C.,Jr. (1932)
150077 Reamer,H.H., Sage,B.H. (1957)
150078 Partington,E.J., Rowlinson,J.S., Weston,J.F. (1960)
150079 Connolly,J.F. (1962)
150080 Guter,M., Newitt,D.M., Ruhemann,M. (1940)
150081 Amick,E.H.,Jr., Johnson,W.B., Dodge,B.F. (1952)
150082 Schroeder,W. (1973)
150083 Reamer,H.H., Sage,B.H., Lacey,W.N. (1950)
150084 Danneil,A., Toedheide,K., Franck,E.U. (1967)
150085 Le Breton,J.G., McKetta,J.J. (1964)
150086 Kohn,J.P., Kurata,F. (1959)
150087 Culberson,O.L., McKetta,J.J.,Jr. (1950)
150088 Culberson,O.L., Horn,A.B., McKetta,J.J.,Jr. (1950)
150089 Cady,H.P., Elsey,H.M., Berger,E.V. (1922)
150090 Pollitzer,F., Strebel,E. (1924)
150091 Morrison,T.J., Billett,F. (1952)

150092 Basset,J., Dode,M. (1936)
150093 Reamer,H.H., Sage,B.H., Lacey,W.N. (1953)
150095 Burriss,W.L., Hsu,N.T., Reamer,H.H., Sage,B.H. (1953)
150096 Kay,W.B., Brice,D.B. (1953)
150097 Pray,H.A., Schweickert,C.E., Minnich,B.H. (1952)
150098 Reamer,H.H., Sage,B.H., Lacey,W.N. (1951)
150099 Reamer,H.H., Sage,B.H., Lacey,W.N. (1951)
150100 Toedheide,K., Franck,E.U. (1963)
150101 Vilcu,R., Gainar,I. (1967)
150102 Hirata,M., Suda,S., Hakuta,T., Nagahama,K. (1969)
150103 Hirata,M., Suda,S., Miyashita,R., Hoshino,T. (1970)
150104 Besserer,G.J., Robinson,D.B. (1975)
150105 Gilliland,E.R., Scheeline,H.W. (1940)
150106 Bartholome,E., Friz,H. (1956)
150107 Azarnoosh,A., McKetta,J.J. (1958)
150108 Brooks,W.B., Gibbs,G.B., McKetta,J.J. (1951)
150109 Mills,J.R., Miller,F.J.L. (1945)
150110 Poettmann,F.H., Dean,M.R. (1946)
150111 Bohr,C. (1899)
150114 Morrison,T.J., Johnstone,N.B. (1954)
150115 Kuenen,J.P. (1897)
150116 Price,A.R., Kobayashi,R. (1959)
150117 Sander,W. (1912)
150118 Clever,H.L., Battino,R., Saylor,J.H., Gross,... (1957)
150119 Reamer,H.H., Sage,B.H., Lacey,W.N. (1960)
150120 Yeh,S.-Y., Peterson,R.E. (1964)
150121 Winkler,L.W. (1891)
150122 Fuehner,H. (1924)
150123 Kritschewsky,I.R., Shaworonkoff,N.M., Aepelb... (1936)
150124 Franck,E.U., Toedheide,K. (1959)
150125 Winkler,L.W. (1901)
150126 Winkler,L.W. (1891)
150127 Winkler,L.W. (1892)
150128 Matous,J., Sobr,J., Novak,J.P., Pick,J. (1969)
150129 Farhi,L.E., Edwards,A.W.T., Homma,T. (1963)
150130 Lannung,A., Gjaldbaek,J.C. (1960)
150131 Gjaldbaek,J.C., Niemann,H. (1958)
150132 Haufe,S. (1966)
150133 Christoff,A. (1906)
150134 Estreicher,T. (1899)
150135 Ipatiew,W.W., Drushina-Artemowitsch,S.I., Ti... (1932)
150136 Ahland,E. (1966)
150137 Miksovsky,J., Wichterle,I. (1975)
150138 Lu,B.C.-Y., Chang,S.-D., Elshayal,I.M., Yu,P... (1969)
150139 Miksovsky,J., Wichterle,I. (1975)
150140 Taylor,H.S., Wald,G.W., Sage,B.H., Lacey,W.N. (1939)
150141 Hirata,M., Suda,S., Hakuta,T., Nagahama,K. (1969)
150142 Hirata,M., Suda,S. (1968)
150143 Duffy,J.R., Smith,N.O., Nagy,B. (1961)
150144 Smith,N.O., Kelemen,S., Nagy,B. (1962)
150146 Sultanov,R.G., Skripka,V.G., Namiot,A.Yu. (1972)
150147 Maslennikova,V.Ya., Goryunova,N.P., Subbotin... (1976)
150148 Ipatev,V., Teodorovich,V.P. (1934)
150150 Adeney,W.E., Becker,H.G. (1919)

150151 Fedoritenko,A., Ruhemann,M. (1937)
150152 Meadows,R.W., Spedding,D.J. (1974)
150154 Nosov,E.F., Barlyaev,E.V. (1968)
150155 Ellis,A.J., Golding,R.M. (1963)
150156 Ellis,A.J. (1959)
150157 Takenouchi,S., Kennedy,G.C. (1964)
150159 Klausutis,N. (1968)
150160 Liabastre,A.A. (1974)
150161 Namiot,A.Yu., Beider,S.Ya. (1960)
150162 Ryabtsev,N.I., Khuchua,R.S. (1970)
150163 Sultanov,R.G., Skripka,V.G., Namiot,A.Yu. (1971)
150164 Sultanov,R.G., Skripka,V.G., Namiot,A.Yu. (1972)
150165 Malinin,S.D. (1959)
150166 Nezdoiminoga,N.A. (1968)
150167 Malinin,S.D., Saveleva,N.I. (1972)
150168 Khitarov,N.I., Malinin,S.D. (1958)
150169 Kazaryan,T.S., Ryabtsev,N.I. (1969)
150170 Abou El-Nour,F., Harting,P., Schuetze,H. (1977)
150171 Bierlein,J.A., Kay,W.B. (1953)
150172 de Wet,W.J. (1964)
150173 Fischer,F., Zerbe,C. (1923)
150174 Fox,C.J.J. (1909)
150175 Gonikberg,M.G., Fastowsky,W.G. (1940)
150176 Loprest,F.J. (1957)
150177 Makranczy,J., Megyery-Balog,K., Rusz,L., Pat... (1976)
150178 Murray,C.N., Riley,J.P., Wilson,T.R.S. (1969)
150179 Murray,C.N., Riley,J.P. (1971)
150180 Paratella,A., Sagramora,G. (1959)
150181 Robinson,D.B., Kalra,H. (1974)
150182 Rutherford,W.M. (1962)
150183 Schroeder,W. (1969)
150184 Steckel,F. (1945)
150186 Weiss,R.F. (1974)
150187 Khitarov,N.I., Malinin,S.D. (1956)
150188 Stewart,P.B., Munjal,P.K. (1969)
150189 Suciu,S., Sibbitt,W.L. (1951)
150190 Barsuk,S.D., Benyaminovich,O.A. (1975)
150191 Khodeeva,S.M. (1966)
150192 Ermolaev,M.I., Kapitanov,V.F., Nesterova,A.K... (1971)
150193 Haehnel,O. (1920)
150194 Malinin,S.D. (1971)
150195 Hachmuth,K.H. (1932)
150196 Barton,J.R., Hsu,C.C. (1971)
150197 Besserer,G.J., Robinson,D.B. (1973)
150198 Brandt,L.W., Stroud,L. (1958)
150199 Brewer,J., Rodewald,N., Kurata,F. (1961)
150200 Connolly,J.F. (1966)
150201 Davis,J.E., McKetta,J.J. (1960)
150202 Hayduk,W., Malik,V.K. (1971)
150203 Kay,W.B. (1970)
150204 Martinez-Ortiz,J.A., Manley,D.B. (1978)
150205 McCormick,R.H., Walsh,W.H., Hetrick,S.S., Zu... (1963)
150206 Mehra,V.S., Thodos,G. (1965)
150207 Reed,C.D., McKetta,J.J. (1959)

150208 Rice,P.A., Gale,R.P., Barduhn,A.J. (1976)
150209 Roberts,L.R., McKetta,J.J. (1961)
150210 Stewart,P.B., Munjal,P. (1970)
150211 Verschaffelt,J. (1898)
150212 Verschaffelt,J. (1899)
150213 Yamamoto,S., Alcauskas,J.B., Crozier,T.E. (1976)
150214 Yen,L.C., McKetta,J.J.,Jr. (1962)
150215 Menra,V.S., Thodos,G. (1963)
150220 Hiza,M.J. (1981)
150221 Tsang,C.Y., Streett,W.B. (1981)
150222 Wright,R.H., Maass,O. (1932)
150223 Forman,J.C., Thodos,G. (1962)
150224 Boone,W.J.,Jr., De Vaney,W.E., Miller,J.E. (1962)
150225 De Vaney,W.E., Stroud.,L., Boone,W.J.,Jr. (1964)
150229 Stephan,E.F., Hatfield,N.S., Peoples,R.S., P... (1956)
150232 Douabul,A.A., Riley,J.P. (1979)
150233 Billman,G.W., Sage,B.H., Lacey,W.N. (1948)
150234 Gregory,D.P., Djordjevich,L., Kao,R., Anders... (1973)
150236 Tsang,C.Y., Clancy,P., Calado,J.C.G., Street... (1980)
150237 Kosyakov,N.E., Ryabinkin,V.V., Chobotko,L.L. (1978)
150239 Etter,D.O., Kay,W.B. (1961)
150241 Luker,J.A., Gniewek,T., Johnson,C.A. (1958)
150242 Rigas,T.J., Mason,D.F., Thodos,G. (1959)
150244 Dourson,R.H., Sage,B.H., Lacey,W.N. (1943)
150246 Andrews,T. (1887)
150247 Stutzman,L.F., Brown,G.M. (1949)
150248 DePriester,C.L. (1953)
150250 Selleck,F.T., Carmichael,L.T., Sage,B.H. (1952)
150251 Hanson,G.H., Brown,G.G. (1945)
150255 Sanchez,M., Coll,R. (1978)
150257 Behnke,A.R., Yarbrough,O.D. (1938)
150258 Maslennikova,V.Ya. (1971)
150259 Maslennikova,V.Ya., Vdovina,N.A., Tsiklis,D.S. (1971)
150260 Kay,W.B., Rambosek,G.M. (1953)
150261 Nikitina,I.E., Zhdanovich,L.A., Sirotin,A.G.... (1972)
150262 Seward,T.M., Franck,E.U. (1981)
150264 Yorizane,M., Yoshimura,S., Masuoka,H. (1972)
150266 Yokoyama,K., Ohe,S. (1971)
150268 Mathot,V. (1955)
150269 Zelvenskii,Ya.D. (1937)
150270 Krichevskii,I.R., Khazanova,N.E., Lesnevskay... (1962)
150271 Carter,R.T., Sage,B.H., Lacey,W.N. (1941)
150273 Lee,J.I., Mather,A.E. (1977)
150275 Kalaida,Yu.A., Katkov,Yu.D., Kuznetsov,V.A.,... (1980)
150276 Kozintseva,T.N. (1965)
150278 McClain,R.A.K.W. (1977)
150279 Altunin,V.V., Gvozdkov,A.V., Sosinovskii,V.K. (1974)
150280 Granzhan,V.A. (1974)
150281 Torocheshnikov,N.S., Semenova,V.A. (1954)
150282 Namiot,A.Yu., Bondareva,M.M. (1962)
150283 Toriumi,T., Kaminishi,G. (1968)
150361 Beuschlein,W.L., Simenson,L.O. (1940)
150362 Calingaert,G., Hitchcock,L.B. (1927)
150363 Campbell,W.B., Maass,O. (1930)

150364 Cook,D. (1953)
150369 Ekiner,O., Thodos,G. (1966)
150370 Herlihy,J.C., Thodos,G. (1962)
150371 Rabe,A.E., Harris,J.F. (1963)
150373 Besserer,G.J., Robinson,D.B. (1975)
150374 Miranda,R.D., Robinson,D.B., Kalra,H. (1976)
150375 Polak,J., Lu,B.C.-Y. (1975)
150377 Davis,J.A., Rodewald,N., Kurata,F. (1962)
150378 Kay,W.B., Fisch,H.A. (1958)
150382 Spall,B.C. (1963)
150384 Morgan,O.M., Maass,O. (1931)
150386 Jones,M.E. (1963)
150387 Johnstone,H.F., Leppla,P.W. (1934)
150389 Wiebe,R., Tremearne,T.H. (1934)
150390 Wiebe,R., Tremearne,T.H. (1933)
150391 Wiebe,R., Gaddy,V.L. (1937)
150505 Tsang,C.Y., Streett,W.B. (1981)
150506 Lhotak,V., Wichterle,I. (1981)
150507 Beranek,P., Wichterle,I. (1981)
150508 Neuhausen,B.S., Patrick,W.A. (1921)
150509 Wells,F.L., MacClaren,R.H. (1955)
150510 Vosolsobe,J., Simecek,A., Michalek,J., Kadle... (1965)
150511 Borgstedt,H.H., Gillies,A.J. (1965)
150512 Kuenen,J.P. (1897)
150513 Roberts,O.L., Brownscombe,E.R., Howe,L.S., R... (1941)
150514 Krichevskii,I.R., Khazanova,N.E. (1939)
150515 Levitskaya,E., Pryannikov,K. (1939)
150516 Velikovskii,A.S., Stepanova,G.S., Vybornova,... (1964)
150517 Krasheninnikov,S.A., Golubev,S.S., Sabaev,I.Ya. (1960)
150518 Ginzburg,D.M., Pikulina,N.S., Litvin,V.P. (1966)
150519 Wucherer,J. (1932)
150520 Krichevsky,I., Ziclis,D. (1943)
150521 Kritschewsky,I., Bolshakov,P. (1941)
150522 Robinson,D.B., Besserer,G.J. (1972)
150523 Rigas,T.J., Mason,D.F., Thodos,G. (1958)
150524 Glowka,S. (1972)
150525 Wehe,A.H., McKetta,J.J. (1961)
150526 Kueffer,A. (1962)
150527 Wiebe,R., Gaddy,V.L., Heins,C.,Jr. (1932)
150528 Dvorak,K., Boublik,T. (1963)
150529 Selleck,F.T., Reamer,H.H., Sage,B.H. (1953)
150530 Kobayashi,R., Katz,D.L. (1953)
150531 Reamer,H.H., Sage,B.H., Lacey,W.N. (1952)
150532 Stone,H.W. (1943)
150533 Sage,B.H., Backus,H.S., Vermeulen,T. (1936)
150534 Lindroos,A.E., Dodge,B.F. (1952)
150535 Hudson,J.C. (1926)
150536 Wilson,T.A. (1925)
150537 Boexkes,W., Emig,G. (1969)
150538 Mittasch,A., Kuss,E., Schlueter,H. (1926)
150539 Wrewsky,M. (1924)
150540 Kuenen,J.P. (1897)
150541 Caubet,F. (1904)
150542 Clifford,I.L., Hunter,E. (1933)

150543 Reamer,H.H., Sage,B.H. (1959)
150544 Reamer,H.H., Sage,B.H. (1959)
150545 Reamer,H.H., Olds,R.H., Sage,B.H., Lacey,W.N. (1944)
150546 Dean,M.R., Walls,W.S. (1947)
150547 Dornte,R.W., Ferguson,C.V. (1939)

NBS-114A (REV. 2-8C)

U.S. DEPT. OF COMM. BIBLIOGRAPHIC DATA SHEET (See instructions)	1. PUBLICATION OR REPORT NO. NBSIR 83-1692	2. Performing Organ. Report No.	3. Publication Date June 1983

4. TITLE AND SUBTITLE

Compilation and Evaluation of Available Data on Phase Equilibria of Natural and Synthetic Gas Mixtures

5. AUTHOR(S)

F. R. Williamson and N. A. Olien

6. PERFORMING ORGANIZATION (If joint or other than NBS, see instructions)

NATIONAL BUREAU OF STANDARDS
DEPARTMENT OF COMMERCE
WASHINGTON, D.C. 20234

7. Contract/Grant No.

8. Type of Report & Period Covered

9. SPONSORING ORGANIZATION NAME AND COMPLETE ADDRESS (Street, City, State, ZIP)

Gas Research Institute
8600 West Bryn Mawr Avenue
Chicago, IL 60631

10. SUPPLEMENTARY NOTES

☐ Document describes a computer program; SF-185, FIPS Software Summary, is attached.

11. ABSTRACT (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here)

This report summarizes the results of a two-year effort to identify, compile, and evaluate the data available in the open literature for the liquid-vapor equilibria for binary and multicomponent mixtures of He, H_2, C_1 - C_5 alkanes, N_2, CO, CO_2, NH_3, H_2S, H_2O, CS_2, COS, HCN, NO_x and SO_x. There were 276 binary systems relevant to the gas industry. The result of the evaluation is that there are: 46 systems for which data are imperative and 104 systems for which data are needed but not imperative. The report lists the data needs in temperature and pressure range for each system for both Priority 1 and 2. The report includes three appendices: A - a listing of the ranges and quality of all available data for binary systems; B - the same for all multicomponent systems; and C - a complete bibliography of the 543 citations identified in the project.

12. KEY WORDS (Six to twelve entries; alphabetical order; capitalize only proper names; and separate key words by semicolons)

bibliography; compilation; evaluation; liquid-vapor equilibrium; natural gas; phase equilibrium; synthetic natural gas.

13. AVAILABILITY

☒ Unlimited

☐ For Official Distribution. Do Not Release to NTIS

☐ Order From Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

☒ Order From National Technical Information Service (NTIS), Springfield, VA. 22161

14. NO. OF PRINTED PAGES

181

15. Price

$17.50

USCOMM-DC 6043-P80

☆U.S. GOVERNMENT PRINTING OFFICE:1983—679-781 / 332