COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Krypton; Kr; 7439-90-9 2. Undecafluoro(trifluoromethyl)-cyclohexane (Perfluoromethylcyclohexane); C_7F_{14}; 355-02-2	Clever, H.L.; Saylor, J.H.; Gross, P.M. J. Phys. Chem. 1958, 62, 89-91.
VARIABLES: T/K: 289.15 - 316.25 Total P/kPa: 101.325 (1 atm)	PREPARED BY: P.L. Long

EXPERIMENTAL VALUES:

T/K	Mol Fraction $X_1 \times 10^3$	Bunsen Coefficient α	Ostwald Coefficient L
289.15	9.06	1.058	1.12
303.15	8.08	0.925	1.027
316.25	7.77	0.872	1.01

Smoothed Data: $\Delta G^o/J\ mol^{-1} = -RT \ln X_1 = -4302.3 + 54.078\ T$

Std. Dev. ΔG^o = 46.1, Coef. Corr. = 0.9980

$\Delta H^o/J\ mol^{-1} = -4302.3$, $\Delta S^o/J\ K^{-1}\ mol^{-1} = -54.078$

T/K	Mol Fraction $X_1 \times 10^3$	$\Delta G^o/J\ mol^{-1}$
288.15	9.02	11,280
293.15	8.75	11,551
298.15	8.49	11,821
303.15	8.25	12,091
308.15	8.03	12,362
313.15	7.81	12,632
318.15	7.61	12,903

The solubility values were adjusted to a partial pressure of krypton of 101.325 kPa (1 atm) by Henry's law.

The Bunsen coefficients were calculated by the compiler.

AUXILIARY INFORMATION

METHOD:

Volumetric. The apparatus (1) is a modification of that used by Morrison and Billett (2). Modifications include the addition of a spiral solvent storage tubing, a manometer for constant reference pressure, and an extra gas buret for highly soluble gases.

SOURCE AND PURITY OF MATERIALS:

1. Krypton. Matheson Co., Inc. Both standard and research grades were used.

2. Perfluoromethylcyclohexane. du Pont FCS-326, shaken with concentrated H_2SO_4, washed, dried over Drierite and distilled.

b.p. 75.95 to 76.05° at 753 mm., lit. b.p. 76.14 at 760 mm.

APPARATUS/PROCEDURE:

(a) Degassing. 700 ml of solvent is shaken and evacuated while attached to a cold trap, until no bubbles are seen; solvent is then transferred through a 1 mm capillary tubing, released as a fine mist into a continuously evacuated flask. (b) Solvent is saturated with gas as it flows through 8 mm x 180 cm of tubing attached to a gas buret. Pressure is maintained at 1 atm as the gas is absorbed.

ESTIMATED ERROR:

$\delta T/K = 0.05$

$\delta P/mmHg = 3$

$\delta X_1/X_1 = 0.03$

REFERENCES:

1. Clever, H.L.; Battino, R.; Saylor, J.H.; Gross, P.M. J. Phys. Chem. 1957, 61, 1078.

2. Morrison, T.J.; Billett, F. J. Chem. Soc. 1948, 2033; ibid. 1952, 3819.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Krypton; Kr; 7439-90-9 2. Dichlorodifluoromethane (Freon-12); CCl_2F_2; 75-71-8	Steinberg, M.; Manowitz, B.; Pruzansky, J. US AEC BNL-542 (T-140). Chem. Abstr. 1959, 53, 21242g.
VARIABLES:	PREPARED BY:
T/K: 190.15 - 273.15	H.L. Clever

EXPERIMENTAL VALUES:

T/K	Absorption Coefficient	Henry's Constant K/atm	Mol Fraction $X_1 \times 10^2$	Bunsen Coefficient α	Ostwald Coefficient L
190.15	13.9	--	4.32	13.2	9.2
193.15	12.6	--	3.76	11.9	8.4
197.65	11.3	--	3.42	10.7	7.7_5
203.15	--	32.5	3.08	--	--
244.15	5.1	--	1.72	4.8	4.3
260.85	--	86	1.16	--	--
273.15	2.4	108	0.925 0.89	2.3	2.3

Smoothed Data: $\Delta G^o/J\ mol^{-1} = -RT \ln X_1 = -7772.6 + 67.346\ T$

Std. Dev. $\Delta G^o = 69.5$, Coef. Corr. = 0.9997

$\Delta H^o/J\ mol^{-1} = -7{,}772.6$, $\Delta S^o/J\ K^{-1}\ mol^{-1} = 0.9997$

T/K	Mol Fraction $X_1 \times 10^2$	$\Delta G^o/J\ mol^{-1}$
193.15	3.84	5,235.4
203.15	3.02	5,908.8
213.15	2.44	6,582.3
223.15	2.00	7,225.8
233.15	1.67	7,929.2
243.15	1.41	8,602.7
253.15	1.22	9,276.2
263.15	1.06	9,949.7
273.15	0.93	10,623

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Dynamic tracer technique (1). The Henry's constant is

$$K = (P/atm)/X_1.$$

The Henry's constants are probably from data smoothed by the authors.

The report is discussed further in a later paper (2).

SOURCE AND PURITY OF MATERIALS:

1. Krypton.
2. Dichlorodifluoromethane.

ESTIMATED ERROR:

$\delta X/X = 0.03 - 0.05$ (Compiler)

REFERENCES:

1. Steinberg, M.; Manowitz, B. Ind. Eng. Chem. 1959, 51, 47.
2. Steinberg, M. US AEC TID-7593, 1959, 217-218. Chem. Abstr. 1961, 55, 9083e.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Krypton; Kr; 7439-90-9 2. Halogenated Methanes	Körösy, F. Trans. Faraday Soc. 1937, 33, 416-425.
VARIABLES: T/K: 273.15 - 295.15 P/kPa: 101.325 (1 atm)	PREPARED BY: H.L. Clever

EXPERIMENTAL VALUES:

T/K	Mol Fraction $X_1 \times 10^3$	Bunsen Coefficient α	Ostwald Coefficient L
Trichloromethane (Chloroform); $CHCl_3$; 67-66-3			
273.15	3.4	0.97	0.97
294.15	3.35	0.938	1.01
Tetrachloromethane (Carbon Tetrachloride); CCl_4; 56-23-5			
273.15	5.02	1.20	1.20
294.15	5.22	1.22	1.31
Tribromomethane (Bromoform); $CHBr_3$; 75-25-2			
295.15	3.01	0.43	0.46

The mole fraction solubility and the Bunsen coefficient were calculated by the compiler. It was assumed that gas behavior is ideal, the Ostwald coefficient is independent of pressure, and that Henry's law is obeyed.

AUXILIARY INFORMATION

METHOD:	SOURCE AND PURITY OF MATERIALS:
The apparatus and method of Winkler (1) were used. However, the apparatus was usually not thermostated, and degassing was by evacuating and shaking the solvent, not by evacuating and boiling the solvent as was done by Winkler.	1. Krypton. Source not given. The gas contained 5% xenon and 1% non-inert gases. 2. Solvents. No information.
APPARATUS/PROCEDURE:	ESTIMATED ERROR: $\delta X_1/X_1 = 0.05$
	REFERENCES: 1. Winkler, L.W. Ber. 1891, 24, 89.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Krypton; Kr; 7439-90-9 2. Fluorobenzene; C_6H_5F; 462-06-6	Saylor, J.H.; Battino, R. J. Phys. Chem. 1958, 62, 1334-1337.
VARIABLES: T/K: 288.15 - 328.15 P/kPa: 101.325 (1 atm)	PREPARED BY: H.L. Clever, A.L. Cramer

EXPERIMENTAL VALUES:

T/K	Mol Fraction $X_1 \times 10^3$	Bunsen Coefficient α	Ostwald Coefficient L
288.15	3.47	0.834	0.880
298.15	3.36	0.798	0.871
313.15	3.13	0.731	0.838
328.15	2.96	0.678	0.814

Smoothed Data: $\Delta G^o/J\ mol^{-1} = -RT \ln X_1 = -3210.3 + 58.186\ T$

Std. Dev. ΔG^o = 13.2, Coef. Corr. = .9999

$\Delta H^o/J\ mol^{-1} = -3210.3$, $\Delta S^o/J\ K^{-1}\ mol^{-1} = -58.186$

T/K	Mol Fraction $X_1 \times 10^3$	$\Delta G^o/J\ mol^{-1}$
288.15	3.49	13,556
293.15	3.41	13,847
298.15	3.33	14,138
303.15	3.26	14,429
308.15	3.20	14,720
313.15	3.13	15,011
318.15	3.07	15,302
323.15	3.02	15,593
328.15	2.96	15,884

Solubility values were adjusted to a partial pressure of krypton of 101.325 kPa (1 atm) by Henry's law. Bunsen coefficients were calculated by the compiler.

AUXILIARY INFORMATION

METHOD /APPARATUS/PROCEDURE:

The solvent was degassed by evacuating the space above it, shaking, and then passing it as a fine mist into another evacuated container. The degassed liquid was saturated as it passed as a thin film inside a glass helix which contained the solute gas plus solvent vapor at a total pressure of 1 atm (1,2). The volume of liquid and the volume of gas absorbed are determined in a system of burets.

SOURCE AND PURITY OF MATERIALS:

1. Krypton. Linde Air Products Co.
2. Fluorobenzene. Eastman Kodak Co., white label. Dried over P_4O_{10}, distilled, b.p. 84.28 - 84.68°C.

ESTIMATED ERROR:

$\delta T/K = 0.03$
$\delta P/mmHg = 1.0$
$\delta X_1/X_1 = 0.005$ (authors)

REFERENCES:

1. Morrison, T.J.; Billett, F. J. Chem. Soc. 1948, 2033.
2. Clever, H.L.; Battino, R.; Saylor, J.H.; Gross, P.M. J. Phys. Chem. 1957, 61, 1078.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Krypton; Kr; 7439-90-9 2. Hexafluorobenzene; C_6F_6; 392-56-3	Evans, F. D.; Battino, R. J. Chem. Thermodyn. 1971, 3, 753-760.
VARIABLES: T/K: 282.91 - 297.92 P/kPa: 101.325 (1 atm)	PREPARED BY: H. L. Clever

EXPERIMENTAL VALUES:

T/K	Mol Fraction $X_1 \times 10^3$	Bunsen Coefficient α	Ostwald Coefficient L
282.91	6.45	1.286	1.332
283.09	6.42	1.279	1.326
297.76	5.92	1.155	1.259
297.92	5.89	1.148	1.252

Smoothed Data: $\Delta G°/J\ mol^{-1} = - RT \ln X_1 = -4,063.6 + 56.302\ T$

Std. Dev. $\Delta G°$ = 4.9, Coef. Corr. = 0.9999

$\Delta H°/J\ mol^{-1}$ = -4063.6, $\Delta S°/J\ K^{-1}\ mol^{-1}$ =-56.302

T/K	Mol Fraction $X_1 \times 10^3$	$\Delta G°/J\ mol^{-1}$
278.15	6.64	11,597
283.15	6.44	11,878
288.15	6.25	12,160
293.15	6.07	12,441
298.15	5.90	12,723

The solubility values were adjusted to a partial pressure of krypton of 101.325 kPa (1 atm) by Henry's law.

The Bunsen coefficients were calculated by the compiler.

AUXILIARY INFORMATION

METHOD /APPARATUS/PROCEDURE:

The solubility apparatus is based on the design of Morrison and Billett (1) and the version used is described by Battino, Evans, and Danforth (2). The degassing apparatus is that described by Battino, Banzhof, Bogan, and Wilhelm (3).

Degassing. Up to 500 cm^3 of solvent is placed in a flask of such size that the liquid is about 4 cm deep. The liquid is rapidly stirred and the vacuum is applied intermittently through a liquid N_2 trap until the permanent gas residual pressure drops to 5 microns.

Solubility Determination. The degassed solvent is passed in a thin film down a glass spiral tube containing solute gas plus the solvent vapor at a total pressure of one atm. The volume of gas absorbed is found by difference between the initial and final volumes in the buret system. The solvent is collected in a tared flask and weighed.

SOURCE AND PURITY OF MATERIALS:

1. Krypton. Either Air Products & Chemicals or Matheson. Better than 99 mol % (usually 99.9+)

2. Hexafluorobenzene. Imperial Smelting Co., Avonmouth, U.K. GC purity 99.7%, density at 25° C 1.60596 g cm^{-3}. Purified by method in Anal. Chem. 1968, 40, 224.

ESTIMATED ERROR:

$\delta T/K = 0.03$
$\delta P/mmHg = 0.5$
$\delta X_1/X_1 = 0.015$

REFERENCES:

1. Morrison, T. J.; Billett, F. J. Chem. Soc. 1948, 2033.
2. Battino, R.; Evans, F. D.; Danforth, W. F. J. Am. Oil Chem. Soc. 1968, 45, 830.
3. Battino, R.; Banzhof, M.; Bogan, M.; Wilhelm, E. Anal. Chem. 1971, 43, 806.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Krypton; Kr; 7439-90-9 2. Chlorobenzene; C_6H_5Cl; 108-90-7	Saylor, J.H.; Battino, R. J. Phys. Chem. 1958, 62, 1334-1337.
VARIABLES: T/K: 288.15 - 328.15 P/kPa: 101.325 (1 atm)	PREPARED BY: H.L. Clever, A.L. Cramer

EXPERIMENTAL VALUES:

T/K	Mol Fraction $X_1 \times 10^3$	Bunsen Coefficient α	Ostwald Coefficient L
288.15	2.84	0.629	0.664
298.15	2.75	0.604	0.659
313.15	2.56	0.553	0.634
328.15	2.44	0.520	0.625

Smoothed Data: $\Delta G^o/J\ mol^{-1} = -RT \ln X_1 = -3079.8 + 59.412\ T$

Std. Dev. ΔG^o = 13.8, Coef. Corr. = .9999

$\Delta H^o/J\ mol^{-1} = -3079.8$, $\Delta S^o/J\ K^{-1}\ mol^{-1} = -59.412$

T/K	Mol Fraction $X_1 \times 10^3$	$\Delta G^o/J\ mol^{-1}$
288.15	2.85	14,040
293.15	2.79	14,337
298.15	2.73	14,634
303.15	2.67	14,931
308.15	2.62	15,228
313.15	2.57	15,525
318.15	2.53	15,822
323.15	2.48	16,119
328.15	2.44	16,416

Solubility values were adjusted to a partial pressure of krypton of 101.325 kPa (1 atm) by Henry's law. Bunsen coefficients were calculated by the compiler.

AUXILIARY INFORMATION

METHOD /APPARATUS/PROCEDURE:

The solvent was degassed by evacuating the space above it, shaking, and then passing it as a fine mist into another evacuated container. The degassed liquid was saturated as it passed as a thin film inside a glass helix which contained the solute gas plus solvent vapor at a total pressure of 1 atm (1,2). The volume of the liquid and the volume of gas absorbed were determined in a system of burets.

SOURCE AND PURITY OF MATERIALS:

1. Krypton. Linde Air Products Co.
2. Chlorobenzene. Eastman Kodak Co., white label. Dried over P_4O_{10}, distilled, b.p. 131.67 - 131.71°C.

ESTIMATED ERROR:

$\delta T/K = 0.03$

$\delta P/mmHg = 1.0$

$\delta X_1/X_1 = 0.005$ (authors)

REFERENCES:

1. Morrison, T.J.; Billett, F. J. Chem. Soc. 1948, 2033.
2. Clever, H.L.; Battino, R.; Saylor, J.H.; Gross, P.M. J. Phys. Chem. 1957, 61, 1078.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Krypton; Kr; 7439-90-9 2. 1,4-Dimethylbenzene (p-Xylene); C_8H_{10}; 106-42-3 3. 1,4-Dichlorobenzene; $C_6H_4Cl_2$; 106-46-7	Clever, H. L. J. Phys. Chem. 1957, 61, 1082 - 1083.
VARIABLES: T/K: 303.15 P/kPa: 101.325 (1 atm) 1,4-Dichlorobenzene/X_3: 0 - 0.455	PREPARED BY: C. E. Eddelman A. L. Cramer

EXPERIMENTAL VALUES:

T/K	1,4-Dichlorobenzene Mol Fraction X_3	Mol Fraction $X_1 \times 10^3$	Bunsen Coefficient α	Ostwald Coefficient L
303.15	0.0	3.81	0.687	0.762
	0.170	3.56	0.652	0.724
	0.310	3.32	0.566	0.628
	0.455	3.10	0.583	0.647

The mole fraction solubility of krypton correlates well in a linear function with the mole fraction of 1,4-dichlorobenzene in the mixed solvent.

$$X_1 \times 10^3 = 3.815 - 1.573\ X_3 \qquad (r = 0.9996)$$

The solubility values were adjusted to a partial pressure of krypton of 101.325 kPa (1 atm) by Henry's law.

The Bunsen coefficients were calculated by the compiler.

AUXILIARY INFORMATION

METHOD:

Volumetric. The solvent is saturated with gas as it flows through an 8 mm x 180 cm glass helix attached to a gas buret. The total pressure of solute gas plus solvent vapor is maintained at 1 atm as the gas is absorbed.

SOURCE AND PURITY OF MATERIALS:

1. Krypton. Linde Air Products Co.
2. 1,4-Dimethylbenzene. Eastman Kodak white label. Distilled.
3. 1,4-Dichlorobenzene. Eastman Kodak white label. Recrytalized twice from methanol, dried in air.

APPARATUS/PROCEDURE:

The apparatus is a modification of the apparatus of Morrison and Billett (1). The modifications include the addition of a helical storage for the solvent, a manometer for a reference pressure, and an extra buret for highly soluble gases. The solvent is degassed by a modification of the method of Baldwin and Daniel (2).

ESTIMATED ERROR:

$\delta T/K = 0.05$
$\delta P/mmHg = 3$
$\delta X_1/X_1 = 0.03$

REFERENCES:

1. Morrison, T.J.; Billett, F. J. Chem. Soc. 1948, 2033; Ibid. 1952, 3819.
2. Baldwin, R.R.; Daniel, S.G. J. Appl. Chem. 1952, 2, 161.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Krypton; Kr; 7439-90-9 2. Bromobenzene; C_6H_5Br; 108-86-1	Saylor, J.H.; Battino, R. J. Phys. Chem. 1958, 62, 1334-1337.
VARIABLES: T/K: 288.15 - 328.15 P/kPa: 101.325 (1 atm)	PREPARED BY: H.L. Clever, A.L. Cramer

EXPERIMENTAL VALUES:

T/K	Mol Fraction $X_1 \times 10^3$	Bunsen Coefficient α	Ostwald Coefficient L
288.15	2.38	0.510	0.538
298.15	2.29	0.487	0.532
313.15	2.14	0.448	0.514
328.15	2.04	0.423	0.508

Smoothed Data: $\Delta G^o/J\ mol^{-1} = -RT \ln X_1 = -3085.7 + 60.924\ T$

Std. Dev. $\Delta G^o = 9.1$, Coef. Corr. = .9999

$\Delta H^o/J\ mol^{-1} = -3085.7$, $\Delta S^o/J\ K^{-1}\ mol^{-1} = -60.924$

T/K	Mol Fraction $X_1 \times 10^3$	$\Delta G^o/J\ mol^{-1}$
288.15	2.38	14,470
293.15	2.33	14,774
298.15	2.28	15,079
303.15	2.24	15,383
308.15	2.19	15,688
313.15	2.15	15,993
318.15	2.11	16,297
323.15	2.07	16,602
328.15	2.04	16,907

Solubility values were adjusted to a partial pressure of krypton of 101.325 kPa (1 atm) by Henry's law. Bunsen coefficients were calculated by the compiler.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

The solvent was degassed by evacuating the space above it, shaking, and then passing it as a fine mist into another evacuated container. The degassed liquid was saturated as it passed as a thin film inside a glass helix which contained the solute gas plus solvent vapor at a totalpressure of 1 atm (1,2).The volume of liquid and the volume of gas absorbed are determined in a system of burets.

SOURCE AND PURITY OF MATERIALS:

1. Krypton. Linde Air Products Co.
2. Bromobenzene. Eastman Kodak Co., white label. Dried over P_4O_{10}, distilled, b.p. 155.86 - 155.90°C.

ESTIMATED ERROR:

$\delta T/K = 0.03$
$\delta P/mmHg = 1.0$
$\delta X_1/X_1 = 0.005$ (authors)

REFERENCES:

1. Morrison, T.J.; Billett, F. J. Chem. Soc. 1948, 2033.
2. Clever, H.L.; Battino, R.; Saylor, J.H.; Gross, P. M. J. Phys. Chem. 1957, 61, 1078.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Krypton; Kr; 7439-90-9 2. 1,4-Dimethylbenzene (p-Xylene); C_8H_{10}; 106-42-3 3. 1,4-Dibromobenzene; $C_6H_4Br_2$; 106-37-6	Clever, H.L. J. Phys. Chem. 1957, 61, 1082-1083.
VARIABLES: T/K: 303.15 P/kPa: 101.325 (1 atm) 1,4-Dibromobenzene/X_3: 0-0.255	PREPARED BY: C.E. Eddleman A.L. Cramer

EXPERIMENTAL VALUES:

T/K	1,4-Dibromobenzene Mol Fraction X_3	Mol Fraction $X_1 \times 10^3$	Bunsen Coefficient α	Ostwald Coefficient L
303.15	0.0	3.81	0.687	0.762
	0.130	3.41	0.618	0.686
	0.255	3.13	0.569	0.631

The solubility values were adjusted to a partial pressure of krypton of 101.325 kPa (1 atm) by Henry's law.

The Bunsen coefficients were calculated by the compiler.

AUXILIARY INFORMATION

METHOD:

Volumetric. The solvent is saturated with gas as it flows through an 8 mm x 180 cm glass helix attached to a gas buret. The total pressure of solute gas plus solvent vapor is maintained at 1 atm as the gas is absorbed.

SOURCE AND PURITY OF MATERIALS:

1. Krypton. Linde Air Products Co.
2. 1,4-Dimtheylbenzene. Eastman Kodak white label. Distilled.
3. 1,4-Dibromobenzene. Eastman Kodak white label. Recrystallized twice and dried in air.

APPARATUS/PROCEDURE:

The apparatus is a modification of the apparatus of Morrison and Billett (1). The modifications include the addition of a helical storage for the solvent, a manometer for a reference pressure, and an extra buret for highly soluble gases. The solvent is degassed by a modification of the method of Baldwin and Daniel (2).

ESTIMATED ERROR:

$\delta T/K = 0.05$
$\delta P/mmHg = 3$
$\delta X_1/X_1 = 0.03$

REFERENCES:

1. Morrison, T.J.; Billett, F. J. Chem. Soc. 1948, 2033; ibid. 1952, 3819.
2. Baldwin, R.R.; Daniel, S.G. J. Appl. Chem. 1952, 2, 161.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Krypton; Kr; 7439-90-9 2. Iodobenzene; C_6H_5I; 591-50-4	Saylor, J.H.; Battino, R. J. Phys. Chem. 1958, 62, 1334-1337.
VARIABLES: T/K: 288.15 - 328.15 P/kPa: 101.325 (1 atm)	PREPARED BY: H.L. Clever, A.L. Cramer

EXPERIMENTAL VALUES:

T/K	Mol Fraction $X_1 \times 10^3$	Bunsen Coefficient α	Ostwald Coefficient L
288.15	1.73	0.349	0.368
298.15	1.70	0.339	0.370
313.15	1.63	0.322	0.369
328.15	1.58	0.309	0.371

Smoothed Data: $\Delta G^o/J\ mol^{-1} = -RT \ln X_1 = -1841.9 + 59.241\ T$

Std. Dev. ΔG^o = 8.8, Coef. Corr. = .9999

$\Delta H^o/J\ mol^{-1} = -1841.9$, $\Delta S^o/J\ K^{-1}\ mol^{-1} = -59.241$

T/K	Mol Fraction $X_1 \times 10^3$	$\Delta G^o/J\ mol^{-1}$
288.15	1.74	15,228
293.15	1.71	15,525
298.15	1.69	15,821
303.15	1.67	16,117
308.15	1.65	16,413
313.15	1.63	16,709
318.15	1.61	17,006
323.15	1.60	17,302
328.15	1.58	17,598

Solubility values were adjusted to a partial pressure of krypton of 101.325 kPa (1 atm) by Henry's law. Bunsen coefficients were calculated by the compiler.

AUXILIARY INFORMATION

METHOD /APPARATUS/PROCEDURE:

The solvent was degassed by evacuating the space above it, shaking, and then passing it as a fine mist into another evacuated container. The degassed liquid was saturated as it passed as a thin film inside a glass helix which contained the solute gas plus solvent vapor at a total pressure of 1 atm (1,2). The volume of liquid and the volume of gas absorbed are determined in a system of burets.

SOURCE AND PURITY OF MATERIALS:

1. Krypton. Linde Air Products Co.
2. Iodobenzene. Eastman Kodak white label. Shaken with aq. $Na_2S_2O_3$, dried over P_4O_{10}, distilled. b.p. 77.40 - 77.60°C (20 mmHg).

ESTIMATED ERROR:

$\delta T/K = 0.03$

$\delta P/mmHg = 1.0$

$\delta X_1/X_1 = 0.005$ (authors)

REFERENCES:

1. Morrison, T.J.; Billett, F. J. Chem. Soc. 1948, 2033.
2. Clever, H.L.; Battino, R.; Saylor, J.H.; Gross, P.M. J. Phys. Chem. 1957, 61, 1078.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Krypton; Kr; 7439-90-9 2. 1,4-Dimethylbenzene (p-Xylene); C_8H_{10}; 106-42-3 3. 1,4-Diiodobenzene; $C_6H_4I_2$; 624-38-4	Clever, H.L. J. Phys. Chem. 1957, 61, 1082-1083.
VARIABLES: T/K: 303.15 P/kPa: 101.325 (1 atm) 1,4-Diiodobenzene/X_3: 0-0.078	PREPARED BY: C.E. Eddleman A.L. Cramer

EXPERIMENTAL VALUES:

T/K	1,4-Diiodobenzene Mol Fraction X_3	Mol Fraction $X_1 \times 10^3$	Bunsen Coefficient α	Ostwald Coefficient L
303.15	0.0	3.81	0.687	0.762
	0.078	3.48	0.626	0.695

The solubility values were adjusted to a partial pressure of krypton of 101.325 kPa (1 atm) by Henry's law.

The Bunsen coefficients were calculated by the compiler.

AUXILIARY INFORMATION

METHOD:

Volumetric. The solvent is saturated with gas as it flows through an 8 mm x 180 cm glass helix attached to a gas buret. The total pressure of solute gas plus solvent vapor is maintained at 1 atm as the gas is absorbed.

SOURCE AND PURITY OF MATERIALS:

1. Krypton. Linde Air Products Co.
2. 1,4-Dimethylbenzene. Eastman Kodak white label. Distilled.
3. 1,4-Diiodobenzene. Eastman Kodak white label. Recrystallized twice and dried in air.

APPARATUS/PROCEDURE:

The apparatus is a modification of the apparatus of Morrison and Billett (1). The modifications include the addition of a helical storage for the solvent, a manometer for a reference pressure, and an extra buret for highly soluble gases. The solvent is degassed by a modification of the method of Baldwin and Daniel (2).

ESTIMATED ERROR:

$\delta T/K = 0.05$
$\delta P/mmHg = 3$
$\delta X_1/X_1 = 0.03$

REFERENCES:

1. Morrison, T.J.; Billett, F. J. Chem. Soc. 1948, 2033; Ibid. 1952, 3819.
2. Baldwin, R.R.; Daniel, S.G. J. Appl. Chem. 1952, 2, 161.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Krypton; Kr; 7439-90-9 2. 1,1,2,2,3,3,4,4,4-nonafluoro-N, N-bis (nonafluorobutyl)-1-butanamine (Perfluorotributylamine); $(C_4F_9)_3N$; 311-89-7	Powell, R.J. J. Chem. Eng. Data 1972, 17, 302-304.
VARIABLES: T/K: 298.15 P/kPa: 101.325 (1 atm)	PREPARED BY: P.L. Long

EXPERIMENTAL VALUES:

T/K	Mol Fraction $X_1 \times 10^3$	Bunsen Coefficient α	Ostwald Coefficient L	$R\frac{\Delta \log x_1}{\Delta \log T} = N$
298.15	11.15	0.708	0.773	-3.30

The author implies that solubility measurements were made between 288.15 and 318.15 K, but only the solubility at 298.15 was given in the paper. The slope $R(\Delta \log x_1/\Delta \log T)$ was given. The smoothed data below were calculated by the compiler from the slope in the form:

$$\log x_1 = \log(11.15 \times 10^{-3}) + (-3.30/R)\log(T/298.15)$$

with $R = 1.9872$ cal K^{-1} mol^{-1}.

Smoothed Data:

T/K	Mol Fraction $X_1 \times 10^3$
288.15	11.81
293.15	11.47
298.15	11.15
303.15	10.85
308.15	10.55
313.15	10.28
318.15	10.01

The Bunsen and Ostwald Coefficients were calculated by the compiler.

AUXILIARY INFORMATION

METHOD /APPARATUS/PROCEDURE:

Solvent is degassed by freezing and pumping, then boiling under reduced pressure. The Dymond and Hildebrand (1) apparatus, with all glass pumping system, is used to spray slugs of degassed solvent into the krypton. Amount of gas dissolved is calculated from the initial and final gas pressure.

SOURCE AND PURITY OF MATERIALS:

1. Krypton. No source. Manufacturer's research grade, dried over $CaCl_2$ before use.

2. Perfluorotributylamine. Minnesota Mining & Mfg. Co. Column distilled, used portion with b.p. = 447.85 - 448.64K, & single peak GC.

ESTIMATED ERROR:

δN /cal K^{-1} mol^{-1} = 0.1

$\delta X_1/X_1$ = 0.002

REFERENCES:

1. Dymond, J.; Hildebrand, J.H. Ind. Eng. Chem. Fundam. 1967, 6, 130.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Krypton; Kr; 7439-90-9 ^{85}Kr; 13983-27-2 2. Carbon Dioxide; CO_2; 124-38-9	Notz, K. J.; Meservey, A. B. ORNL-5121, June 1976 Chem. Abstr. 1977, 86, 61170c, 79549t.
VARIABLES: T/K: 223.15 - 301.15	PREPARED BY: A. L. Cramer H. L. Clever

EXPERIMENTAL VALUES:

T/K	Mol Fraction $X_1 \times 10^3$	Bunsen Coefficient α	Ostwald Coefficient L
223.15	5.72	3.370	2.75
233.15	5.48	3.126	2.67
243.15	5.26	2.894	2.57
253.15	5.26	2.771	2.57
263.15	5.38	2.701	2.60
273.15	5.61	2.655	2.66
283.15	6.00	2.642	2.74
293.15	6.51	2.564	2.75
297.15	6.97	2.567	2.79
301.15	8.46	2.808	3.10

The mole fraction solubility at a krypton partial pressure of 101.325 kPa (1 atm) was calculated by the compiler.

A smoothed data fit with thermodynamic values for the transfer of one mole of krypton from the gas at 101.325 kPa to the hypothetical unit mole fraction krypton liquid is on the next page. The mole fraction solubility value at 301.15 K was not included in the smoothed data fit.

Another report (1) on this system gives values lower by a factor of 2. The results are thought to be in error because of a systematic sampling error.

AUXILIARY INFORMATION

METHOD:

Tracer technique. Collimated counter with equilibrated gas-liquid samples. Krypton gas was 5 per cent $^{85}Krypton$ and 95 per cent stable Kr. The total pressure of the system was the equilibrium pressure of liquid CO_2 + the Kr pressure.

SOURCE AND PURITY OF MATERIALS:

1. Krypton. Cryogenic Rare Gas Labs. Ultra high purity grade. Krypton-85. Isotopes Div., ORNL.
2. Carbon dioxide. Matheson Co., Inc. Research grade.

APPARATUS/PROCEDURE:

ESTIMATED ERROR:

$\delta L/L = 0.006$ at 220 K, less at higher temperatures.

REFERENCES:

1. Laser, M.; Barnert-Wiemer, H.; Beanjean, H.; Merz, E.; Vygen, H. Proc. 13th AEC Air Cleaning Conf., 1974. CONF-740807, 1, 246-262.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Krypton; Kr; 7439-90-9 ^{85}Kr; 13983-27-2 2. Carbon Dioxide; CO_2; 124-38-9	Notz, K.J.; Meservey, A. B. ORNL-5121, June 1976 Chem. Abstr. 1977, 86, 61170c,79548t.
VARIABLES: T/K: 223.15 - 301.15	PREPARED BY: A.L. Cramer H.L. Clever

EXPERIMENTAL VALUES:

Smoothed Data: $\ln X_1 = 41.5327 - 65.4529/(T/100) - 67.2463 \ln (T/100) + 16.4072 (T/100)$

Std. error about regression line 5.429×10^{-3}.

T/K	Mol Fraction $X_1 \times 10^3$	ΔG^o/kJmol^{-1}	ΔH^o/kJmol^{-1}	ΔS^o/JK^{-1}mol^{-1}	ΔCp^o/JK^{-1}mol^{-1}
223.15	5.73	9.578	-2.416	-53.75	49.71
233.15	5.45	10.10	-1.782	-50.98	77.00
243.15	5.30	10.59	-0.876	-47.18	104.3
253.15	5.26	11.04	+0.302	-42.43	131.6
263.15	5.36	11.44	1.755	-36.81	158.8
273.15	5.60	11.78	3.480	-30.38	186.1
283.15	6.00	12.05	5.478	-23.20	213.4
293.15	6.60	12.24	7.748	-15.32	240.7
298.15	6.99	12.30	8.986	-11.13	254.3

The mol fraction solubility at 301.15 K was not used in the smoothed data fit.

AUXILIARY INFORMATION

METHOD:	SOURCE AND PURITY OF MATERIALS:
See preceeding page.	See preceeding page.
APPARATUS/PROCEDURE:	ESTIMATED ERROR: See preceeding page.
	REFERENCES: See preceeding page.