

<p>COMPONENTS:</p> <ol style="list-style-type: none"> <li>1. Krypton; Kr; 7439-90-9</li> <li>2. Sea Water</li> </ol>	<p>EVALUATOR:</p> <p>H. L. Clever Chemistry Department Emory University Atlanta, GA 30322 U.S.A.</p>
<p>CRITICAL EVALUATION:</p> <p>There are three reports of the solubility of krypton in sea water. König (1) reports krypton solubility values at eight temperatures between 273.15 and 297.15 K. Wood and Caputi (2) report krypton solubility values at three temperatures between 274.45 and 321.25 K. Weiss and Kyser (3) report three to five krypton solubility values at each of seven temperatures between 273.23 and 313.25 K.</p> <p>Weiss and Kyser appear to have carried out the most reliable work and we recommend use of their values. Weiss and Kyser corrected these data for the real molar value of krypton and for the fugacity of the krypton. Their equation for the Bunsen solubility coefficient of krypton, corrected for nonideal behavior, is given by the equation</p> $\ln[\text{Bunsen}] = -57.2596 + 87.4242(100/T) + 22.9332 \ln(T/100) + S\%[-0.008723 - 0.002793(T/100) + 0.0012398(T/100)^2]$ <p>where T is the absolute temperature and S% is the salinity in parts per thousand.</p> <p>Weiss and Kyser give equations for the solubility of krypton from moist air at 101.325 kPa (1 atm) total pressure in units of <math>\text{cm}^3 \text{ Kr(STP) dm}^{-3}</math> sea water and <math>\text{cm}^3 \text{ Kr(STP) kg}^{-1}</math> sea water assuming that krypton mole fraction in dry air is <math>1.141 \times 10^{-6}</math> (4). The equations are</p> $\ln[\text{cm}^3 \text{ Kr(STP) dm}^{-3}] = -109.9320 + 149.8152(100/T) + 72.8393 \ln(T/100) - 9.9217(T/100) + S\%[-0.006953 - 0.004085(T/100) + 0.0014759(T/100)^2]$ <p>and</p> $\ln[\text{cm}^3 \text{ Kr(STP) kg}^{-1}] = -112.6840 + 153.5817(100/T) + 74.4690 \ln(T/100) - 10.0189(T/100) + S\%[-0.011213 - 0.001844(T/100) + 0.0011201(T/100)^2]$ <p>Extensive tables of krypton Bunsen coefficients and <math>\text{cm}^3 \text{ Kr(STP) kg}^{-1}</math> as a function of temperature and salinity as calculated from the above equations are given in the original paper.</p> <p>Weiss and Kyser compare the earlier work with their results. They show that the König data are as much as 14 per cent lower at low temperatures and that the Wood and Caputi data averages 1.9 percent lower than their own data at 274.45 and 299.55 K. Data sheets follow for both the Weiss and Kyser and the Wood and Caputi solubility values. The Wood and Caputi values extend the temperature range another seven degrees.</p> <ol style="list-style-type: none"> <li>1. König, H. <u>Z. Naturforsch.</u> 1963, 18a, 363.</li> <li>2. Wood, D.; Caputi, R. <u>USNRDL-TR-988</u>, Feb. 1966.</li> <li>3. Weiss, R. F.; Kyser, T. K. <u>J. Chem. Eng. Data</u>, 1978, 23, 69.</li> <li>4. Glueckauf, E.; Kitt, G. A. <u>Proc. Roy. Soc. London</u>, 1956, 234A, 557.</li> </ol>	

COMPONENTS:		ORIGINAL MEASUREMENTS:	
1. Krypton; Kr; 7439-90-9		Weiss, R. F.; Kyser, T. K.	
2. Sea Water		J. Chem. Eng. Data 1978, 23, 69 - 72.	
VARIABLES:		PREPARED BY:	
T/K: 273.22 - 313.25 Kr P/kPa: 101.325 (1 atm) Salinity/mil <sup>-1</sup> : 0 - 36.595		A. L. Cramer	
EXPERIMENTAL VALUES:		Salinity/‰	
0.0		19.046	
36.595			
T/K	Bunsen/α	T/K	Bunsen/α
273.74	0.10778	273.24	0.08451
273.72	0.10778	273.22	0.08438
273.72	0.10790	273.24	0.08442
273.73	0.10786	273.23	0.08444
		278.47	0.07198
283.48	0.07981	278.46	0.07204
283.47	0.07985	278.47	0.07193
283.47	0.07979	283.57	0.06273
293.39	0.06222	283.57	0.06276
293.39	0.06220	283.56	0.06270
293.40	0.06227	288.25	0.05566
293.39	0.06221	288.25	0.05547
293.40	0.06226	288.25	0.05554
		293.49	0.04920
304.12	0.04953	293.49	0.04933
304.13	0.04957	293.49	0.04935
304.13	0.04955	303.11	0.04084
304.12	0.04961	303.12	0.04093
		303.11	0.04085
313.24	0.04215	313.25	0.03475
313.25	0.04218	313.25	0.03469
313.25	0.04216	313.25	0.03481
		313.24	0.03475
AUXILIARY INFORMATION			
METHOD: Solubility determinations by the Scholander microgasometric technique as used by Douglas (1), with minor modification by Weiss (2).  Real krypton molar volume at STP was used and a fugacity correction was applied.		SOURCE AND PURITY OF MATERIALS: 1. Krypton. Matheson Gas Products. > 99.995 % pure. Gas chromatographic checks showed ≤ 0.01 % air. 2. Sea Water. Collected from surface, evaporated to increase salinity ~ 2‰, passed through 0.45 μ millipore filter and poisoned with 1 mg/l of HgCl <sub>2</sub> .	
APPARATUS/PROCEDURE: An equilibrium chamber, containing pure gas saturated with water vapor, is separated by mercury from a closed side chamber containing degassed water. The apparatus is tipped on its side, allowing degassed water to flow into the equilibrium chamber. Dissolution is aided by mechanical shaking.		ESTIMATED ERROR:  δT/K = 0.01 δsalinity = 0.004	
		REFERENCES: 1. Douglas, E. J. Phys. Chem. 1964, 68, 169. ibid. 1965, 69, 2608. 2. Weiss, R. F. J. Chem. Eng. Data 1971, 16, 235-241.	

COMPONENTS:		ORIGINAL MEASUREMENTS:			
1. Krypton; Kr; 7439-90-9 2. Sea Water		Wood, D.; Caputi, R.  U.S.N.R.D.L.-TR-988, 27 Feb. 1966 <u>Chem. Abstr.</u> 1967, 66, 118693u.			
VARIABLES:		PREPARED BY:			
T/K: 274.45 - 320.95 P/kPa: 101.325 (1 atm)		A. L. Cramer			
EXPERIMENTAL VALUES:					
T/K	Henry's Constant $K = (P_1/\text{mmHg})/X_1$	Percent Error*	Number of Determinations	Mol Fraction $X_1 \times 10^3$	Bunsen Coefficient $\alpha$
Water; H <sub>2</sub> O; 7732-18-5					
274.45	$0.866 \times 10^7$	0.3	3	0.0878	0.1098
298.15	$1.653 \times 10^7$	0.4	2	0.0450	0.0571
320.95	$2.340 \times 10^7$	2.1	4	0.0325	0.0400
Artificial Sea Water(1); S% = 34.727					
274.45	$1.181 \times 10^7$	0.3	2	0.0644	0.0803
299.55	$2.163 \times 10^7$	0.1	2	0.0351	0.0435
320.35	$2.792 \times 10^7$	0.3	2	0.0272	0.0335
<p>* Percent error is the maximum spread in Henry's constant times 100 divided by average Henry's constant.</p> <p>The mole fractions were calculated by the compiler from the average Henry's constant. The Bunsen coefficients were calculated by the compiler from the mole fractions using a solvent mean molecular weight of 18.4823 and sea water densities from the International Critical Tables.</p>					
AUXILIARY INFORMATION					
METHOD/APPARATUS/PROCEDURE:			SOURCE AND PURITY OF MATERIALS:		
<p>Degassed water was introduced into an evacuated apparatus (&lt; 50 <math>\mu</math> Hg) and gas bled into burette. After the system was isolated, gas was admitted to equilibrium column and the water was circulated through the column, flowing over packing of 4 mm Berl saddles at 110 ml/min for 4-5 hr.</p> <p>Dissolved gas was reclaimed and measured by evacuating the system + &lt; 1 <math>\mu</math> Hg and allowing water to distill and condense in a cold trap. Water was melted and refrozen until all the gas was recovered. Gas was then transferred to a gas burette and the pressure was measured with a Hg manometer. Purity was checked by gas chromatography.</p>			1. Krypton. AIRCO. Certified 0.015% Xe. Air contamination 0.0001 determined by gas chromatography. 2. Water. Distilled three times before degassing. Sea Water. Artificial, modified from (1).		
			ESTIMATED ERROR: $\delta T/K = 0.1, 0.005, 0.03$ (as T increases) $\delta P/P = 0.001$ $\delta H/H = 0.005$ (author's error analysis)		
			REFERENCES:		
			1. Lyman, J.; Fleming, R. H. <u>J. Mar. Res.</u> 1940, 3, 134.		

<p>COMPONENTS:</p> <ol style="list-style-type: none"> <li>1. Krypton; Kr; 7439-90-9</li> <li>2. Water; H<sub>2</sub>O; 7732-18-5</li> <li>3. Electrolyte</li> </ol>	<p>EVALUATOR:</p> <p>H. L. Clever Chemistry Department Emory University Atlanta, GA 30322 U. S. A.</p> <p>September 1978</p>
<p>CRITICAL EVALUATION:</p> <p>The solubility of krypton in aqueous electrolyte solutions.</p> <p>The results of studies of the solubility of krypton in aqueous salt solution can be classified as no better than tentative. Körösy (1) reports a solubility of krypton in aqueous 20 weight per cent CaCl<sub>2</sub> solution which is of dubious value. Morrison and Johnstone (2) report Setschenow salt effect parameters for 13 aqueous electrolyte solutions. All of their values are based on only one measurement in a one molal salt solution. Although Morrison and Johnstone's Setschenow parameter values for other gases usually accord well with the results of more extensive studies of other workers, their values based on only one measurement in an electrolyte solution must be classed as tentative.</p> <p>Yeh and Peterson (3), Kitani (4), and Kirk, Parrish and Morken (5) have measured the solubility of krypton in 0.9 weight percent NaCl solution. Kirk <i>et al.</i> did not report a krypton solubility in water so it is not possible to convert their solubility value to a Setschenow parameter. The Setschenow salt effect parameters for krypton in aqueous NaCl solutions from the data of Morrison and Johnstone, Yeh and Peterson, and Kitani do not agree well (Table 1). The values based on Yeh and Peterson's data appear to be high and somewhat erratic as a function of temperature. The values of Morrison and Johnstone and of Kitani are probably more reliable.</p> <p>Anderson, Keeler and Klach (6) measured the solubility of krypton in water, and in aqueous solution containing UO<sub>2</sub>SO<sub>4</sub>, CuSO<sub>4</sub> and H<sub>2</sub>SO<sub>4</sub> at temperatures between 373 and 573 K. They found no statistical difference in the Henry's constant of krypton in water and in a solution that was 0.02 mol dm<sup>-3</sup> UO<sub>2</sub>SO<sub>4</sub>, 0.005 mol dm<sup>-3</sup> CuSO<sub>4</sub> and 0.005 mol dm<sup>-3</sup> H<sub>2</sub>SO<sub>4</sub>. There were differences in the Henry's constant for krypton in water and in a little more concentrated solution containing 0.04 mol dm<sup>-3</sup> UO<sub>2</sub>SO<sub>4</sub>, 0.01 mol dm<sup>-3</sup> CuSO<sub>4</sub> and 0.01 mol dm<sup>-3</sup> H<sub>2</sub>SO<sub>4</sub>.</p>	

COMPONENTS:			EVALUATOR:		
1. Krypton; Kr; 7439-90-9			H. L. Clever		
2. Water; H <sub>2</sub> O; 7732-18-5			Chemistry Department		
3. Electrolyte			Emory University		
			Atlanta, GA 30322		
			U. S. A.		
			September 1978		
CRITICAL EVALUATION:					
Electrolyte	T/K	mol salt Kg <sup>-1</sup> H <sub>2</sub> O	k <sub>s</sub> = (1/m) log (S <sup>o</sup> /S)	K <sub>sx</sub> = (1/m) log (X <sup>o</sup> /X)	Ref.
NH <sub>4</sub> Cl	298.15	1.0	0.065	0.080	2
(CH <sub>3</sub> ) <sub>4</sub> NI	298.15	1.0	-0.016	-0.001	2
(C <sub>2</sub> H <sub>5</sub> ) <sub>4</sub> NBr	298.15	1.0	-0.032	-0.017	2
HCl	298.15	1.0	0.028	0.043	2
HNO <sub>3</sub>	298.15	1.0	-0.003	0.012	2
BaCl <sub>2</sub>	298.15	1.0	0.151	0.174	2
LiCl	298.15	1.0	0.116	0.131	2
NaCl	298.15	1.0	0.146	0.161	2
	298.15	0.155	0.195	0.210	3
	303.15	0.155	0.216	0.231	3
	310.15	0.155	0.224	0.239	3
	310.15	0.155	0.137	0.152	4
	310.15	0.155	*	--	5
	318.15	0.155	0.197		3
Na <sub>2</sub> SO <sub>4</sub>	298.15	1.0	0.203	0.226	2
Na <sub>3</sub> PO <sub>4</sub> **	298.15	0.066	0.266	--	3
	303.15	0.066	0.287	--	3
	310.15	0.066	0.265	--	3
	318.15	0.066	0.368	--	3
KCl	298.15	1.0	0.124	0.139	2
KBr	298.15	1.0	0.120	0.135	2
KI	298.15	1.0	0.120	0.135	2
KNO <sub>3</sub>	298.15	1.0	0.093	0.108	2
UO <sub>2</sub> SO <sub>4</sub>	373-573	0.02-0.04	--	--	6
*k <sub>s</sub> ranges between 0.05 and 0.20 depending on the value of water solubility used.					
** The Na <sub>3</sub> PO <sub>4</sub> concentration in mol dm <sup>-3</sup> solution.					
REFERENCES					
1. Korossy, F.	Trans. Faraday Soc.	1937, 33,	416.		
2. Morrison, T. J.; Johnstone, N. B. B.	J. Chem. Soc.	1955,	3655.		
3. Yeh, S. Y.; Peterson, R. E.	J. Pharm. Sci.	1964, 53,	822.		
4. Kitani, K.	Scand. J. Clin. Lab. Invest.	1972, 29,	167.		
5. Kirk, W. P.; Parish, P. W.; Morken, D. A.	Health Physics	1975, 28,	249.		
6. Anderson, C. J.; Keeler, R. A.; Klach, S. S.	J. Chem. Eng. Data	1962, 7,	290.		

<b>COMPONENTS:</b> 1. Krypton; Kr; 7439-90-9 2. Water; H <sub>2</sub> O; 7732-18-5 3. Ammonium Chloride; NH <sub>4</sub> Cl; 12125-02-9	<b>ORIGINAL MEASUREMENTS:</b> Morrison, T.J.; Johnstone, N.B.B.  <u>J. Chem. Soc.</u> 1955, 3655-3659.						
<b>VARIABLES:</b> T/K: 298.15 P/kPa: 101.325 (1 atm)	<b>PREPARED BY:</b> T.D. Kittredge H.L. Clever						
<b>EXPERIMENTAL VALUES:</b> <table border="1" data-bbox="302 499 1085 610"> <thead> <tr> <th>T/K</th> <th><math>k_s = (1/m) \log (S^0/S)</math></th> <th><math>k_{sX} = (1/m) \log (X^0/X)</math></th> </tr> </thead> <tbody> <tr> <td>298.15</td> <td>0.065</td> <td>0.080</td> </tr> </tbody> </table> <p>The value of the Setschenow salt effect parameter, <math>k_s</math>, was apparently determined from only two solubility measurements. They were the solubility of krypton in pure water, <math>S^0</math>, and the solubility of krypton in a near one equivalent of salt per kg of water solution, <math>S</math>. No solubility values are given in the paper. The <math>S^0/S</math> ratio was referenced to a solution containing one kg of water. The compiler calculated the salt effect parameter <math>k_{sX}</math> from the mole fraction solubility ratio <math>X^0/X</math>. The electrolyte was assumed to be 100 per cent dissociated and both cation and anion were used in the mole fraction calculation.</p>		T/K	$k_s = (1/m) \log (S^0/S)$	$k_{sX} = (1/m) \log (X^0/X)$	298.15	0.065	0.080
T/K	$k_s = (1/m) \log (S^0/S)$	$k_{sX} = (1/m) \log (X^0/X)$					
298.15	0.065	0.080					
<b>AUXILIARY INFORMATION</b>							
<b>METHOD:</b> Gas absorption in a flow system.	<b>SOURCE AND PURITY OF MATERIALS:</b> 1. Krypton. British Oxygen Co. Ltd. 2. Water. No information given. 3. Electrolyte. No information given.						
<b>APPARATUS/PROCEDURE:</b> The previously degassed solvent flows in a thin film down an absorption spiral containing Kr gas plus solvent vapor at a total pressure of one atm. The volume of gas absorbed is measured in attached calibrated burets (1).	<b>ESTIMATED ERROR:</b> $\delta k_s = 0.010$  <b>REFERENCES:</b> 1. Morrison, T.J.; Billett, F. <u>J. Chem. Soc.</u> 1952, 3819.						

COMPONENTS:		ORIGINAL MEASUREMENTS:																
1. Krypton; Kr; 7439-90-9		Morrison, T.J.; Johnstone, N.B.B.																
2. Water; H <sub>2</sub> O; 7732-18-5																		
3. Ammonium Type Salts		J. Chem. Soc. 1955, 3655-3659.																
VARIABLES:		PREPARED BY:																
T/K: 298.15		T.D. Kittredge																
P/kPa: 101.325 (1 atm)		H.L. Clever																
EXPERIMENTAL VALUES:																		
<table><tr><td>T/K</td><td><math>k_s = (1/m) \log (S^O/S)</math></td><td><math>k_{sx} = (1/m) \log (X^O/X)</math></td></tr><tr><td colspan="3">N,N,N-Trimethylmethanaminium iodide (Tetramethyl-ammonium iodide); C<sub>4</sub>H<sub>12</sub>NI; 75-58-1</td></tr><tr><td>298.15</td><td>-0.016</td><td>-0.001</td></tr><tr><td colspan="3">N,N,N-Triethylethanaminium bromide (Tetraethyl-ammonium bromide); C<sub>8</sub>H<sub>20</sub>NBr; 71-91-0</td></tr><tr><td>298.15</td><td>-0.032</td><td>-0.017</td></tr></table>				T/K	$k_s = (1/m) \log (S^O/S)$	$k_{sx} = (1/m) \log (X^O/X)$	N,N,N-Trimethylmethanaminium iodide (Tetramethyl-ammonium iodide); C <sub>4</sub> H <sub>12</sub> NI; 75-58-1			298.15	-0.016	-0.001	N,N,N-Triethylethanaminium bromide (Tetraethyl-ammonium bromide); C <sub>8</sub> H <sub>20</sub> NBr; 71-91-0			298.15	-0.032	-0.017
T/K	$k_s = (1/m) \log (S^O/S)$	$k_{sx} = (1/m) \log (X^O/X)$																
N,N,N-Trimethylmethanaminium iodide (Tetramethyl-ammonium iodide); C <sub>4</sub> H <sub>12</sub> NI; 75-58-1																		
298.15	-0.016	-0.001																
N,N,N-Triethylethanaminium bromide (Tetraethyl-ammonium bromide); C <sub>8</sub> H <sub>20</sub> NBr; 71-91-0																		
298.15	-0.032	-0.017																
The values of the Setschenow salt effect parameter, $k_s$ , were apparently determined from only two solubility measurements. They were the solubility of krypton in pure water, $S^O$ , and the solubility of krypton in a near one equivalent of salt per kg of water solution, $S$ . No solubility values are given in the paper. The $S^O/S$ ratio was referenced to a solution containing one kg of water. The compiler calculated the salt effect parameter $k_{sx}$ from the mole fraction solubility ratio $X^O/X$ . The electrolytes were assumed to be 100 per cent dissociated and both cation and anion were used in the mole fraction calculation.																		
AUXILIARY INFORMATION																		
METHOD:		SOURCE AND PURITY OF MATERIALS:																
Gas absorption in a flow system.		1. Krypton. British Oxygen Co. Ltd.																
		2. Water. No information given.																
		3. Electrolyte. No information given.																
APPARATUS/PROCEDURE:		ESTIMATED ERROR:																
The previously degassed solvent flows in a thin film down an absorption spiral containing the gas plus solvent vapor at a total pressure of one atm. The volume of gas absorbed is measured in attached calibrated burets (1).		$\delta k_s = 0.010$																
		REFERENCES:																
		1. Morrison, T.J.; Billett, F. J. Chem. Soc. 1952, 3819.																

COMPONENTS:		ORIGINAL MEASUREMENTS:																
1. Krypton; Kr; 7439-90-9		Morrison, T.J.; Johnstone, N.B.B.																
2. Water; H <sub>2</sub> O; 7732-18-5																		
3. Acids		J. Chem. Soc. 1955, 3655-3659.																
VARIABLES:		PREPARED BY:																
T/K: 298.15		T.D. Kittredge																
P/kPa: 101.325 (1 atm)		H.L. Clever																
EXPERIMENTAL VALUES:																		
<table><tr><td>T/K</td><td><math>k_s = (1/m) \log (S^O/S)</math></td><td><math>k_{sX} = (1/m) \log (X^O/X)</math></td></tr><tr><td colspan="3">Hydrochloric Acid; HCl; 7647-01-0</td></tr><tr><td>298.15</td><td>0.028</td><td>0.043</td></tr><tr><td colspan="3">Nitric Acid; HNO<sub>3</sub>; 7697-37-2</td></tr><tr><td>298.15</td><td>-0.003</td><td>0.012</td></tr></table>				T/K	$k_s = (1/m) \log (S^O/S)$	$k_{sX} = (1/m) \log (X^O/X)$	Hydrochloric Acid; HCl; 7647-01-0			298.15	0.028	0.043	Nitric Acid; HNO <sub>3</sub> ; 7697-37-2			298.15	-0.003	0.012
T/K	$k_s = (1/m) \log (S^O/S)$	$k_{sX} = (1/m) \log (X^O/X)$																
Hydrochloric Acid; HCl; 7647-01-0																		
298.15	0.028	0.043																
Nitric Acid; HNO <sub>3</sub> ; 7697-37-2																		
298.15	-0.003	0.012																
The values of the Setschenow salt effect parameter, $k_s$ , were apparently determined from only two solubility measurements. They were the solubility of krypton in pure water, $S^O$ , and the solubility of krypton in a near one equivalent of salt per kg of water solution, $S$ . No solubility values are given in the paper. The $S^O/S$ ratio was referenced to a solution containing one kg of water. The compiler calculated the salt effect parameter $k_{sX}$ from the mole fraction solubility ratio $X^O/X$ . The electrolytes were assumed to be 100 per cent dissociated and both cation and anion were used in the mole fraction calculation.																		
AUXILIARY INFORMATION																		
METHOD:		SOURCE AND PURITY OF MATERIALS:																
Gas absorption in a flow system.		1. Krypton. British Oxygen Co. Ltd.																
		2. Water. No information given.																
		3. Electrolyte. No information given.																
APPARATUS/PROCEDURE:		ESTIMATED ERROR:																
The previously degassed solvent flows in a thin film down an absorption spiral containing the gas plus solvent vapor at a total pressure of one atm. The volume of gas absorbed is measured in attached calibrated burets (1).		$\delta k_s = 0.010$																
		REFERENCES:																
		1. Morrison, T.J.; Billett, F. J. Chem. Soc. 1952, 3819.																



COMPONENTS:		ORIGINAL MEASUREMENTS:		
1. Krypton; Kr; 7439-90-9 Krypton-85; <sup>85</sup> Kr; 13983-27-3		Anderson, C. J.; Keeler, R. A.; Klach, S.J.		
2. Water; H <sub>2</sub> O; 7732-18-5		J. Chem. Eng. Data 1962, 7, 290-294.		
3. Uranium dioxosulfato-(Uranyl sul- fate); UO <sub>2</sub> SO <sub>4</sub> ;1314-64-3				
4. Copper sulfate; CuSO <sub>4</sub> ; 7758-98-7				
5. Sulfuric Acid; H <sub>2</sub> SO <sub>4</sub> ; 7664-93-9				
VARIABLES:		PREPARED BY:		
T/K: 373.15 - 578.15 Kr P/pa: 0.407 - 36.680 (0.59 - 53.2 x 10 <sup>-4</sup> psia)		A.L. Cramer H.L. Clever		
EXPERIMENTAL VALUES:				
T/K	Pressure/psia		Henry's Constant	Mol Fraction
	Total	Partial x 10 <sup>4</sup>	K = (p/psia)/X <sub>1</sub>	X <sub>1</sub> x 10 <sup>5</sup>
	O <sub>2</sub> + H <sub>2</sub> O + Kr	Kr	K x 10 <sup>-5</sup>	at 101.325 kPa Kr
	0.02 mol dm <sup>-3</sup> UO <sub>2</sub> SO <sub>4</sub> ,	0.005 mol dm <sup>-3</sup> CuSO <sub>4</sub>	and 0.005 mol dm <sup>-3</sup> H <sub>2</sub> SO <sub>4</sub>	
373.15	115	0.93	6.37	2.31
	365	5.03	6.66	2.21
398.15	110	0.59	5.78	2.54
	350	33.9	5.93	2.48
423.15	125	0.40	5.1	2.88
	315	28.2	5.20	2.83
523.15	1120	15.0	2.60	5.65
	1165	15.0	2.70	5.44
	1310	6.20	2.80	5.25
	1330	7.20	2.60	5.65
	1495	39.0	2.38	6.18
524.15	1095	53.2	2.08	7.07
543.15	1235	44.1	1.75	8.40
548.15	1340	11.0	1.9	7.74
	1485	4.20	1.8	8.17
	1565	6.00	2.0	7.35
	1715	42.9	1.90	7.74
573.15	1577	7.0	1.0	14.7
	1665	9.1	1.1	13.4
	1736	3.0	1.20	12.3
	1870	4.5	1.3	11.3
	2015	3.77	1.49	9.87
578.15	1625	2.5	1.01	14.55
*See note below				
AUXILIARY INFORMATION				
METHOD /APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:		
A Kr/ <sup>85</sup> Kr stock mixture and O <sub>2</sub> are added separately to a thermostated stainless steel vessel containing about 275 ml of solution. Equilibration time varied from 1.5 to 22 hours without appreciable difference in results (one run went for 64 hours). At equilibrium both liquid and vapor were sampled and the krypton in each phase was determined by counting the <sup>85</sup> Kr tag.		No information		
Henry's law constant is linear in temperature. The authors give K = (9.188 - 0.0267t/°C)x10 <sup>5</sup> psia x <sub>1</sub> <sup>-1</sup> with a standard deviation about the line of 0.170 x 10 <sup>5</sup> .		ESTIMATED ERROR: The 95% confidence limits are given by K ± 0.357 x 10 <sup>5</sup> [ 0.05 + (t-230) <sup>2</sup> / 130,000 ] <sup>1/2</sup>		
The solubility of Kr in water and in the uranyl sulfate solution above appears to be the same. The Henry's constant for the two sets of data pooled for one equation is K = (9.162-0.0265t/°C)x10 <sup>5</sup> psia x <sub>1</sub> <sup>-1</sup>		REFERENCES:		
		*The mole fraction solubility at a krypton partial pressure of 101.325 kPa was calculated by the compilers.		

COMPONENTS:			ORIGINAL MEASUREMENTS:		
1. Krypton; Kr; 7439-90-9 Krypton-85; <sup>85</sup> Kr; 13983-27-3			Anderson, C. J.; Keeler, R. A.; Klach, S. J.		
2. Water; H <sub>2</sub> O; 7732-18-5			J. Chem. Eng. Data 1962, 7, 290-294.		
3. Uranium dioxosulfato-(Uranyl sulfate); UO <sub>2</sub> SO <sub>4</sub> ; 1314-64-3					
4. Copper sulfate; CuSO <sub>4</sub> ; 7758-98-7					
5. Sulfuric Acid; H <sub>2</sub> SO <sub>4</sub> ; 7664-93-9					
VARIABLES: T/K: 373.15 - 573.15 Kr P/pa: 2.261 - 50-332 (3.28 - 73.0 x 10 <sup>-4</sup> psia)			PREPARED BY:  A.L. Cramer H.L. Clever		
EXPERIMENTAL VALUES:					
T/K	Pressure/psia		Henry's Constant		Mol Fraction
	Total	Partial x 10 <sup>4</sup>	K = (p/psia)/X <sub>1</sub>		X <sub>1</sub> x 10 <sup>5</sup>
	O <sub>2</sub> + H <sub>2</sub> O + Kr	Kr	K x 10 <sup>-5</sup>		at 101.325 kPa Kr
	0.04 mol dm <sup>-3</sup>	UO <sub>2</sub> SO <sub>4</sub> , 0.01 mol dm <sup>-3</sup>	CuSO <sub>4</sub> , 0.01 mol dm <sup>-3</sup>	H <sub>2</sub> SO <sub>4</sub>	
373.15	355	29.8	6.31	2.33	
	350	7.25	6.20	2.37	
	380	68.0	5.96	2.47	
423.15	400	27.6	5.19	2.83	
	410	6.93	5.73	2.57	
	445	73.0	5.18	2.84	
523.15	825	43.7	1.90	7.74	
	860	5.02	2.03	7.24	
	860	25.1	2.20	6.68	
	905	55.7	2.11	6.97	
573.15	1440	26.0	0.97	15.15	
	1480	3.28	1.17	12.6	
	1485	13.3	1.34	11.0	
	1505	36.0	0.889	16.5	
The mole fraction solubility at a krypton partial pressure of 101.325 kPa was calculated by the compilers.					
AUXILIARY INFORMATION					
METHOD/APPARATUS/PROCEDURE:			SOURCE AND PURITY OF MATERIALS:		
A Kr/ <sup>85</sup> Kr stock mixture and O <sub>2</sub> are added separately to a thermostated stainless steel vessel containing about 275 ml of solution. Equilibration time varied from 1.5 to 22 hours without appreciable difference in results (one run went for 64 hours). At equilibrium both liquid and vapor were sampled and the krypton in each phase was determined by counting the <sup>85</sup> Kr tag.			No information		
Henry's law constant is not linear in temperature as it appears to be for water and the more dilute uranyl sulfate solution.			ESTIMATED ERROR:		
The mean values of K at the four temperatures are			REFERENCES:		
T/K	K/psia X <sub>1</sub> <sup>-1</sup> x 10 <sup>-5</sup>				
373.15	(6.16 ± 0.26)				
423.15	(5.36 ± 0.26)				
473.15	(2.06 ± 0.23)				
523.15	(1.09 ± 0.23)				

COMPONENTS:		ORIGINAL MEASUREMENTS:							
1. Krypton; Kr; 7439-90-9 2. Water; H <sub>2</sub> O; 7732-18-5 3. Barium Chloride; BaCl <sub>2</sub> ; 10361-37-2		Morrison, T.J.; Johnstone, N.B.B.  J. Chem. Soc. 1955, 3655-3659.							
VARIABLES: T/K: 298.15 P/kPa: 101.325 (1 atm)		PREPARED BY:  T.D. Kittredge H.L. Clever							
EXPERIMENTAL VALUES:									
<table><tr><td>T/K</td><td><math>k_s = (1/m) \log (S^0/S)</math></td><td><math>k_{sX} = (1/m) \log (X^0/X)</math></td></tr><tr><td>298.15</td><td>0.151</td><td>0.166</td></tr></table>				T/K	$k_s = (1/m) \log (S^0/S)$	$k_{sX} = (1/m) \log (X^0/X)$	298.15	0.151	0.166
T/K	$k_s = (1/m) \log (S^0/S)$	$k_{sX} = (1/m) \log (X^0/X)$							
298.15	0.151	0.166							
<p>The value of the Setschenow salt effect parameter, <math>k_s</math>, was apparently determined from only two solubility measurements. They were the solubility of krypton in pure water, <math>S^0</math>, and the solubility of krypton in a near one equivalent of salt per kg of water solution, <math>S</math>. No solubility values are given in the paper. The <math>S^0/S</math> ratio was referenced to a solution containing one kg of water. The compiler calculated the salt effect parameter <math>k_{sX}</math> from the mole fraction solubility ratio <math>X^0/X</math>. The electrolyte was assumed to be 100 per cent dissociated and both cation and anion were used in the mole fraction calculation.</p>									
AUXILIARY INFORMATION									
METHOD:  Gas absorption in a flow system.		SOURCE AND PURITY OF MATERIALS: 1. Krypton. British Oxygen Co. Ltd. 2. Water. No information given. 3. Electrolyte. No information given.							
APPARATUS/PROCEDURE:  The previously degassed solvent flows in a thin film down an absorption spiral containing the gas plus solvent vapor at a total pressure of one atm. The volume of gas absorbed is measured in attached calibrated burets (1).		ESTIMATED ERROR:  $\delta k_s = 0.010$							
		REFERENCES: 1. Morrison, T.J.; Billett, F. J. Chem. Soc. 1952, 3819.							

COMPONENTS:		ORIGINAL MEASUREMENTS:	
1. Krypton; Kr; 7439-90-9		Yeh, S.Y.; Peterson, R.E.	
2. Water; H <sub>2</sub> O; 7732-18-5			
3. Sodium Chloride; NaCl; 7647-14-5		J. Pharm. Sci. 1964, 53, 822 - 824.	
VARIABLES:		PREPARED BY:	
T/K: 298.15 - 318.15		H.L. Clever	
P/kPa: 101.325 (1 atm)			
EXPERIMENTAL VALUES:			
T/K	Ostwald Coefficient L	ΔH <sup>o</sup> /cal mol <sup>-1</sup>	ΔS <sup>o</sup> /cal K <sup>-1</sup> mol <sup>-1</sup>
298.15	0.0542	-5017	-28.9
303.15	0.0499	-4252	-26.4
310.15	0.0444	-3181	-22.9
318.15	0.0411	-1957	-19.0
For comparison, the authors'Ostwald coefficients in water were 0.0581, 0.0539, 0.0481 and 0.0441 at the four temperatures.			
The sodium chloride solution is 0.9 weight percent which is about 0.155 mole NaCl kg <sup>-1</sup> water.			
Each solubility value is the average of three or four measurements. The standard deviation of each measurement closely approximates 1.0 per cent.			
The thermodynamic changes are for the transfer of one mole of krypton from the gas phase at a concentration of one mole dm <sup>-3</sup> to the solution at a concentration of one mole dm <sup>-3</sup> .			
AUXILIARY INFORMATION			
METHOD /APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:	
Freshly boiled solution was introduced into 125 ml. absorption flask of solubility apparatus (1), then frozen and boiled under vacuum three times. Water-saturated gas was introduced and equilibrated (2) and weight of solution was determined.		1. Krypton. Matheson Co.	
Thermodynamic constants were calculated from equations (3):		2. Water. Distilled from glass apparatus.	
log S = A/T + B log T - C		3. Sodium chloride. Analytical grade.	
ΔH <sup>o</sup> = R(-2.3A + BT - T)		ESTIMATED ERROR:	
ΔS <sup>o</sup> = R(-B-BlnT + 2.3C + ln(0.082T) + 1		δT/K = 0.05	
		δP/mmHg = 0.2	
		δL/L = 0.01	
		REFERENCES:	
		1. Geffken, G. Z. Physik Chem. 1904, 49, 257.	
		2. Yeh, S.Y.; Peterson, R.E. J. Pharm. Sci. 1963, 52, 453-8.	
		3. Eley, E.E. Trans. Faraday Soc. 1939, 35, 1281.	

COMPONENTS: 1. Krypton; Kr; 7439-90-9 2. Water; H <sub>2</sub> O; 7732-18-5 3. Alkali Halides	ORIGINAL MEASUREMENTS: Morrison, T.J.; Johnstone, N.B.B.  J. Chem. Soc. 1955, 3655-3659.																																	
VARIABLES: T/K: 298.15 P/kPa: 101.325 (1 atm)	PREPARED BY: T.D. Kittredge H.L. Clever																																	
EXPERIMENTAL VALUES: <table><tr><th>T/K</th><th><math>k_s = (1/m) \log (S^0/S)</math></th><th><math>k_{sX} = (1/m) \log (X^0/X)</math></th></tr><tr><td colspan="3">Lithium Chloride; LiCl; 7447-41-8</td></tr><tr><td>298.15</td><td>0.116</td><td>0.0131</td></tr><tr><td colspan="3">Sodium Chloride; NaCl; 7647-14-5</td></tr><tr><td>298.15</td><td>0.146</td><td>0.161</td></tr><tr><td colspan="3">Potassium Chloride; KCl; 7447-40-7</td></tr><tr><td>298.15</td><td>0.124</td><td>0.139</td></tr><tr><td colspan="3">Potassium Bromide; KBr; 7758-02-3</td></tr><tr><td>298.15</td><td>0.120</td><td>0.135</td></tr><tr><td colspan="3">Potassium Iodide; KI; 7681-11-0</td></tr><tr><td>298.15</td><td>0.120</td><td>0.135</td></tr></table> <p>The values of the Setschenow salt effect parameter, <math>k_s</math>, were apparently determined from only two solubility measurements. They were the solubility of krypton in pure water, <math>S^0</math>, and the solubility of krypton in a near one equivalent of salt per kg of water solution, <math>S</math>. No solubility values are given in the paper. The <math>S^0/S</math> ratio was referenced to a solution containing one kg of water. The compiler calculated the salt effect parameter <math>k_{sX}</math> from the mole fraction solubility ratio <math>X^0/X</math>. The electrolytes were assumed to be 100 per cent dissociated and both cation and anion were used in the mole fraction calculation.</p>		T/K	$k_s = (1/m) \log (S^0/S)$	$k_{sX} = (1/m) \log (X^0/X)$	Lithium Chloride; LiCl; 7447-41-8			298.15	0.116	0.0131	Sodium Chloride; NaCl; 7647-14-5			298.15	0.146	0.161	Potassium Chloride; KCl; 7447-40-7			298.15	0.124	0.139	Potassium Bromide; KBr; 7758-02-3			298.15	0.120	0.135	Potassium Iodide; KI; 7681-11-0			298.15	0.120	0.135
T/K	$k_s = (1/m) \log (S^0/S)$	$k_{sX} = (1/m) \log (X^0/X)$																																
Lithium Chloride; LiCl; 7447-41-8																																		
298.15	0.116	0.0131																																
Sodium Chloride; NaCl; 7647-14-5																																		
298.15	0.146	0.161																																
Potassium Chloride; KCl; 7447-40-7																																		
298.15	0.124	0.139																																
Potassium Bromide; KBr; 7758-02-3																																		
298.15	0.120	0.135																																
Potassium Iodide; KI; 7681-11-0																																		
298.15	0.120	0.135																																
AUXILIARY INFORMATION																																		
METHOD: Gas absorption in a flow system.	SOURCE AND PURITY OF MATERIALS: 1. Krypton. British Oxygen Co. Ltd. 2. Water. No information given. 3. Electrolyte. No information given.																																	
APPARATUS/PROCEDURE: The previously degassed solvent flows in a thin film down an absorption spiral containing the gas plus solvent vapor at a total pressure of one atm. The volume of gas absorbed is measured in attached calibrated burets (1).	ESTIMATED ERROR: $\delta k_s = 0.010$  REFERENCES: 1. Morrison, T.J.; Billett, F. J. Chem. Soc. 1952, 3819.																																	

COMPONENTS:		ORIGINAL MEASUREMENTS:	
1. Krypton; Kr; 7439-90-9		Morrison, T.J.; Johnstone, N.B.B.	
2. Water; H <sub>2</sub> O; 7732-18-5			
3. Sodium Sulfate; Na <sub>2</sub> SO <sub>4</sub> ; 7757-82-6		J. Chem. Soc. 1955, 3655-3659.	
VARIABLES:		PREPARED BY:	
T/K: 298.15		T.D. Kittredge	
P/kPa: 101.325 (1 atm)		H.L. Clever	
EXPERIMENTAL VALUES:			
T/K	k <sub>s</sub> = (1/m) log (S <sup>0</sup> /S)	k <sub>sX</sub> = (1/m) log (X <sup>0</sup> /X)	
298.15	0.203	0.226	
The value of the Setschenow salt effect parameter, k <sub>s</sub> , was apparently determined from only two solubility measurements. They were the solubility of krypton in pure water, S <sup>0</sup> , and the solubility of krypton in a near one equivalent of salt per kg of water solution, S. No solubility values are given in the paper. The S <sup>0</sup> /S ratio was referenced to a solution containing one kg of water. The compiler calculated the salt effect parameter k <sub>sX</sub> from the mole fraction solubility ratio X <sup>0</sup> /X. The electrolyte was assumed to be 100 per cent dissociated and both cation and anion were used in the mole fraction calculation.			
AUXILIARY INFORMATION			
METHOD:		SOURCE AND PURITY OF MATERIALS:	
Gas absorption in a flow system.		1. Krypton. British Oxygen Co. Ltd.	
		2. Water. No information given.	
		3. Electrolyte. No information given.	
APPARATUS/PROCEDURE:		ESTIMATED ERROR:	
The previously degassed solvent flows in a thin film down an absorption spiral containing the gas plus solvent vapor at a total pressure of one atm. The volume of gas absorbed is measured in attached calibrated burets (1).		δk <sub>s</sub> = 0.010	
		REFERENCES:	
		1. Morrison, T.J.; Billett, F. J. Chem. Soc. 1952, 3819.	

COMPONENTS:		ORIGINAL MEASUREMENTS:	
1. Krypton; Kr; 7439-90-9		Yeh, S-Y.; Peterson, R.E.	
2. Water; H <sub>2</sub> O; 7732-18-5			
3. Sodium Phosphate (phosphate buffer); Na <sub>3</sub> PO <sub>4</sub> ; 7601-54-9		J. Pharm. Sci. 1964, 53, 822 - 824.	
VARIABLES:		PREPARED BY:	
T/K: 298.15 - 318.15 P/kPa: 101.325 (1 atm)		H.L. Clever	
EXPERIMENTAL VALUES:			
T/K	Ostwald Coefficient L	ΔH <sup>o</sup> /cal mol <sup>-1</sup>	ΔS <sup>o</sup> /cal K <sup>-1</sup> mol <sup>-1</sup>
298.15	0.0558	-4012	-25.5
303.15	0.0516	-3744	-24.6
310.15	0.0462	-3369	-23.4
318.15	0.0417	-2941	-22.0
For comparison, the author's Ostwald coefficients in water were 0.0581, 0.0539, 0.0481 and 0.0441 at the four temperatures.			
The sodium phosphate solution is an 0.066 molar buffer adjusted to pH 7.0. The solution might be better described as Na <sub>x</sub> H <sub>y</sub> PO <sub>4</sub> ; 7632-05-5.			
Each solubility value is the average of three to four measurements. The standard deviation of each measurement closely approximates 1.0 per cent.			
The thermodynamic changes are for the standard state transfer of one mole of krypton from the gas at a concentration of one mole dm <sup>-3</sup> to the solution at a concentration of one mole dm <sup>-3</sup> .			
AUXILIARY INFORMATION			
METHOD /APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:	
Freshly boiled solution was introduced into 125 ml. absorption flask of solubility apparatus (1), then frozen and boiled under vacuum three times. Water-saturated gas was introduced and equilibrated (2) and weight of solution was determined.		1. Krypton. Matheson Co.	
Thermodynamic constants were calculated from equations (3):		2. Water. Distilled from glass apparatus.	
log S = A/T + B log T - C		3. Sodium phosphate. Analytical grade.	
ΔH <sup>o</sup> = R(-2.3A + BT - T)		ESTIMATED ERROR:	
ΔS <sup>o</sup> = R(-B-BlnT + 2.3C + ln(0.082T) + 1)		δT/K = 0.05	
		δP/mmHg = 0.2	
		δL/L = 0.01	
		REFERENCES:	
		1. Geffken, G. Z. Physik Chem. 1904, 49, 257.	
		2. Yeh, S.Y.; Peterson, R.E. J. Pharm. Sci. 1963, 52, 453-8.	
		3. Eley, E.E. Trans. Faraday Soc. 1939, 35, 1281.	

COMPONENTS:		ORIGINAL MEASUREMENTS:							
1. Krypton; Kr; 7439-90-9		Morrison, T.J.; Johnstone, N.B.B.							
2. Water; H <sub>2</sub> O; 7732-18-5									
3. Potassium Nitrate; KNO <sub>3</sub> ; 7757-79-1		J. Chem. Soc. 1955, 3655-3659.							
VARIABLES:		PREPARED BY:							
T/K: 298.15		T.D. Kittredge							
P/kPa: 101.325 (1 atm)		H.L. Clever							
EXPERIMENTAL VALUES:									
<table><tr><td>T/K</td><td><math>k_s = (1/m) \log (S^0/S)</math></td><td><math>k_{sX} = (1/m) \log (X^0/X)</math></td></tr><tr><td>298.15</td><td>0.093</td><td>0.108</td></tr></table>				T/K	$k_s = (1/m) \log (S^0/S)$	$k_{sX} = (1/m) \log (X^0/X)$	298.15	0.093	0.108
T/K	$k_s = (1/m) \log (S^0/S)$	$k_{sX} = (1/m) \log (X^0/X)$							
298.15	0.093	0.108							
<p>The value of the Setschenow salt effect parameter, <math>k_s</math>, was apparently determined from only two solubility measurements. They were the solubility of krypton in pure water, <math>S^0</math>, and the solubility of krypton in a near one equivalent of salt per kg of water solution, <math>S</math>. No solubility values are given in the paper. The <math>S^0/S</math> ratio was referenced to a solution containing one kg of water. The compiler calculated the salt effect parameter <math>k_{sX}</math> from the mole fraction solubility ratio <math>X^0/X</math>. The electrolyte was assumed to be 100 per cent dissociated and both cation and anion were used in the mole fraction calculation.</p>									
AUXILIARY INFORMATION									
METHOD:		SOURCE AND PURITY OF MATERIALS:							
Gas absorption in a flow system.		1. Krypton. British Oxygen Co. Ltd.							
		2. Water. No information given.							
		3. Electrolyte. No information given.							
APPARATUS/PROCEDURE:		ESTIMATED ERROR:							
The previously degassed solvent flows in a thin film down an absorption spiral containing the gas plus solvent vapor at a total pressure of one atm. The volume of gas absorbed is measured in attached calibrated burets (1).		$\delta k_s = 0.010$							
		REFERENCES:							
		1. Morrison, T.J.; Billett, F. J. Chem. Soc. 1952, 3819.							