COMPONENTS :	EVALUATOR:
<pre>1. Silane; SiH₄; [7803-62-5] Germane; GeH₄; [7782-65-2] Stannane; SnH₄; [2406-52-2] 2. Organic liquids.</pre>	P. G. T. Fogg, School of Chemistry, Polytechnic of North London, Holloway, London N7 8DB, United Kingdom. October 1983

CRITICAL EVALUATION:

Devyatykh *et al*. (1) measured distribution constants for each of the three gases and several solvents by a chromatographic method. It is, however, unwise to equate these constants with Ostwald coefficients in order to estimate solubilities. The data may, perhaps, be used to estimate relative solubilities but such estimates may not be precise.

The solubility of silane in cyclohexane was measured by Cauquil (2). Very simple apparatus was used. The possibility that equilibrium between gas and liquid was not achieved should be borne in mind.

References:

- 1. Devyatykh, G. G.; Ezheleva, A. E.; Zorin, A. D.; Zueva, M. V. Zh. Neorgan. Khim. <u>1963</u>, 8, 1307. (Russ. J. Inorg. Chem. <u>1963</u>, 8, 678.)
- Cauquil, G.
 J. Chim. Phys. Phys. Chim. Biol. <u>1927</u>, 24, 53.

COMPONENTS :		ORIGINAL MEASUREMENTS:	
1. Silane; SiH ₄ ; [7803-62	-5]	Devyatykh, G.G.; Ezhele Zorin, A.D.; Zueva, M.V	va, A.E.; •
2. Various liquids		Ruвв. J. Inorg. Chem. <u>1</u> 678-682.	9 <u>63</u> ,8,
VARIABLES:		PREPARED BY:	
Temperature, press	ure	P.G.T. Fogg	
EXPERIMENTAL VALUES:			
Solvent	Pressure range /mmHg	Distribution constant ^{VOl} SiH ₄ /VOlsolvent	Heat of solution /kcal mol ⁻¹
2-Ethoxyethanol; C ₄ H ₁₀ O ₂ ; [110-80-5]	0.5 -17.]	.8 3.24	-1.2
l,l'-oxybis [2-chloro- ethane]; C⊾HgCl2O; [lll-44-4]	0.06 -21.0	4.02	-1.2
Nitrobenzene, C ₆ H ₅ NO ₂ ; [98-95-3]	0.03 -18.7	4.38	-0.93
Liquid paraffin	0.5 -50.0	5.46	-3.8
Silicone PFMS-4F	0.05 -34.0	6.4	-2.2
Temperature = 293.2 K.	760 mmHg =	$1 \text{ atm} = 1.013 \times 10^5 \text{ Pa.}$	
range of partial pressures of silane mmHg. At a fixed temperature the dis from the mean values by more than ±3% at one temperature only but heats of ated from the variation of distributi given. If it is assumed that distrik ure according to equations of the for		and a total pressure of a tribution constants did n . These mean values were solution, said to have be on constants with tempera ution constants vary with m :	bout 760 ot depart reported en calcul- ture, were temperat-
	AUXILIARY	INFORMATION	
METHOD/APPARATUS/PROCEDURE:	·····	SOURCE AND PURITY OF MATERIALS	:
A chromatographic method was used. Temperatures were controlled to \pm 0.5 K. The support phase consist- ed of Nichrome spirals. The carrier gas was either nitrogen or hydrogen. The volume, V ₁ , of the liquid phase was calculated from the weight of the column before and after filling with liquid and allowing to drain. The free volume, V _g , was equated with the retention volume for		 Prepared by disproportionation of triethoxysilane in the presence of metallic sodium; distilled with low temperature still; chromatographically pure. H₂ & N₂: passed through activated carbon and through molecular sieve. 	
constant, K , was calculated from the James and Martin equation :		ESTIMATED ERROR:	
$v_{R} = v_{g} + K v_{I}$			
where V_R is the retention silane.	volume for	REFERENCES :	

COMPONENTS:

1. Silane; SiH₄; [7803-62-5]

2. Various liquids

ORIGINAL MEASUREMENTS:

Devyatykh, G.G.; Ezheleva, A.E.; Zorin, A.D.; Zueva, M.V.

Russ, J. Inorg. Chem. <u>1953</u>, 8, 678-682.

EXPERIMENTAL VALUES:

 $\ln K = (-\Delta H/RT) + A$

where K is the distribution constant for a temperature $T, \Delta H$ is the heat of solution of silane in the solvent and A is a constant for the solvent, then distribution constants at any temperature in the range 278.2 K to 323.2 K may be estimated from a value at 293.2 K and the corresponding value of the heat of solution. The equation for K may be written in the form :

 $K = \exp \left[A + (B/T)\right]$

The following values of A and B have been calculated by the compiler:

Solvent	A	в/к
2-Ethoxyethanol	-0.885	604
1,1'oxybis [2-chloroethane]	-0.670	604
Nitrobenzene	-0.120	468
Liquid paraffin	-4.828	1913
Silicone PFMS-4F	-1.922	1108

In the opinion of the compiler these distribution constants cannot be equated with Ostwald coefficients unless the assumption is made that equilibrium was established between gas and liquid phases under the conditions of the experiment.

In addition, possible adsorption of the silane at the stationary phasecarrier gas interface may have lowered the accuracy of the results.

	OPTCINAL MEACUPRIMINE
COMPONENTS:	Derive tack C. C. a. Estalana D. E. a
1. Silane; Sin ₄ ; [/803-62-5]	Zorin, A.D.; Zueva, M.V.
2. Various liquids	Russ J Inong Cham 1963 8
	678-682
VARIABLES:	PREPARED BY:
i emperature	1.0.1. 1099
· · · · · · · · · · · · · · · · · · ·	
EXPERIMENTAL VALUES:	
Solvent Dist vo	ribution constant Heat of solution ^l /vol /kcal mol ⁻¹ SiH ₄ solvent
2-Furancarboxaldebyde: C.H.O.:	
[98-01-1]	3.08 -4.4
1.2-Benzenedicarboxylic acid.	
didecyl ester; C ₂₈ H ₄₆ O ₄ ;	
[84-77-5]	4.8 -3.8
Triethoxysilane; C ₆ H ₁₆ O ₃ Si; [998-30-1]	2.8 -6.0
Silicic acid, tetraethyl ester; C ₈ H ₂₀ O ₄ Si; [78-10-4]	5.10 -5.4
Silicone 702-DF	3.8 -2.0
Silicone VKZh-94B	3.0 -4.3
Temperature = 293.2 K Distribution constants were measure	between 278.2 K and 323.2 K. The
stated. The total pressures of silane at which stated. The total pressure of silan in each case. Distribution constan only but heats of solution, said to	h these measurements were made were not he and carrier gas was about 760 mmHg ts were reported at one temperature have been calculated from the
AUXILIARY	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
A chromatographic method was used.	1. Prepared by disproportionation
Temperatures were controlled to ±0.5K	of triethoxysilane in the
Nichrome spirals. The carrier gas	distilled with low temperature
was either nitrogen or hydrogen. The	still; chromatographically pure.
calculated from the weight of the	$H_2 \& N_2$: passed through activat-
column before and after filling with	ed carbon and through molecular
free volume, V, was equated with	SIEVE.
the retention volume for hydrogen gas	
The distribution constant, K, was	ESTIMATED ERROR:
equation:	
$v_{R} = v_{g} + K v_{l}$	
where V_{p} is the retention volume	REFERENCES:
for silane.	

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Silane; SiH ₄ ; [7803-62-5]	Devyatykh, G.G. Ezheleva, A.E. Zorin, A.D.; Zueva, M.V.
2. Various liquids	Russ. J. Inorg. Chem. <u>1963,</u> 8, 678-682.

EXPERIMENTAL VALUES:

variation of distribution constants with temperature, were given.

If it is assumed that distribution constants vary with temperature according to equations of the form:

 $\ln \kappa = (-\Delta H/RT) + A$

where K is the distribution constant for a temperature T, ΔH is the heat of solution in the solvent and A is a constant for the solvent, then distribution constants at any temperature in the range 278.2 K to 323.2K may be estimated from a value at 293.2 K and the corresponding value of the heat of solution. The equation for K may be written in the form :

 $K = \exp [A + (B/T)]$

The following values of A and B have been calculated by the compiler:

Solvent	А	B/K
2-Furancarboxaldehyde	-6.431	2215
<pre>1,2-Benzenedicarboxylic acid didecyl ester</pre>	-4.957	1913
Triethoxysilane	-9.274	3021
Silicic acid, tetraethyl est	er-7.644	2719
Silicone 702-DF	-2.100	1007
Silicone VKZh-94B	-6.286	2165

In the opinion of the compiler these distribution constants cannot be equated with Ostwald coefficients unless the assumption is made that equilibrium was established between gas and liquid phases under the conditions of the experiment.

In addition, possible adsorption of silane at the stationary phasecarrier gas interface may have lowered the accuracy of the results.

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COMPONENTS:	ORIGINAL MEASUREMENTS:
<pre>1. Silane, SiH₄; [7803-62-5] 2. Cyclohexanol, C₆H₁₂O; [108-93-0]</pre>	Cauquil, G. J. Chim. Phys. Phys. Chim. Biol. <u>1927</u> , 24, 53-55.
	·
VARIABLES:	PREPARED BY: P. G. T. Fogg
EXPERIMENTAL VALUES:	L
T/K ^p SiH ₄ /mmHg Ostw	ald coefficient Mole fraction* L x_{SiH_4} (1 atm)
299.2 765	0.097 0.00042
<pre>// I atm = 1.013 x 10⁵ Pa * Calculated by the compiler using equation for SiH₄ given in ref.</pre>	constants of the van der Waals (1) and densities of C ₆ H ₁₂ 0 given
in refs. (1) and (2)	
	INFORMATION
METHOD/APPARATUS/PROCEDURE: A measured volume of cyclohexanol was put into contact with a measured volume of silane in a graduated tube over mercury. The final volume of gas and the temperature and pressure were measured when equilibrium had been reached. The author considered that no allowance for the vapor pressure of cyclohexanol at the temperature of measurement was necessary.	SOURCE AND PURITY OF MATERIALS: C ₆ H ₁₂ O: dissolved air removed by boiling. b.p. 334.1 K (766 mmHg) ESTIMATED ERROR:
	 REFERENCES: 1. Handbook of Chemistry & Physics (61st edition), C.R.C. Press, Cleveland, Ohio. <u>1980</u>. 2. J. Timmermans, Physico-Chemical Constants of Pure Organic Compound. Vol. 2, Elsevier, Amsterdam. <u>1965</u>.

COMPONENTS:		ORIGINAL MEASUREMENTS:		
1. Germane, GeH ₄ ; [7782-65-2]		Devyatykh, G.G.; Ezheleva, A.E.; Zorin, A.D.; Zueva, M.V.		
2. Various liquids		Russ. J. Inorg. Chem. <u>1963</u> ,8, 678-682.		
VARIABLES:		PREPARED BY:		
Temperature, press	ıre	P.G.T. Fogg	P.G.T. Fogg.	
EXPERIMENTAL VALUES:				
Solvent	Pressure range /mmHg	Distribution constant ^{Vol} GeH4 ^{/Vol} solvent	Heat of solution /kcal mol ⁻¹	
2-Ethoxyethanol, C ₄ H ₁₀ O ₂ ; [110-80-5]	0.1 - 18.5	6.24	-1.3	
l,1 ⁻ -oxybis [2-chloroethane], C ₄ H ₈ Cl ₂ O; [111-44-4]	0.05- 16.3	8.57	-1.5	
Nitrobenzene, C ₆ H ₅ NO ₂ ; [98-95-3]	0.03- 19.0	9.0	-1.64	
Liquid paraffin	0.4 - 43.5	9.4	-3.4	
Silicone PFMS-4F	0.03- 22.0	11.7	-3.0 .	
Temperature = 293.2K.	760 mmHg =	$1 \text{ atm} = 1.013 \times 10^5 \text{ Pa.}$		
Distribution constants were measured by range of partial pressures of germane a mmHg. At a fixed temperature the dist from the mean values by more than ± 3 %. at one temperature only but heats of so ated from the variation of distribution given. If it is assumed that distribu		between 278.2 K and 323.2 and a total pressure of ribution constants did n These mean values were solution, said to have be on constants with tempera tion constants vary with	K over a about 760 ot depart reported en calcul- ture, were temperature	
	AUXILIARY	INFORMATION		
METHOD / APPARATUS / PROCEDURE :		SOURCE AND PURITY OF MATERIAL	.S ;	
A chromatographic method w Temperatures were control: \pm 0.5 K. The support phase consisted of Nichrome spin carrier gas was either nit or hydrogen. The volume, the liquid phase was calcu from the weight of the col- and after filling with lic allowing to drain. The fra- volume, V _g , was equated with	vas used. led to se cals. The crogen V ₁ , of lated lumn before quid and cee th the	 Prepared by reduction lithium tetrahydroal ether; distilled wit temperature still; c H₂ and N₂ : passed t activated carbon and molecular sieve. 	n of GeCl ₄ by uminate in h low ontained 5% H ₂ hrough through	
The distribution constant, calculated from the James Martin equation:	A K, was and	ESTIMATED ERROR:		
$v_{R} = v_{g} + Kv_{l}$		REFERENCES:	;	
where V_R is the retention germane.	volume for			

COMPONENTS: 1. Germane, GeH₄; [7782-65-2]

2. Various liquids

ORIGINAL MEASUREMENTS

Devyatykh, G.G.; Ezheleva, A.E. Zorin, A.D.; Zueva, M.V.

Russ. J. Inorg. Chem. <u>1963</u>, 8, 678-682.

EXPERIMENTAL VALUES:

according to equations of the form:

 $\ln K = (-\Delta H/RT) + A$

where K is the distribution constant for a temperature $T, \Delta H$ is the heat of solution of germane in the solvent and A is a constant for the solvent, then distribution constants at any temperature in the range 278.2 K may be estimated from a value at 293.2 K and the corresponding value of the heat of solution. The equation for K may be written in the form:

 $K = \exp \left[A + (B/T)\right]$

The following values of A and B have been calculated by the compiler:

Solvent	A	B/K
2-Ethoxyethanol	-0.402	655
1,1'-oxybis [2-chloroethane]	-0.428	755
Nitrobenzene	-0.619	826
Liquid paraffin	-3.598	1712
Silicone PFMS-4F	-2.692	1511

In the opinion of the compiler these distribution constants cannot be equated with Ostwald coefficients unless the assumption is made that equilibrium was established between gas and liquid phases under the conditions of the experiment.

In addition, possible adsorption of the germane at the stationary phasecarrier gas interface may have lowered the accuracy of the results.

COMPONENTS	ORIGINAL MEASUREMENTS.
1. Germane; GeH ₄ ; [7782-65-2]	Devyatykh, G.G.; Ezheleva, A.E.; Zorin, A.D.; Zueva, M.V.
2. Various liquids	Russ. J. Inorg. Chem. <u>1963</u> ,8, 678-682.
VARIABLES: Temperature	PREPARED BY: P.G.T. Fogg
Solvent D	istribution constant Heat of solution vol _{GeH4} vol _{solvent} / kcal mol ⁻¹
2-Furancarboxaldehyde, C ₅ H ₄ O ₂ ; [98-01-1]	8.31 -4.5
l,2-Benzenedicarboxylic acid, didecyl ester, C ₂₈ H ₄₆ O ₄ ;[84-77-5]	7.4 -3.4
Triethoxysilane, C ₆ H ₁₆ O ₃ Si; [998-30-1]	6.8 -4.4
Silicic acid, tetraethyl ester, C ₈ H ₂₀ O₄Si; [78-10-4]	11.72 -6.4
Silicone 702-DF	6.14 -3.2
Silicone VKZh-94B	3.98 -4.3 -
Temperature = 293.2 K	
Distribution constants were measured between 278.2 K and 323.2 K. The partial pressures of germane at which these measurements were made were not stated. The total pressure of germane and carrier gas was about 760 mmHg in each case. Distribution constants were reported at one temperature only but heats of solution, said to have been calculated from the variation of distribution constants with temperature, were give	
AUXILIAR	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
A chromatographic method was used. Temperatures were controlled to \pm 0.5K. The support phase consisted of Nichrome spirals. The carrier gas was either nitrogen or hydrogen. The volume, V ₁ , of the liquid phase was calculated from the weight of the colum before and after filling with liquid and allowing to drain. The free volume, V _g , was equated wit the retention volume for hydrogen	1. Prepared by reduction of GeCl ₄ by lithium tetrahydroaluminate in ether; distilled with low temperature still; contained 5% H ₂ . H ₂ and N ₂ : passed through activated carbon and through molecular sieve
gas. The distribution constant, K, was calculated from the James and Martin equation:	ESTIMATED ERROR:
$v_{R} = v_{\sigma} + k v_{1}$	
where V_R is the retention volume for germane.	REFERENCES:

Solubilities of Silane, Germane and Stannane

COM	PONENTS:	ORIGINAL MEASUREMENTS
 Germane; GeH₄; [7782²65-2] 	Germane; GeH ₄ ; [7782-65-2]	Devyatykh, G.G.; Ezheleva, A.E. Zorin, A.D.; Zueva, M.V.
2.	Various liquids	Russ. J. Inorg. Chem. <u>1963</u> ,8, 678-682.

EXPERIMENTAL VALUES:

If it is assumed that distribution constants vary with temperature according to equations of the form:

 $\ln K = (-\Delta H/RT) + A$

where K is the distribution constant for a temperature $T, \Delta H$ is the heat of solution in the solvent and A is a constant for the solvent, then distribution constants at any temperature in the range 278.2 K to 323.2 K may be estimated from a value at 293.2 K and the corresponding value of the heat of solution. The equation for K may be written in the form:

 $K = \exp \left[A + (B/T)\right]$

The following values of A and B have been calculated by the compiler:

Solvent	A	B/K
2-Furancarboxaldehyde	-5.611	2266
<pre>l,2-Benzenedicarboxylic acid, didecyl ester</pre>	-3.837	1712
Triethoxysilane	-5.639	2215
Silicic acid, tetraethyl ester	-8.530	3222
Silicone 702-DF	-3.681	1611
Silicone VKZh-94B	-6.003	2165

In the opinion of the compiler these distribution constants cannot be equated with Ostwald coefficients unless the assumption is made that equilibrium was established between gas and liquid phases under the conditions of the experiment.

In addition, possible adsorption of the germane at the stationary phasecarrier gas interface may have lowered the accuracy of the results.

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	ORIGINAL MEAS	ORIGINAL MEASUREMENTS:		
1. Stannane; SnH ₄ ; [2406-52-2]	Devyatykh,	Devyatykh, G. G.; Ezheleva, A. E.;		
	Zorin, A.	Zorin, A. D.; Zueva, M. V.		
2. Various liquids	Russ. J. I	norg. Chem.		
	1963, 8, 6	78-682.		
VARTABLES :	PREPARED BY			
VARIABLE .	richt med bri			
Temperature, pressure		P. G. T. FC	99	
	1			
EXPERIMENTAL VALUES:		Distribution	Heat of	
Solvent	² SnH.	constant	solution	
borvent	/mmHa	VOI SnH ₄	/kcal mol	
		solvent		
	··· · · · · · · · · · · · · · · · · ·			
2-Ethoxyethanol; $C_4H_{10}O_2$;	0 5	26.2	1 54	
[110-00-5]	0.5	20.2	-1.54	
$C_4H_8Cl_2O;$ [111-44-4]	0.3	27.3	-2.3	
Nitrobenzene; C ₆ H ₅ NO ₂ ;				
[98-95-3]	0.9	15.4	-1.82	
Liquid paraffin	1.2	17.0	-3.9	
Silicone PFMS-4F	0.9	12.1	-2.8	
Temperature = 293.2 K. 760 mmH	Ig = 1 atm =	= 1.013 × 10 ⁵ Pa	ı .	
total pressure of stannane and carrier gas of about 760 mmHg. At a fixed temperature the distribution constants did not depart from the mean values by more than ±3%. These mean values were reported at one temperature only but heats of solution, said to have been calculated from the variation of distribution constants with temperature, were given. If it is assumed that distribution constants vary with temperature according to equations of the form:				
	·· <u>···</u> ····		(cont.)	
AUXILIARY	INFORMATION			
METHOD/APPARATUS/PROCEDURE:	SOURCE AND P	URITY OF MATERIALS	:	
A chromatographic method was used.				
Temperatures were controlled to	1. Prepare	d by reduction		
±0.5 K. The support phase consisted	borate	ueous soaium te	of SnCl ₄	
of Nichrome enirals The carrier		in acid: purif	of SnCl ₄ trahydro- ied by	
Of Michicome Spirars. The carrier	vacuum	<pre>in acid; purif distillation;</pre>	of SnCl ₄ trahydro- ied by contained	
gas was either nitrogen or hydrogen.	vacuum ∿ 5% H₂	<pre>in acid; purif distillation; .</pre>	of SnCl ₄ trahydro- ied by contained	
gas was either nitrogen or hydrogen. The volume, V_{ℓ} , of the liquid phase	vacuum \sim 5% H ₂ H ₂ and N ₂ :	<pre>in acid; purif distillation; . passed throug</pre>	of SnCl ₄ trahydro- ied by contained h activated	
gas was either nitrogen or hydrogen. The volume, V_l , of the liquid phase was calculated from the weight of	vacuum $\sim 5\%$ H ₂ H ₂ and N ₂ :	<pre>in acid; purif distillation; passed throug carbon and th cular sieve</pre>	of SnCl ₄ trahydro- ied by contained h activated rough mole-	
gas was either nitrogen or hydrogen. The volume, V_{l} , of the liquid phase was calculated from the weight of the column before and after filling	vacuum \sim 5% H ₂ H ₂ and N ₂ :	<pre>in acid; purif distillation; . passed throug carbon and th cular sieve.</pre>	of SnCl ₄ trahydro- ied by contained h activated rough mole-	
gas was either nitrogen or hydrogen. The volume, V_{l} , of the liquid phase was calculated from the weight of the column before and after filling with liquid and allowing to drain.	vacuum \sim 5% H ₂ H ₂ and N ₂ :	<pre>in acid; purif distillation; passed throug carbon and th cular sieve. </pre>	of SnCl ₄ trahydro- ied by contained h activated rough mole-	
gas was either nitrogen or hydrogen. The volume, V_{ℓ} , of the liquid phase was calculated from the weight of the column before and after filling with liquid and allowing to drain. The free volume, V_{σ} , was equated with	vacuum \sim 5% H ₂ H ₂ and N ₂ : ESTIMATED ER	<pre>in acid; purif distillation; passed throug carbon and th cular sieve. ROR:</pre>	of SnCl ₄ trahydro- ied by contained h activated rough mole-	
gas was either nitrogen or hydrogen. The volume, V_{l} , of the liquid phase was calculated from the weight of the column before and after filling with liquid and allowing to drain. The free volume, V_{g} , was equated with the retention volume for hydrogen	vacuum \sim 5% H ₂ H ₂ and N ₂ :	<pre>in acid; purif distillation; passed throug carbon and th cular sieve. ROR:</pre>	of SnCl ₄ trahydro- ied by contained h activated rough mole-	
gas was either nitrogen or hydrogen. The volume, V_{l} , of the liquid phase was calculated from the weight of the column before and after filling with liquid and allowing to drain. The free volume, V_{g} , was equated with the retention volume for hydrogen gas. The distribution constant, K,	vacuum \sim 5% H ₂ H ₂ and N ₂ : ESTIMATED ER	in acid; purif distillation; passed throug carbon and th cular sieve.	of SnCl ₄ trahydro- ied by contained h activated rough mole-	
gas was either nitrogen or hydrogen. The volume, V_{l} , of the liquid phase was calculated from the weight of the column before and after filling with liquid and allowing to drain. The free volume, V_{g} , was equated with the retention volume for hydrogen gas. The distribution constant, K , was calculated from the James and	vacuum \sim 5% H ₂ H ₂ and N ₂ : ESTIMATED ER REFERENCES:	<pre>in acid; purif distillation; passed throug carbon and th cular sieve. ROR:</pre>	of SnCl ₄ trahydro- ied by contained h activated rough mole-	
gas was either nitrogen or hydrogen. The volume, V_{l} , of the liquid phase was calculated from the weight of the column before and after filling with liquid and allowing to drain. The free volume, V_{g} , was equated with the retention volume for hydrogen gas. The distribution constant, K , was calculated from the James and Martin equation:	vacuum \sim 5% H ₂ H ₂ and N ₂ : ESTIMATED ER REFERENCES:	in acid; purif distillation; passed throug carbon and th cular sieve.	of SnCl ₄ trahydro- ied by contained h activated rough mole-	
gas was either nitrogen or hydrogen. The volume, V_{l} , of the liquid phase was calculated from the weight of the column before and after filling with liquid and allowing to drain. The free volume, V_{g} , was equated with the retention volume for hydrogen gas. The distribution constant, K, was calculated from the James and Martin equation: $V_{p} = V_{a} + KV_{a}$	vacuum \sim 5% H ₂ H ₂ and N ₂ : ESTIMATED ER REFERENCES:	in acid; purif distillation; passed throug carbon and th cular sieve.	of SnCl ₄ trahydro- ied by contained h activated rough mole-	
gas was either nitrogen or hydrogen. The volume, V_{ℓ} , of the liquid phase was calculated from the weight of the column before and after filling with liquid and allowing to drain. The free volume, V_{g} , was equated with the retention volume for hydrogen gas. The distribution constant, K, was calculated from the James and Martin equation: $V_{R} = V_{g} + KV_{\ell}$	vacuum \sim 5% H ₂ H ₂ and N ₂ : ESTIMATED ER REFERENCES:	in acid; purif distillation; passed throug carbon and th cular sieve.	of SnCl ₄ trahydro- ied by contained h activated rough mole-	
gas was either nitrogen or hydrogen. The volume, V_{l} , of the liquid phase was calculated from the weight of the column before and after filling with liquid and allowing to drain. The free volume, V_{g} , was equated with the retention volume for hydrogen gas. The distribution constant, K , was calculated from the James and Martin equation: $V_{R} = V_{g} + KV_{l}$ where V_{R} is the retention volume for	vacuum \sim 5% H ₂ H ₂ and N ₂ : ESTIMATED ER REFERENCES:	in acid; purif distillation; passed throug carbon and th cular sieve. ROR:	of SnCl ₄ trahydro- ied by contained h activated rough mole-	

Solubilities of Silane, Germane and Stannane

COMPONENTS:		ORIGINAL MEASUREMENTS:
 Stannane; SnH₄; Various liquids 	[2406-52-2]	Devyatykh, G. G.; Ezheleva, A. E.; Zorin, A. D.; Zueva, M. V. <i>Russ. J. Inorg. Chem.</i> 1963, <i>8</i> , 678-682.

EXPERIMENTAL VALUES:

 $\ln K = (-\Delta H/RT) + A$

where K is the distribution constant for a temperature T, ΔH is the heat of solution of stannane in the solvent and A is a constant for the solvent, then distribution constants at any temperature in the range 278.2 K to 323.2 K may be estimated from a value at 293.2 K and the corresponding value of the heat of solution. The equation for K may be written in the form:

```
K = \exp \left[A + (B/T)\right].
```

The following values of A and B have been calculated by the compiler:

Solvent	А	в/к
2-Ethoxyethanol	0.621	775
l,l'-oxybis[2-chloroethane]	-0.643	1158
Nitrobenzene	-0.391	916
Liquid paraffin	-3.864	1964
Silicone PFMS-4F	-2.315	1410

In the opinion of the compiler these distribution constants can not be equated with Ostwald coefficients unless the assumption is made that equilibrium was established between gas and liquid phases under the conditions of the experiment.

In addition, possible adsorption of stannane at the stationary phasecarrier gas interface may have lowered the accuracy of the results.

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COMPONENTS:	ORIGINAL MEASUREMENTS:		
1 Stampono SnH (2406-52-2)	Devvatykh, G. G.: Ezheleva, A. E.		
1. Stannane; Sint; [2400-52-2]	Zorin A D : Zueva M V		
	Buss I Thong Chem		
2. Various liquids	1062 0 670_602		
	<u>1903</u> , 8, 878-882.		
VARIABLES:	PREPARED BY:		
Temperature	P. G. T. Fogg		
EXPERIMENTAL VALUES:			
	constant Heat of solution		
Solvent	vol /kcal mol ⁻¹		
	/vol_solvent		
2-Furancarboxaldehyde; $C_5H_4O_2$;			
[98-01-1]	18.2 -4.6		
1,2-Benzenedicarboxylic acid, didecyl			
ester; $C_{28}H_{46}O_{4}$; [84-//-5]	8.3 -4.0		
Triethoxysilane; $C_6H_{16}O_3S1;$ [998-30-1]	31.7 -6.0		
Silicic acid, tetraethyl ester;			
$C_{8}H_{20}O_{4}SI;$ [78-10-4]			
Silicone /u2-DF			
Silicone VK2n-94B	7.26 -5.6		
Temperature = 293.2 K.			
Distribution constants were measured between 278.2 K and 323.2 K. The partial pressures of stannane at which these measurements were made were not stated. The total pressure of stannane and carrier gas was about 760 mmHg in each case. Distribution constants were reported at one temperature only but heats of solution, said to have been calculated from the variation of distribution constants with temperature, were given.			
METHOD/APPARATUS/PROCEDURE:	Dependence and PORITY OF MATERIALS;		
A chromatographic method was used.	with aqueous sodium tetrahydro-		
Temperatures were controlled to	borate in acid; purified by		
±0.5 K. The support phase consisted	\sim 5% H ₂ .		
of Nichrome spirais. The carrier			
gas was either hitrogen or hydrogen.	n ₂ and N ₂ : passed through acti- vated carbon and through		
The volume, V _l , of the liquid phase	molecular sieve.		
was calculated from the weight of			
the column before and after filling			
with liquid and allowing to drain.	ESTIMATED ERROR:		
The free volume, V, was equated with			
the retention volume for hydrogen			
gas. The distribution constant, K,	REFERENCES		
was calculated from the James and			
Martin equation:			
$v_{R} = v_{g} + k v_{k}$			

Solubilities of Silane, Germane and Stannane

COMPONENTS:	ORIGINAL MEASUREMENTS:	
<pre>1. Stannane; SnH₄; [2406-52-2]</pre>	Devyatykh, G. G.; Ezheleva, A. E.; Zorin, A. D.; Zueva, M. V.	
2. Various liquids	Russ. J. Inorg. Chem.	
	<u>1963</u> , 8, 678-682.	

EXPERIMENTAL VALUES:

If it is assumed that distribution constants vary with temperature according to equations of the form:

 $\ln K = (-\Delta H/RT) + A$

where K is the distribution constant for a temperature T, ΔH is the heat of solution in the solvent and A is a constant for the solvent, then distribution constants at any temperature in the range 278.2 K to 323.2 K may be estimated from a value at 293.2 K and the corresponding value of the heat of solution. The equation for K may be written in the form:

 $K = \exp \left[A + (B/T)\right].$

The following values of A and B have been calculated by the compiler:

Solvent

2-Furancarboxaldehyde	-4.998	2316
1,2-Benzenedicarboxylic acid, didecyl ester	-4.753	2014
Triethoxysilane	-6.848	3021
Silicic acid, tetraethyl ester	-5.514	2518
Silicone 702-DF	-2.849	1511
Silicone VKZh-94B	-7.635	2820

Α

B/K

In the opinion of the compiler these distribution constants can not be equated with Ostwald coefficients unless the assumption is made that equilibrium was established between gas and liquid phases under the conditions of the experiment.

In addition, possible adsorption of stannane at the stationary phasecarrier gas interface may have lowered the accuracy of the results.