COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Hydrogen sulfide; H_2S; [7783-06-4] 2. Various liquids	Devyatykh, G.G.; Ezheleva, A.E.; Zorin, A.D.; Zueva, M. V. *Zh. Neorgan. Khim.* 1963, *8(6)*, 1307-1313. *Russ. J. Inorg. Chem.* 1963, *8*, 678-682.
VARIABLES:	PREPARED BY:
Temperature, pressure	P.G.T. Fogg

EXPERIMENTAL VALUES:

Solvent	Distribution constant vol.H_2S / vol.solvent	Heat of solution / kcal mol^{-1}
2-Ethoxyethanol; $C_4H_{10}O_2$; [110-80-5]	12.5	- 0.9
Nitrobenzene; $C_6H_5NO_2$; [98-95-3]	12.4	- 2.29
2-Furancarboxaldehyde; $C_5H_4O_2$; [98-01-1]	17.3	- 3.5
1,1'-Oxybis[2-chloroethane]; $C_4H_8Cl_2O$; [111-44-4]	10.5	- 3.3
1,2-Benzenedicarboxylic acid, didecyl ester; $C_{28}H_{46}O_4$; [84-77-5]	34.3	- 3.6
Triethoxysilane; $C_6H_{16}O_3Si$; [998-30-1]	3.52	- 4.7
Silicic acid, tetraethyl ester; $C_8H_{28}O_4Si$; [78-10-4]	5.21	- 4.5
Liquid paraffin	18.32	- 2.6
Silicone 702-DF	37.0	- 3.0
Silicone PFMS-4F	8.4	- 2.8
Silicone VKZh-94B	16.5	- 5.6

Temperature = 293.2 K

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

A chromatographic method was used. 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 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 i.e.

$$V_R = V_g + KV_1$$

where V_R is the retention volume for hydrogen sulfide.

SOURCE AND PURITY OF MATERIALS:

1. from FeS and HCl; purified by vacuum distillation.

H_2 & N_2 : passed through activated carbon and through molecular sieve.

ESTIMATED ERROR:

$\delta T/K = \pm 0.5$ (authors)

REFERENCES:

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EXPERIMENTAL VALUES:

Distribution constants were measured between 278.2 K and 323.2 K with a total pressure of hydrogen sulfide and carrier gas of about 760 mmHg (1.013 bar). In the case of measurements on 2-ethoxyethanol the partial pressure of hydrogen sulfide at the inlet to the column varied from 1.4 to 21.9 mmHg. The partial pressure at the exit to the column varied from 0.2 to 20.7 mmHg depending upon the inlet pressure and the length of the column. The corresponding partial pressures during experiments on other solvents were not stated but are likely to have been similar.

The authors stated that, 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. The detail of these calculations were not given by the authors but the compiler considers that they used an equation 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 of hydrogen sulfide in the solvent and A is a constant for the solvent. On the basis of this equation distribution constants in the range 278.2 K to 323.2 K may be estimated from a value at 293.2 K and the corresponding 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	A	B/K
2-Ethoxyethanol	0.980	453
Nitrobenzene	- 1.415	1153
2-Furancarboxaldehyde	- 3.160	1762
1,1'-Oxybis[2-chloroethane]	- 3.316	1662
1,2-Benzenedicarboxylic acid, didecyl ester	- 2.647	1813
Triethoxysilane	- 6.813	2367
Silicic acid, tetraethyl ester	- 6.077	2266
Liquid paraffin	- 1.557	1309
Silicone 702-DF	- 1.541	1511
Silicone PFMS-4F	- 2.680	1410
Silicone VKZh-94B	- 6.814	2820

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 the hydrogen sulfide at the stationary phase / carrier gas interface may have lowered the accuracy of the results.