COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nickel selenite; $NiSeO_3$; [10101-96-9] 2. Water; H_2O; [7732-18-5]	Ripan, R.; Vericeanu, G. *Studia Univ. Babes-Bolyai, Ser. Chim.* 1968, *13*, 31-37.
VARIABLES· One temperature: 291 K	PREPARED BY: Mary R. Masson

EXPERIMENTAL VALUES:

All concentrations are expressed in units of mol dm^{-3}.

Concentration	K_{s0} $mol^2\ dm^{-6}$	Mean K_{s0}	pK_{s0}
2.040×10^{-3}	4.16×10^{-6}	$5.1 \pm 1.5 \times 10^{-6}$	5.29
2.132×10^{-3}	4.55×10^{-6}		
2.133×10^{-3}	4.56×10^{-6}	$mol^2\ dm^{-6}$	
2.450×10^{-3}	6.0×10^{-6}		
2.365×10^{-3}	5.6×10^{-6}		
2.385×10^{-3}	5.6×10^{-6}		

The concentration c in the saturated solution was calculated from the measured conductivity κ from the equation

$$c = \frac{1000\kappa}{\Lambda^\circ}$$

Compiler's note
Neither in the determination of the ionic conductivity of the selenite ion nor in the evaluation of the solubility product was hydrolysis of the selenite ion taken into account. This would give rise to errors, since, for example, in a 0.001M solution, $[SeO_3^{-}] = 0.000955M$, $[HSeO_3^-] = 0.000045M$ and $[OH^-] = 0.000045M$, and hydroxide and hydrogen selenite have different ionic conductivities from selenite. If the ionic conductivity of hydrogen selenite were known, the experimental results could have been interpreted correctly (cf. ref. 2), but this value does not seem to be available.

However, because the calibration and sample solutions had concentrations of about the same order of magnitude, the errors would cancel to some extent, but the K_{s0} value cannot be regarded as reliable.

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The ionic conductivity of the selenite ion in water was determined by measuring the mean molar conductivities of a series of aqueous solutions of lithium selenite with concentrations below 2×10^{-3} mol dm^{-3}. The mean molar conductivity at infinite dilution was found by extrapolation to be $172 \pm 2.9\ \Omega^{-1}cm^2mol^{-1}$ at 18°C. At that temperature, the ionic conductivity of the lithium ion is $33.4\ \Omega^{-1}cm^2mol^{-1}$, so the ionic conductivity of the selenite ion is $105.2\ \Omega^{-1}cm^2mol^{-1}$.	Lithium selenite was prepared from sublimed selenium dioxide by neutralization with lithium hydroxide. An approximately 0.05M solution was standardized gravimetrically, and this was used to prepare the various dilutions. The composition of the selenite was checked by analysis.
The well washed nickel selenite was mixed with 150 ml of water and agitated intermittently for 1 hr. From this, 10-20 ml was taken in the conductivity cell and the conductivity measured. The sampling and measurement were repeated until a constant value for the conductivity was obtained. The value of $\Lambda^\circ = (\lambda_+ + \lambda_-)$, the molar conductivity, was calculated with $\lambda_- = 105.2$ and $\lambda_+ = 90\ \Omega^{-1}cm^2mol^{-1}$.	ESTIMATED ERROR: Temperature: ±0.5 K Error in K_{s0} (2s) = 1.5×10^{-6} (compiler)
	REFERENCES: 1. Landolt-Bornstein *Physicalisch-Chemische Tabellen II* 1923, p. 1105. 2. Monk, C.B. *J. Chem. Soc.* 1949, 429.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nickel selenite; $NiSeO_3$; [10101-96-9] 2a. Nitric acid; HNO_3; [7697-37-2] 2b. Sulfuric acid; H_2SO_4; [7664-93-9] 3. Water; H_2O; [7732-18-5]	Chukhlantsev, V.G.; Tomashevsky, G.P. *Zh. Anal. Khim.* <u>1957</u>, *12*, 296-301; **J. Anal. Chem. USSR* <u>1957</u>, *12*, 303-9.
VARIABLES: Nitric and sulfuric acid concentrations One temperature: 293 K	PREPARED BY: Mary R. Masson

EXPERIMENTAL VALUES:

All concentrations are expressed in units of mol dm^{-3}.

Soln.	Initial pH	Final pH	$[Ni^{2+}]$	pNi	log $\alpha_{L(H)}$	$p[SeO_3^{2-}]$	pK_{s0}
HNO_3	2.41	7.12	8.8×10^{-3}	2.06	0.91	2.97	5.03
	2.05	6.20	2.6×10^{-2}	1.59	1.80	3.39	4.98
H_3SO_4	2.74	7.68	5.1×10^{-3}	2.29	0.50	2.79	5.08
	2.13	6.38	2.1×10^{-2}	1.67	1.63	3.30	4.97
	2.08	6.26	2.5×10^{-2}	1.60	1.72	3.32	4.92

The average value is $K_{s0} = 1.0 \times 10^{-5}$ mol^2dm^{-6}.

$$(pK_{s0} = 5.0)$$

<u>Notes</u>.

$[Se_{tot}] = [Ni^{2+}]$ and $[SeO_3^{2-}] = [Se_{tot}]/\alpha_{L(H)}$

where $\alpha_{L(H)} = (1 + [H^+]/K_2 + [H^+]^2/K_1K_2)$

and the acid dissociation constants have the values $K_1 = 4 \times 10^{-3}$ and

$K_2 = 1.0 \times 10^{-8}$ (ref. 1).

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Solutions of nitric and sulfuric acids were saturated with nickel selenite by shaking in a thermostat at $20^{\pm}0.05°C$ for 8 hr. The remaining solid phase was removed by centrifugation, then the pH was measured ("Moskip" pH meter, to 0.01 pH unit) and the nickel concentration was determined gravimetrically with dimethyl-glyoxime.	C.P.-grade reagents were used. Nickel selenite was prepared by mixing a $0.1N$ solution of nickel sulfate with a 5% excess of $0.1N$ sodium selenite. After 24 hr, the precipitate was separated by centrifugation and decanting, then it was dried at 40°C. Nickel was determined gravimetrically as the dimethylglyoximate, and selenium as the element after precipitation with hydrazine.

ESTIMATED ERROR:
$^{\pm}0.1 \times 10^{-5}$. (The spread in the results is 0.16 of a log unit.) Temperature: $^{\pm}0.05$ K

REFERENCES:
1. Rumpf, P. *Compt. Rendu* <u>1933</u>, *197*, 686.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nickel selenite; $NiSeO_3$; [10101-96-9]	Ebert, M.; Mička, Z.; Peková, I.
2. Selenium dioxide; SeO_2; [7446-08-4]	*Collect. Czech. Chem. Commun.* 1982, 47, 2069-76.
3. Water; H_2O; [7732-18-5]	

VARIABLES:	PREPARED BY:
One temperature: 298 K	Mary R. Masson

EXPERIMENTAL VALUES:

The solution at point P has the composition 7.1% $NiSeO_3$, 17.9% SeO_2 and 75.0% H_2O.   The solution at point E has the composition 8.0% $NiSeO_3$, 64.8% SeO_2 and 27.2% H_2O.   The other data were presented only in graphical form.

The concentration at the two points expressed as molalities[a] are:

for P, $NiSeO_3$ = 0.510 mol/kg, SeO_2 = 2.151 mol/kg;

for E, $NiSeO_3$ = 1.584 mol/kg, SeO_2 = 21.470 mol/kg.
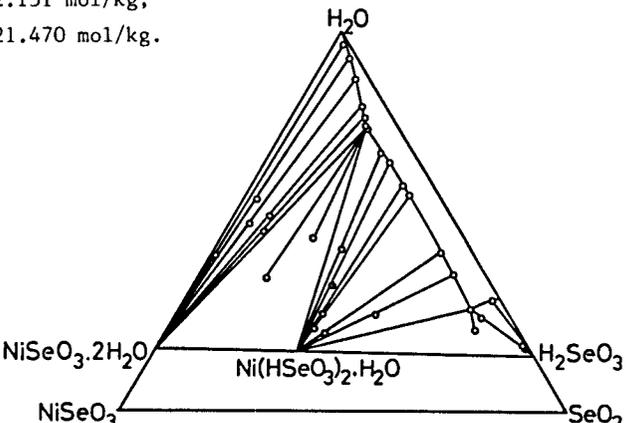
[a] Molalities calculated by the compiler.   Reprinted by permission

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Schreinemakers' wet residue method was used to study the solubility in this system. It required 5 - 12 weeks for equilibrium to be established. Selenium(IV) was determined iodometrically (1), and nickel by titration with EDTA, with murexide as indicator (2).	$NiSeO_3 \cdot 2H_2O$ was prepared by dropwise addition of $0.06M$ sodium selenite solution to boiling $0.05M$ nickel chloride solution. Reagent-grade materials (Lachema, Brno) were used.
	ESTIMATED ERROR:
	No estimates possible.
	REFERENCES:
	1. Ganitskii, M.Zh.; Zelinokrajte, V.I. *Zh. Neorg. Khim.* 1957, 2, 134.
	2. Přibil, R. *Applied Complexometry*, Pergamon, Oxford, 1982.