COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Europium chloride; $EuCl_3$; [10025-76-0] (2) Alcohols	Kirmse, E.M. *Tr. II Vses. Konf. po Teor. Rastvorov* <u>1971</u>, 200-6.

VARIABLES:	PREPARED BY:
T/K - 298	T. Mioduski and M. Salomon

EXPERIMENTAL VALUES:

				$EuCl_3$ solubility[a]	
solvent				mass %	mole kg^{-1}
2-methoxyethanol;	$C_3H_8O_2$;	[109-86-4]		4.4	0.18^b
2-ethoxyethanol;	$C_4H_{10}O_2$;	[110-80-5]		20.8	1.02^c
1-propanol;	C_3H_8O;	[71-23-8]		33.5	1.95^d

[a]Molalities calculated by the compilers.

[b]Solid phase is $EuCl_3.2.95C_3H_8O_2$.

[c]Solid phase is $EuCl_3.2C_4H_{10}O_2$.

[d]Solid phase is $EuCl_3.C_3H_8O$.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Experimental details not given, but were probably similar to previous works of the author which are compiled throughout this volume.	Nothing specified, but based on previous work by the author, the anhydrous salt was probably prepared by the method of Taylor and Carter (1).

	ESTIMATED ERROR:
	Nothing specified.

	REFERENCES:
	1. Taylor, M.D.; Carter, C.P. *J. Inorg. Nucl. Chem.* <u>1962</u>, *24*, 387.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Europium chloride; $EuCl_3$; [10025-76-0] (2) Ethanol; C_2H_6O; [64-17-5] (3) Water; H_2O; [7732-18-5]	Sakharova, N.N.; Sakharova, Yu.G.; Ezhova, T.A.; Izmailova, A.A. *Zh. Neorg. Khim.* 1975, 20, 1479-83; *Russ. J. Inorg. Chem. (Engl. Transl.)* 1975, 20, 830-2.

VARIABLES:	PREPARED BY:
Temperature	T. Mioduski and M. Salomon

EXPERIMENTAL VALUES:

solubility of $EuCl_3 \cdot 6H_2O$ in 96.8 % C_2H_5OH[a]

t/°C	sample 1 g/100 g[b]	sample 2 g/100 g	sample 3 g/100 g	sample 4 g/100 g	mean solubilities g/100 g	mol kg^{-1}[c]
20	29.23	29.18	29.20	29.30	29.23	1.127
30	29.39	29.32	29.22	29.17	29.27	1.129
40	29.47	29.58	29.86	29.94	29.71	1.154
50	30.95	31.13	30.99	31.16	31.05	1.229
60	33.33	33.14	32.87	32.70	33.01	1.345

[a]It is not clearly stated whether the mixture is 96.8 mass % of 96.8 volume % ethanol.

[b]Solubilities reported as grams of hexahydrate in 100 g of solvent.

[c]Molalities calculated by the compilers.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Isothermal method used. Equilibrium was reached after 3-4 h. Identical results obtained by approaching equilibrium from above and below. Two of the data points in the table were obtained after 3 h of equilibration, and the remaining two data points were obtained after 4 h of equilibration. The metal content in each aliquot taken for analysis was determined by complexometric titration with Trilon B. Analyses of the solids withdrawn at 20°C, 40°C and 60°C showed the solid phase to be the hexahydrate: i.e. ethanol was not found in any of the solid phases. The hexahydrate melted at 151.2 - 151.7°C.	$EuCl_3 \cdot 6H_2O$ prepd by dissolving c.p. grade oxide in dil (1:3) HCl followed by evapn and crystn. The crystals were dried in a desiccator over $CaCl_2$, P_2O_5 and NaOH. The crystals analyzed for the metal by titrn with Trilon B, and for Cl by the Volhard method. Found (%) for Eu: 41.53, 41.40 (calcd 41.48). Found (%) for Cl; 29.27, 22.10 (calcd 29.07). 96.8% ethanol prepd by prolonged boiling of c.p. grade 93.5% ethanol with anhydr $CuSO_4$ followed by distn. Ethanol concn determined refractometrically and pycnometrically.
	ESTIMATED ERROR: Soly: results apparently precise to within ± 0.8% (compilers). Temp: nothing specified.
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Europium chloride; $EuCl_3$; [10025-76-0] (2) 1,2-Diethoxyethane; $C_6H_{14}O_2$; [629-14-1]	Kirmse, E.M.; Zwietasch, K.J. *Z. Chem.* 1967, 7, 281.
VARIABLES: T/K = 298	PREPARED BY: T. Mioduski

EXPERIMENTAL VALUES:

The solubility of $EuCl_3$ in 1,2-diethoxyethane at 25°C was reported to be

0.25 mass %

The corresponding molality calculated by the compiler is

$$0.0097 \text{ mol kg}^{-1}$$

The composition of the solid phase was given in terms of the Eu:Cl:ether ratio as

1:2.91:1.10

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Isothermal method used. The anhydrous mixtures were equilibrated at 25°C for several days with frequent shaking. The solid phase was dried in a vacuum desiccator over P_2O_5. Eu was determined by complexometric titration using Xylenol Orange indicator. Chloride was determined by the Volhard titration method.	Sources and purities of materials not given. The anhydrous chloride was obtained by the method of Taylor and Carter (1). The solvent was prepared by the Williamson synthesis: i.e. by reaction of C_2H_5I with the monoethylether of ethylene glycol.
	ESTIMATED ERROR: No estimates possible.
	REFERENCES: 1. Taylor, M.D.; Carter, C.P. *J. Inorg. Nucl. Chem.* 1962, 24, 387.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Europium chloride; $EuCl_3$; [10025-76-0] (2) Alkyl ethers	Kirmse, E.M.; Dressler, H. *Z. Chem.* <u>1975</u>, *15*, 239-40.

VARIABLES:	PREPARED BY:
Room Temperature: (293-298 K)	T. Mioduski and M. Salomon

EXPERIMENTAL VALUES:

solvent			solubility[a]	
			mass %	mol kg^{-1}
1-methoxypentane;	$C_6H_{14}O$;	[628-80-8]	0.4	0.016
1-methoxyheptane;	$C_8H_{18}O$;	[629-32-3]	0.5	0.019
1-methoxyoctane;	$C_9H_{20}O$;	[929-56-6]	0.13	0.0050
1-methoxynonane;	$C_{10}H_{22}O$;	[7289-51-2]	0.5	0.019
1-methoxydecane;	$C_{11}H_{24}O$;	[7289-52-3]	1.1	0.043

[a]Molalities calculated by the compilers. Composition of solid phases not specified.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The solute-solvent mixtures were isothermally agitated (at room temperature) until equilibrium was attained. The anhydrous reagents were handled in a dry box containing P_4O_{10}. Eu was determined by complexometric titration using Xylenol Orange indicator. The reported solubilities are mean values based on four determinations.	Nothing specified.
	ESTIMATED ERROR: Nothing specified.
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Europium chloride; $EuCl_3$; [10025-76-0] (2) Ethers	Kirmse, E.M.; Zwietasch, K.J.; Tirschmann, J.; Oelsner, L.; Niedergeases, U. Z. Chem. 1968, 8, 472-3. Kirmse, E.M. Tr. II Vses. Konf. po Teor. Rastvorov. 1971, 200-6.

VARIABLES:	PREPARED BY:
Room Temperature: T/K around 298	T. Mioduski and M. Salomon

EXPERIMENTAL VALUES:

			solubility[a,b]	
solvent			mass %	mol kg^{-1}
1-ethoxy-2-methoxyethane;	$C_5H_{12}O_2$;	[5137-45-1]	0.6	0.023
1,3-dioxolane;	$C_3H_6O_2$;	[646-06-0]	3.5	0.14
1,4-dioxane;	$C_4H_8O_2$;	[123-91-1]	0.07	0.0027

[a]Molalities calculated by the compilers.

[b]Nature of the solid phases not specified.

AUXILIARY INFORMATION	

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The solute-solvent mixtures were isothermally agitated at 25°C or at room temperature. Authors state that the difference found for the solubility was within experimental error limits. Eu was determined by complexometric titration. No other details given.	The anhydrous salt was prepared by the method of Taylor and Carter (1). No other information given.

ESTIMATED ERROR:
Nothing specified.

REFERENCES:
1. Taylor, M.D.; Carter, C.P.   J. Inorg. Nucl. Chem. 1962, 24, 387.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Europium chloride; $EuCl_3$; [10025-76-0] (2) Tributylphosphate; $C_{12}H_{27}O_4P$; [126-73-8]	Korovin, S.S.; Galaktionova, O.V.; Lebedeva, E.N.; Voronskaya, G.N. *Zh. Neorg. Khim.* 1975, 20, 908-14; *Russ. J. Inorg. Chem. (Engl. Transl.)* 1975, 20, 508-11.

VARIABLES:	PREPARED BY:
T/K = 298	T. Mioduski and M. Salomon

EXPERIMENTAL VALUES:

Composition of saturated solutions[a,b]

mass %	mol/kg sln[c]	g dm^{-3c}	mol dm^{-3c}	mol kg^{-1}	density/g cm^{-3c}
35.2	1.35	455	1.76	2.10	1.30

[a]Solid phase is $EuCl_3$.

[b]Molality calculated by the compilers from the experimental solubility of 35.2 mass %.

[c]It is implied that these data also correspond to the saturated solution. However the molality calculated from these data is 2.08 mol kg^{-1}.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Saturated solutions prepared isothermally with magnetic stirring. Equilibrium was attained after 25-30 d. The solution was centrifuged and an aliquot for analysis taken and added to methanol and precipitated with aq NH_3. The pptd $Eu(OH)_3$ was washed repeatedly and heated to the oxide for gravimetric analysis. The solid phase was analyzed (no details given) for phosphorous, and only the anhydrous $EuCl_3$ was found. All operations were performed in a dry box through which a stream of argon was passed. The major objective of this work was to establish the nature of complexation between TBP and $EuCl_3$ in solution.	Anhydrous $EuCl_3$ prepared by chlorination of Eu_2O_3 with CCl_4 vapor (1,2). Source and purity of materials not given. Eu was analyzed gravimetrically, and Cl by Volhard's method. Tributylphosphate (TBP) was purified "by the standard method." No additional details given.
	ESTIMATED ERROR: No estimates possible.
	REFERENCES: 1. Korshunov, B.G.; Drobot, D.V.; Bukhtiyarov, V.V.; Shevtsova, Z.N. *Zh. Neorg. Khim.* 1964, 9, 1427. 2. Novikov, G.I.; Tolmacheva, V.D. *Zh. Prikl. Khim.* 1965, 38, 1160.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Europium chloride; EuCl$_3$; [10025-76-0] (2) Amines	Kirmse, E.M. *Tr. II Vses. Konf. po Teor. Rastvorov* <u>1971</u>, 200-6.

VARIABLES:	PREPARED BY:
T/K = 298	T. Mioduski and M. Salomon

EXPERIMENTAL VALUES:

				solubility[a]	
solvent				mass %	mol kg^{-1}
2-propanamine;	iso-C$_3$H$_9$N;	[75-31-0]		11.6	0.508
2-propen-1-amine[b];	C$_3$H$_7$N;	[107-11-9]		6.0	0.247
1-butanamine;	C$_4$H$_{11}$N;	[109-73-9]		25.5	1.325

[a]Molalities calculated by the compilers.

[b]The original paper simply specifies the solvent as C$_3$H$_5$NH$_2$, and upon request the author kindly identified the solvent as allylamine.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Experimental details not given, but were probably similar to previous works of the author which are compiled throughout this volume. Nature of solid phases not specified.	Nothing specified, but based on previous work by the author the anhydrous salt was probably prepared by the method of Taylor and Carter (1).
	ESTIMATED ERROR: Nothing specified.
	REFERENCES: 1. Taylor, M.D.; Carter, C.P. *J. Inorg. Nucl. Chem.* <u>1962</u>, *24*, 387.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Europium chloride; $EuCl_3$; [10025-76-0] (2) Hexamethylphosphorotriamide; $C_6H_{18}N_3OP$; [680-31-9]	Mikheev, N.B.; Kamenskaya, A.N.; Konovalova, N.A.; Zhilina, T.A. *Zh. Neorg. Khim.* 1977, 22, 1761-6; *Russ. J. Inorg. Chem. (Engl. Transl.)* 1977, 22, 955-8.

VARIABLES:	PREPARED BY:
Room temperature: T/K = 298 ± 3	T. Mioduski

EXPERIMENTAL VALUES:

Starting with the solvate $EuCl_3 \cdot 3((CH_3)_2N)_3PO$, the solubility at 25 ± 3°C[a] was given as

$$0.121 \pm 0.001 \text{ mol dm}^{-3}$$

[a]Table 3 in the English translation of the source paper states the temperature to be
23 ± 3°C. This is probably a typographical error as the text clearly states that all
measurements were carried out at 25 ± 3°C.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Isothermal method used. Salt and solvent were placed in a test-tube in a dry box, and the tube agitated at room temperature (25 ± 3°C) until equilibrium was reached. Aliquots were withdrawn periodically and analyzed for the metal content. Rare earth concentration was determined by complexometric titration, and by the radiometric method using the isotope Tm-170 ($t_{\frac{1}{2}}$ = 169 d). Authors state that results for both methods agreed. Although not clearly stated, it appears that equilibrium was reached in several weeks to several months.	$EuCl_3 \cdot 3C_6H_{18}N_3OP$ prepd by dissolving the hydrate in $C_3H_{18}N_3OP$ and heating to 140-145° C for 5 m. The solvate was pptd by addition of abs ether, washed 7 times with ether, and dried over P_2O_5 in a stream of dry nitrogen. Yield was about 90%. The solvent was purified as described in (1).

METHOD (cont.)	
Solid phase samples washed three times with benzene or ether and dried on a steam bath in an argon atmosphere. The solid phase was analyzed and found to be $EuCl_3 \cdot 3C_6H_{18}N_3OP$. The solvate was analyzed for metal content by Volhard method, and the solvent was obtained by difference. IR spectra confirmed the absence of water. Structural studies of the solvate also carried out by X-ray analysis.	**ESTIMATED ERROR:** Soly: precision ± 0.001 mol dm^{-3} at a 95% level of confidence (authors). Temp: precision ± 3K. **REFERENCES:** 1. Fomicheva, M.G.; Kessler, Yu.M.; Zabusova, S.E.; Alpatova, N.M. *Elektrokhimiya* 1975, 11, 163.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Europium chloride; $EuCl_3$; [10025-76-0] (2) Tetrachlorostannate; $SnCl_4$; [7646-78-8] (3) Phosphorus oxychloride; $POCl_3$; [10025-87-3]	Lyubimov, E.I.; Batyaev, I.M. *Zh. Prikl. Khim.* <u>1972</u>, 45, 1176-8.

VARIABLES:	PREPARED BY:
$SnCl_4$ concentration T/K = 293	T. Mioduski

EXPERIMENTAL VALUES:

$SnCl_4$:$POCl_3$ ratio (by volume)	$SnCl_4$ concentration mol dm^{-3}	solubility of Eu_2O_3[a] moles Eu dm^{-3}
.0	0	0.005
1:250	0.035	0.11
1:100	0.085	0.22
1:50	0.17	0.28
1:25	0.33	0.25
1:15	0.59	0.048
1:10	0.78	0.11

[a]This is also the solubility of $EuCl_3$ since the oxide is quantitatively converted to the chloride according to

$$Eu_2O_3 + 6POCl_3 = 2EuCl_3 + 3P_2O_3Cl_4$$

Assuming $P_2O_3Cl_4$ to be soluble, the equilibrated solutions would then constitute a four component mixture.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Isothermal method used. $POCl_3$ + $SnCl_4$ solutions were prepared by volume in a dry box. The $SnCl_4$ content was verified by chemical analysis for Sn. This solution and Eu_2O_3 were placed in sealed ampoules and rotated in an air thermostat at 20°C for 2-200 hours. Without preheating, equilibrium was established after 200 hours. Preheating to 120°C lowered the equilibration time at 20°C to 2 hours. Eu was determined by the oxalate method. The reported solubilities are mean values based on 3-5 parallel determinations. The solubility of $EuCl_3$ in pure $POCl_3$ is small, but in the presence of $SnCl_4$ the solubility increases due to complexation: $$2EuCl_3 + 3SnCl_4 = Eu_2(SnCl_6)_3$$	Eu_2O_3 of "the first sort" was ignited at 950°C for 2 hours. "Pure" grade $SnCl_4$ and $POCl_3$ were dehydrated with P_2O_5 and distilled under vacuum.
	ESTIMATED ERROR: Soly: authors state the "coefficient of variance" to be less than 7%. Temp: precision presumably ± 0.2K (compiler).
	REFERENCES: