

COMPONENTS: (1) Gadolinium chloride; $GdCl_3$; [10138-52-0] (2) Methanol; CH_3O ; [67-56-1]	ORIGINAL MEASUREMENTS: Merbach, A.; Pitteloud, M.N.; Jaccard, P. <i>Helv. Chim. Acta</i> <u>1972</u> , 55, 44-52. Pitteloud, M.N. <i>These. Faculte des Sciences de</i> <i>l'Universite de Lausanne.</i> <u>1971</u> .				
VARIABLES: T/K = 298.2	PREPARED BY: T. Mioduski and M. Salomon				
EXPERIMENTAL VALUES: <table data-bbox="450 551 934 665" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">$t/^\circ C$</th> <th style="text-align: center;">mean solubility^a mol kg^{-1}</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">25</td> <td style="text-align: center;">4.21</td> </tr> </tbody> </table> <p>^aInitial salt was the adduct $GdCl_3 \cdot 4CH_3OH$. Analysis of the equilibrated solid phase yielded $GdCl_3 \cdot 4.1CH_3OH$.</p>		$t/^\circ C$	mean solubility ^a mol kg^{-1}	25	4.21
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AUXILIARY INFORMATION					
METHOD/APPARATUS/PROCEDURE: Isothermal method as in (1,2). Mixtures were equilibrated for at least 4 days. Prolonged operations were performed in a dry box. Gadolinium determined by titration with $(NH_4)_3H(EDTA)$ using a small amount of urotropine buffer and Xylenol Orange indicator. Chloride was determined by potentiometric titration with $AgNO_3$ solution. Composition of the adduct $GdCl_3 \cdot 4CH_3OH$ confirmed by 1H NMR and X-ray diffraction. The reported solubility is a mean of 2-4 determinations.	SOURCE AND PURITY OF MATERIALS: Gd_2O_3 of at least 99.9% purity dissolved in HCl to produce the hexahydrate. The adduct $GdCl_3 \cdot 4CH_3OH$ prepared by dissolving the hydrate in a small excess of o-methylformate followed by distillation and crystallization from methanol. Methanol was purified and dried by the Vogel method. ESTIMATED ERROR: Soly: precision $\pm 0.5\%$ as in (1) (compilers). Temp: precision probably at least ± 0.05 K as in (1) (compilers). REFERENCES: 1. Brunisholz, F.; Quinche, J.P.; Kalo, A.M. <i>Helv. Chim. Acta</i> <u>1964</u> , 47, 14. 2. Flatt, R. <i>Chimia</i> <u>1952</u> , 6, 62.				

COMPONENTS: (1) Gadolinium chloride; $GdCl_3$; [10138-52-0] (2) Ethanol; C_2H_6O ; [64-17-5]	ORIGINAL MEASUREMENTS: Merbach, A.; Pitteloud, M.N.; Jaccard, P. <i>Helv. Chim. Acta</i> <u>1972</u> , 55, 44-52. Pitteloud, M.N. <i>These. Faculte des Sciences de</i> <i>l'Universite de Lausanne. 1971,</i>				
VARIABLES: T/K = 298.2	PREPARED BY: T. Mioduski and M. Salomon				
EXPERIMENTAL VALUES: <table data-bbox="466 518 932 663" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">$t/^\circ C$</th> <th style="text-align: center;">mean solubility^a mol kg⁻¹</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">25</td> <td style="text-align: center;">2.43</td> </tr> </tbody> </table> <p>^aInitial salt was the adduct $GdCl_3 \cdot 3C_2H_5OH$. Analysis of the equilibrated solid phase yielded $GdCl_3 \cdot 4.1C_2H_5OH$.</p>		$t/^\circ C$	mean solubility ^a mol kg ⁻¹	25	2.43
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COMPONENTS: (1) Gadolinium chloride; $GdCl_3$; [10138-52-0] (2) Alcohols	ORIGINAL MEASUREMENTS: Kirmse, E.M. <i>Tr. II Vses. Konf. po Teor. Rastvorov</i> <u>1971</u> , 200-6.																														
VARIABLES: T/K = 298	PREPARED BY: T. Mioduski and M. Salomon																														
EXPERIMENTAL VALUES: <table border="1" data-bbox="112 531 1218 848"> <thead> <tr> <th>solvent</th> <th></th> <th></th> <th>mass %</th> <th>mole kg^{-1}</th> <th>nature of the solid phase</th> </tr> </thead> <tbody> <tr> <td>ethanol;</td> <td>C_2H_6O;</td> <td>[64-17-5]</td> <td>39.0</td> <td>2.43</td> <td>$GdCl_3 \cdot C_2H_6O$</td> </tr> <tr> <td>2-methoxyethanol;</td> <td>$C_3H_8O_2$;</td> <td>[109-86-4]</td> <td>4.0</td> <td>0.16</td> <td>$GdCl_3 \cdot nC_3H_8O_2$ (n = 2-3)</td> </tr> <tr> <td>2-ethoxyethanol;</td> <td>$C_4H_{10}O_2$;</td> <td>[110-80-5]</td> <td>15.2</td> <td>0.680</td> <td>$GdCl_3 \cdot C_4H_{10}O_2$</td> </tr> <tr> <td>2-propen-1-ol;^b</td> <td>C_3H_6O;</td> <td>[107-18-6]</td> <td>30.0</td> <td>1.63</td> <td>$GdCl_3 \cdot C_3H_6O$</td> </tr> </tbody> </table> <p>^aMolalities calculated by the compilers.</p> <p>^bThe source paper reports the solvent as C_3H_5OH. Upon request, the author kindly specified the solvent as allyl alcohol.</p>		solvent			mass %	mole kg^{-1}	nature of the solid phase	ethanol;	C_2H_6O ;	[64-17-5]	39.0	2.43	$GdCl_3 \cdot C_2H_6O$	2-methoxyethanol;	$C_3H_8O_2$;	[109-86-4]	4.0	0.16	$GdCl_3 \cdot nC_3H_8O_2$ (n = 2-3)	2-ethoxyethanol;	$C_4H_{10}O_2$;	[110-80-5]	15.2	0.680	$GdCl_3 \cdot C_4H_{10}O_2$	2-propen-1-ol; ^b	C_3H_6O ;	[107-18-6]	30.0	1.63	$GdCl_3 \cdot C_3H_6O$
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METHOD/APPARATUS/PROCEDURE: Experimental details not given, but were probably similar to previous works of the author which are compiled throughout this volume.	SOURCE AND PURITY OF MATERIALS: Nothing specified, but based on previous work by the authors, 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. <i>J. Inorg. Nucl. Chem.</i> <u>1962</u> , 24, 387.																														

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VARIABLES: Temperature		PREPARED BY: T. Mioduski and M. Salomon				
EXPERIMENTAL VALUES:						
solubility of $GdCl_3 \cdot 6H_2O$ in 96.8 % $C_2H_5OH^a$						
	sample 1	sample 2	sample 3	sample 4	mean solubilities	
t/°C	g/100 g ^b	g/100 g	g/100 g	g/100 g	g/100 g	mol kg ^{-1c}
20	30.48	30.67	30.67	30.45	30.56	1.184
30	29.86	29.70	29.82	29.78	29.79	1.142
40	29.88	29.99	29.87	30.05	29.94	1.150
50	30.46	30.43	30.58	30.35	30.45	1.178
60	31.80	31.63	31.63	31.73	31.69	1.248
^a It is not clearly stated whether the mixture is 96.8 mass % or 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: 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 156.8 - 157.8°C.				SOURCE AND PURITY OF MATERIALS: $GdCl_3 \cdot 6H_2O$ prep'd 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 Gd: 42.39, 42.30 (calcd 42.31). Found (%) for Cl: 28.69, 28.54 (calcd 28.65). 96.8% ethanol prep'd 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 $\pm 0.8\%$ (compilers). Temp: nothing specified.		
				REFERENCES:		

COMPONENTS: (1) Gadolinium chloride; $GdCl_3$; [10138-52-0] (2) 2-Propanol; C_3H_8O ; [67-63-0]	ORIGINAL MEASUREMENTS: Merbach, A.; Pitteloud, M.N.; Jaccard, P. <i>Helv. Chim. Acta</i> <u>1972</u> , 55, 44-52. Pitteloud, M.N. <i>These. Faculte des Sciences de l'Universite de Lausanne.</i> <u>1971</u> .				
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VARIABLES: T/K = 273-323	PREPARED BY: M. Salomon and T. Mioduski																												
EXPERIMENTAL VALUES: <p style="text-align: center;">Composition of Saturated Solutions</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">$t/^\circ C$</th> <th style="text-align: center;">$Gd_2O_3^a$ g/25 cc</th> <th style="text-align: center;">$GdCl_3^b$ g/dm³</th> <th style="text-align: center;">$GdCl_3^b$ mol/dm³</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">0</td><td style="text-align: center;">0.6345</td><td style="text-align: center;">36.91</td><td style="text-align: center;">0.1400</td></tr> <tr><td style="text-align: center;">10</td><td style="text-align: center;">0.8111</td><td style="text-align: center;">47.19</td><td style="text-align: center;">0.1790</td></tr> <tr><td style="text-align: center;">20</td><td style="text-align: center;">1.0495</td><td style="text-align: center;">61.06</td><td style="text-align: center;">0.2316</td></tr> <tr><td style="text-align: center;">30</td><td style="text-align: center;">1.1564</td><td style="text-align: center;">67.27</td><td style="text-align: center;">0.2552</td></tr> <tr><td style="text-align: center;">40</td><td style="text-align: center;">1.3202</td><td style="text-align: center;">76.80</td><td style="text-align: center;">0.2914</td></tr> <tr><td style="text-align: center;">50</td><td style="text-align: center;">1.4464</td><td style="text-align: center;">84.15</td><td style="text-align: center;">0.3192</td></tr> </tbody> </table> <p>^a Apparently these are average values of at least two analyses from a given bottle. The author did not indicate whether there were any differences in results using $GdCl_3$ from preparations 1 and 2.</p> <p>^b Recalculated by the compilers using 1977 IUPAC recommended atomic masses.</p> <p style="text-align: center;">The equilibrated solid phase not analyzed.</p>		$t/^\circ C$	$Gd_2O_3^a$ g/25 cc	$GdCl_3^b$ g/dm ³	$GdCl_3^b$ mol/dm ³	0	0.6345	36.91	0.1400	10	0.8111	47.19	0.1790	20	1.0495	61.06	0.2316	30	1.1564	67.27	0.2552	40	1.3202	76.80	0.2914	50	1.4464	84.15	0.3192
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METHOD/APPARATUS/PROCEDURE: Isothermal method. About 75-100 cc of solvent + excess salt were placed in bottles and agitated in a thermostat for at least 12 h. Ice + water was used for the 0°C measurements. The bottles were fitted with ground glass stoppers and were sealed from the atmosphere by placing gum rubber tubing over the stoppers and necks of the bottles, and a rubber stopper was fitted into the upper end of the tubing. After equilibration, the solutions were allowed to settle for at least 12 h, and using a calibrated 25 cc pipet, two samples were removed for analysis. The samples were evaporated to dryness and dissolved in aq HCl and pptd as the oxalate by addn of oxalic acid. The samples were filtered, washed with dist water and ignited to constant weight as the oxide. The oxide was found to be insoluble in the organic solvent.	SOURCE AND PURITY OF MATERIALS: Commercial solvent was permitted to stand over CaO for at least 1 week and then dist. A middle portion (fraction not specified) was retained and stored in a stoppered flask; b.p. 134°C. Gd salts prepd in 1925 as double ammonium nitrates were of "spectroscopic purity" and converted to the oxide, and the anhydr chloride prepd by two methods. 1. The oxide was dissolved in aq HCl and the excess HCl evapd. The crystd salt was dehydrated by heating in the presence of dry HCl first at 100°C for several h, then at 200°C. 2. The rare earth benzoate was pptd from the aq chloride or nitrate with sodium benzoate, and the benzoate dehydrated by heating to 110°C for at least 24 h. Extraction of the chloride was carried out with HCl satd ether, and the resulting chloride heated at 60°C first in a stream of dry HCl and then in dry air. The salt was stored in a desiccator over P_2O_5 . Dry HCl was prepd from NaCl + H_2SO_4 followed by passage through H_2SO_4 drying towers.																																			
ESTIMATED ERROR: Soly: precision probably within 3% (compilers). Temp: precision ± 0.2 K (author).	REFERENCES: 1. Hopkins, B.S.; Audrieth, L.F. <i>Trans. Electrochem. Soc.</i> 1934, 66, 135.																																			

COMPONENTS: (1) Gadolinium chloride; $GdCl_3$; [10138-52-0] (2) Diethyl ether (ethyl ether); $C_4H_{10}O$; [60-29-7]	ORIGINAL MEASUREMENTS: Dzhuraev, Kh. Sh.; Mirsaidov, U.; Kurbanbekov, A.; Rakhimova, A. <i>Dokl. Akad. Nauk Tadzh. SSR</i> <u>1976</u> , 19, 32-4.
VARIABLES: T/K = 293	PREPARED BY: T. Mioduski
EXPERIMENTAL VALUES: <p>The solubility of $GdCl_3$ in diethyl ether at 20°C was reported to be</p> <p style="text-align: center;">0.028 mass %</p> <p>The corresponding molality calculated by the compiler is</p> <p style="text-align: center;">$1.06 \times 10^{-3} \text{ mol kg}^{-1}$</p>	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: Isothermal method employed. Equilibrium was attained within 24 h and it was verified by constancy in the Gd concentration. The saturated solution and the equilibrated solid phase were analyzed. Gd determined by complexometric titration in presence of uropine buffer and methyl-thymol blue indicator. Chloride determined by titration with $AgNO_3$. The solid phase corresponded to $GdCl_3 \cdot 0.5Et_2O$ (the etherate was dried under vacuum at 40°C prior to analysis).	SOURCE AND PURITY OF MATERIALS: Anhydrous $GdCl_3$ prepared by the ethanol solvate method (no details given). Ethyl ether was dried with Na and distilled from $LiAlH_4$ before use.
ESTIMATED ERROR: Nothing specified.	
REFERENCES:	

COMPONENTS: (1) Gadolinium chloride; $GdCl_3$; [10138-52-0] (2) 1,2-Diethoxyethane; $C_6H_{14}O_2$; [629-14-1]	ORIGINAL MEASUREMENTS: Kirmse, E.M.; Zwietasch, K.J. <i>Z. Chem.</i> <u>1967</u> , 7, 281.
VARIABLES: T/K = 298	PREPARED BY: T. Mioduski
EXPERIMENTAL VALUES: <p>The solubility of $GdCl_3$ in 1,2-diethoxyethane at 25°C was reported to be</p> <p style="text-align: center;">0.33 mass %</p> <p>The corresponding molality calculated by the compiler is</p> <p style="text-align: center;">0.0126 mol kg⁻¹</p> <p>The composition of the solid phase was given in terms of the Gd:Cl:ether ratio as</p> <p style="text-align: center;">1:2.91:0.99</p>	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: <p>Isothermal method used. The anhydrous mixtures were equilibrated at 25°C for several days with frequent shaking.</p> <p>The solid phase was dried in a vacuum desiccator over P_2O_5.</p> <p>Gd was determined by complexometric titration using Xylenol Orange indicator. Chloride was determined by the Volhard titration method.</p>	SOURCE AND PURITY OF MATERIALS: <p>Sources and purities of materials not given. The anhydrous chloride was obtained by the method of Taylor and Carter (1).</p> <p>The solvent was prepared by the Williamson synthesis: i.e. by reaction of C_2H_5I with the monoethylether of ethylene glycol.</p> <hr/> ESTIMATED ERROR: No estimate possible.
REFERENCES: 1. Taylor, M.D.; Carter, C.P. <i>J. Inorg. Nucl. Chem.</i> <u>1962</u> , 24, 387.	

COMPONENTS: (1) Gadolinium chloride; $GdCl_3$; [10138-52-0] (2) Ethers	ORIGINAL MEASUREMENTS: Kirmse, E.M.; Zwietasch, K.J.; Tirschmann, J.; Oelsner, L.; Niedergesaess, U. <i>Z. Chem.</i> <u>1968</u> , <i>8</i> , 472-3. Kirmse, E.M. <i>Tr. II Vses. Konf. po Teor. Rastvorov.</i> <u>1971</u> , 200-6.															
VARIABLES: Room Temperature: T/K around 298	PREPARED BY: T. Mioduski and M. Salomon															
EXPERIMENTAL VALUES: <table border="0" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;"></th> <th colspan="2" style="text-align: right; border-bottom: 1px solid black;">$GdCl_3$ solubility^{a,b}</th> </tr> <tr> <th style="text-align: left; border-bottom: 1px solid black;">solvent</th> <th style="text-align: center; border-bottom: 1px solid black;">mass %</th> <th style="text-align: center; border-bottom: 1px solid black;">mol kg⁻¹</th> </tr> </thead> <tbody> <tr> <td>1-ethoxy-2-methoxyethane; $C_5H_{12}O_2$; [5137-45-1]</td> <td style="text-align: center;">0.55</td> <td style="text-align: center;">0.021</td> </tr> <tr> <td>1-methoxypentane; $C_6H_{14}O$; [628-80-8]</td> <td style="text-align: center;">0.08</td> <td style="text-align: center;">0.0030</td> </tr> <tr> <td>1,4-dioxane; C_4H_8O; [123-91-1]</td> <td style="text-align: center;">0.1</td> <td style="text-align: center;">0.0038</td> </tr> </tbody> </table> <p>^aMolalities calculated by the compilers.</p> <p>^bNature of solid phases not specified.</p>			$GdCl_3$ solubility ^{a,b}		solvent	mass %	mol kg ⁻¹	1-ethoxy-2-methoxyethane; $C_5H_{12}O_2$; [5137-45-1]	0.55	0.021	1-methoxypentane; $C_6H_{14}O$; [628-80-8]	0.08	0.0030	1,4-dioxane; C_4H_8O ; [123-91-1]	0.1	0.0038
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AUXILIARY INFORMATION																
METHOD/APPARATUS/PROCEDURE: 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. Gd was determined by complexometric titration. No other details given.	SOURCE AND PURITY OF MATERIALS: 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. <i>J. Inorg. Nucl. Chem.</i> <u>1962</u> , <i>24</i> , 387.															

COMPONENTS: (1) Gadolinium chloride; $GdCl_3$; [10138-52-0] (2) Tetrahydrofuran; C_4H_8O ; [109-99-9]	ORIGINAL MEASUREMENTS: Rossmannith, K.; Auer-Welsbach, C. <i>Monatsh. Chem.</i> <u>1965</u> , <i>96</i> , 602-5.
VARIABLES: Room Temperature: T/K about 293	PREPARED BY: T. Mioduski
EXPERIMENTAL VALUES: The solubility of $GdCl_3$ in tetrahydrofuran at 20°C (room temperature) was reported to be 1.91 g per 100 ml of solution (0.0725 mol dm^{-3} , compiler).	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: Isothermal method employed. The solution was equilibrated in an extractor with agitation for 60-80 hours at room temperature. Gadolinium was determined by the oxalate method, and by titration with EDTA using Xylenol Orange indicator. The solvent was determined by difference. Anhydrous materials were handled in a dry box through which was passed a stream of nitrogen free of carbon dioxide. The solid phase is $GdCl_3 \cdot 2.07C_4H_8O$.	SOURCE AND PURITY OF MATERIALS: Sources and purities of initial materials not specified. $GdCl_3$ was prepared by conversion of the oxide by high temperature reaction with an excess of NH_4Cl followed by heating the product in a stream of dry nitrogen, and then in vacuum to remove unreacted NH_4Cl . Tetrahydrofuran was distilled from $LiAlH_4$. ESTIMATED ERROR: Nothing specified. REFERENCES:

COMPONENTS: (1) Gadolinium chloride; $GdCl_3$; [10138-52-0] (2) Tributylphosphate; $C_{12}H_{27}O_4P$; [126-73-8]	ORIGINAL MEASUREMENTS: 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: T/K = 298	PREPARED BY: T. Mioduski and M. Salomon												
EXPERIMENTAL VALUES: <p style="text-align: center;">Composition of saturated solution</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">mass %</th> <th style="text-align: left;">mol/kg sln</th> <th style="text-align: left;">g dm⁻³</th> <th style="text-align: left;">mol dm⁻³</th> <th style="text-align: left;">mol kg⁻¹ (compiler)</th> <th style="text-align: left;">density/g cm³</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">37.8</td> <td style="text-align: center;">1.44</td> <td style="text-align: center;">494.0</td> <td style="text-align: center;">1.88</td> <td style="text-align: center;">2.31</td> <td style="text-align: center;">1.33</td> </tr> </tbody> </table> <p>The solid phase is $GdCl_3$.</p>		mass %	mol/kg sln	g dm ⁻³	mol dm ⁻³	mol kg ⁻¹ (compiler)	density/g cm ³	37.8	1.44	494.0	1.88	2.31	1.33
mass %	mol/kg sln	g dm ⁻³	mol dm ⁻³	mol kg ⁻¹ (compiler)	density/g cm ³								
37.8	1.44	494.0	1.88	2.31	1.33								
AUXILIARY INFORMATION													
METHOD/APPARATUS/PROCEDURE: 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 pptd with aq NH_3 . The pptd $Gd(OH)_3$ was washed repeatedly and heated to the oxide for gravimetric analysis. The solid phase was analyzed (no details given) for phosphorous and only anhydrous $GdCl_3$ 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 $GdCl_3$ in solution. Additional IR spectra studies with unsaturated solutions are discussed in the source paper.	SOURCE AND PURITY OF MATERIALS: Anhydrous $GdCl_3$ prepared by chlorination of Gd_2O_3 with CCl_4 vapor (1,2). Source and purity of materials not given. Gd 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: (1) Gadolinium chloride; $GdCl_3$; [10138-52-0] (2) Alkyl amines	ORIGINAL MEASUREMENTS: Kirmse, E.M. <i>Tr. II Vses. Konf. po Teor. Rastvorov</i> <u>1971</u> , 200-6.																											
VARIABLES: T/K = 298	PREPARED BY: T. Mioduski and M. Salomon																											
EXPERIMENTAL VALUES: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">solvent</th> <th colspan="3">$GdCl_3$ solubility^a</th> </tr> <tr> <th></th> <th>mass %</th> <th>mol kg⁻¹</th> </tr> </thead> <tbody> <tr> <td>1-propanamine; C_3H_9N;</td> <td>[107-10-8]</td> <td>32.4</td> <td>1.82</td> </tr> <tr> <td>2-propanamine; iso-C_3H_9N;</td> <td>[75-31-0]</td> <td>21.0</td> <td>1.01</td> </tr> <tr> <td>2-propen-1-amine;^b C_3H_7N;</td> <td>[107-11-9]</td> <td>14.6</td> <td>0.649</td> </tr> <tr> <td>1-butanamine; n-$C_4H_{11}N$;</td> <td>[109-73-9]</td> <td>23.0</td> <td>1.13</td> </tr> <tr> <td>2-butanamine; sec-$C_4H_{11}N$;</td> <td>[13952-84-6]</td> <td>18.7</td> <td>0.873</td> </tr> </tbody> </table> <p>^aMolalities calculated by the compilers.</p> <p>^bThe original paper simply specifies the solvent as $C_3H_5NH_2$, and upon request, the author kindly identified the solvent as allylamine.</p>		solvent	$GdCl_3$ solubility ^a				mass %	mol kg ⁻¹	1-propanamine; C_3H_9N ;	[107-10-8]	32.4	1.82	2-propanamine; iso- C_3H_9N ;	[75-31-0]	21.0	1.01	2-propen-1-amine; ^b C_3H_7N ;	[107-11-9]	14.6	0.649	1-butanamine; n- $C_4H_{11}N$;	[109-73-9]	23.0	1.13	2-butanamine; sec- $C_4H_{11}N$;	[13952-84-6]	18.7	0.873
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METHOD/APPARATUS/PROCEDURE: 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.	SOURCE AND PURITY OF MATERIALS: 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. <i>J. Inorg. Nucl. Chem.</i> <u>1962</u> , 24, 387.																											

COMPONENTS: (1) Gadolinium chloride; $GdCl_3$; [10138-52-0] (2) Hexamethylphosphorotriamide; $C_6H_{18}N_3OP$; [680-31-9]	ORIGINAL MEASUREMENTS: Mikheev, N.B.; Kamenskaya, A.N.; Konovalova, N.A.; Zhilina, T.A. <i>Zh. Neorg. Khim.</i> 1977, 22, 1761-6; <i>Russ. J. Inorg. Chem. (Engl. Transl.)</i> 1977, 22, 955-8.
VARIABLES: Room temperature: $T/K = 298 \pm 3$	PREPARED BY: T. Mioduski
EXPERIMENTAL VALUES: Starting with the solvate $GdCl_3 \cdot 3((CH_3)_2N)_3PO$, the solubility at $25 \pm 3^\circ C^a$ was given as $0.125 \pm 0.002 \text{ mol dm}^{-3}$ ^a Table 3 in the English translation of the source paper states the temperature to be $23 \pm 3^\circ C$. This is probably a typographical error as the text clearly states that all measurements were carried out at room temperature ($25 \pm 3^\circ C$).	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: Isothermal method used. Salt and solvent were placed in a test-tube in a dry box, and the tube agitated at room temperature ($25 \pm 3^\circ C$) 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 $Tm-170$ ($t_{1/2} = 169 \text{ d}$). Authors state that results for both methods agreed. Although not clearly stated, it appears that equilibrium was reached in several weeks to several months. 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 $GdCl_3 \cdot 3C_6H_{18}N_3OP$. The solvate was analyzed for metal content by complexometric titrn, for chloride by the 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.	SOURCE AND PURITY OF MATERIALS: $GdCl_3 \cdot 3C_6H_{18}N_3OP$ prepd by dissolving the hydrate in $C_3H_8N_3OP$ and heating to $140-150^\circ C$ 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). ESTIMATED ERROR: Soly: precision $\pm 0.002 \text{ mol dm}^{-3}$ at a 95% level of confidence (authors). Temp: precision $\pm 3K$. REFERENCES: 1. Fomicheva, M.G.; Kessler, Yu.M.; Zabusova, S.E.; Alpatova, N.M. <i>Elektrokhimiya</i> 1975, 11, 163.

COMPONENTS: (1) Gadolinium chloride; GdCl ₃ ; [10138-52-0] (2) Tetrachlorostannate; SnCl ₄ ; [7646-78-8] (3) Phosphorus oxychloride; POCl ₃ ; [10025-87-3]	ORIGINAL MEASUREMENTS: Lyubimov, E.I.; Batyaev, I.M. Zh. Prikl. Khim. 1972, 45, 1176-8.																								
VARIABLES: T/K = 293 Concentration of SnCl ₄	PREPARED BY: T. Mioduski																								
EXPERIMENTAL VALUES: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">SnCl₄:POCl₃ ratio (by volume)</th> <th style="text-align: center;">SnCl₄ concentration mol dm⁻³</th> <th style="text-align: center;">Gd₂O₃ solubility^{a, b} moles Gd dm⁻³</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">0</td><td style="text-align: center;">0</td><td style="text-align: center;">0.015</td></tr> <tr><td style="text-align: center;">1:250</td><td style="text-align: center;">0.035</td><td style="text-align: center;">0.11</td></tr> <tr><td style="text-align: center;">1:100</td><td style="text-align: center;">0.085</td><td style="text-align: center;">0.27</td></tr> <tr><td style="text-align: center;">1:50</td><td style="text-align: center;">0.17</td><td style="text-align: center;">0.29 (0.16)</td></tr> <tr><td style="text-align: center;">1:25</td><td style="text-align: center;">0.33</td><td style="text-align: center;">0.079</td></tr> <tr><td style="text-align: center;">1:15</td><td style="text-align: center;">0.59</td><td style="text-align: center;">0.042</td></tr> <tr><td style="text-align: center;">1:10</td><td style="text-align: center;">0.78</td><td style="text-align: center;">0.11</td></tr> </tbody> </table> <p>^aSolutions preheated to 220°C. Value in parenthesis corresponds to preheating at 120°C.</p> <p>^bThis is also the solubility of GdCl₃ in the SnCl₄-POCl₃ mixture because the oxide is quantitatively converted to the chloride according to</p> $\text{Gd}_2\text{O}_3 + 6\text{POCl}_3 = 2\text{GdCl}_3 + 3\text{P}_2\text{O}_3\text{Cl}_4$ <p>Thus the equilibrated solutions should actually be considered to be a four component system containing SnCl₄, GdCl₃, P₂O₃Cl₄ and POCl₃ (the compiler assumes P₂O₃Cl₄ is soluble).</p> <p>Authors state that the solubility of GdCl₃ is enhanced by complex formation according to</p> $2\text{GdCl}_3 + 3\text{SnCl}_4 = \text{Gd}_2(\text{SnCl}_6)_3$		SnCl ₄ :POCl ₃ ratio (by volume)	SnCl ₄ concentration mol dm ⁻³	Gd ₂ O ₃ solubility ^{a, b} moles Gd dm ⁻³	0	0	0.015	1:250	0.035	0.11	1:100	0.085	0.27	1:50	0.17	0.29 (0.16)	1:25	0.33	0.079	1:15	0.59	0.042	1:10	0.78	0.11
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1:15	0.59	0.042																							
1:10	0.78	0.11																							
AUXILIARY INFORMATION																									
METHOD/APPARATUS/PROCEDURE: 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 Gd ₂ O ₃ were placed in sealed ampoules, heated to 20-250°C to increase the rate of solution, and then 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. Gd was determined by colorimetric analysis, and in some cases by the oxalate method. The reported solubilities are mean values based on 3-5 parallel determinations.	SOURCE AND PURITY OF MATERIALS: Gd ₂ O ₃ of "the first sort" was ignited at 950°C for 2 hours. "Pure" grade SnCl ₄ and POCl ₃ were dehydrated with P ₂ O 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:																								