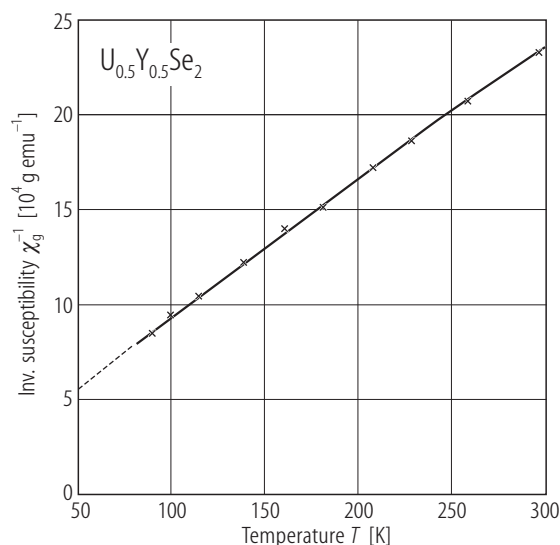
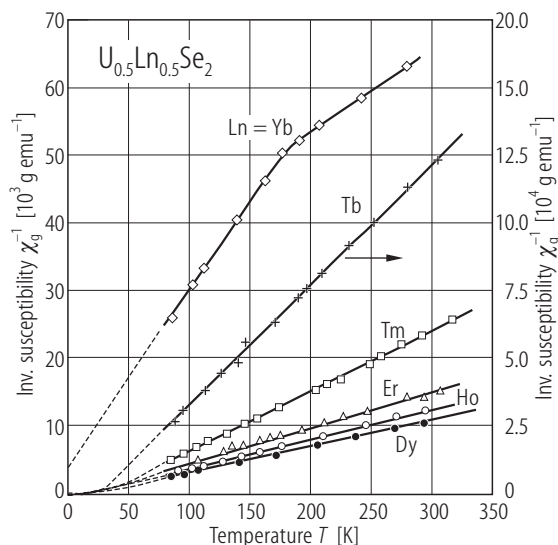


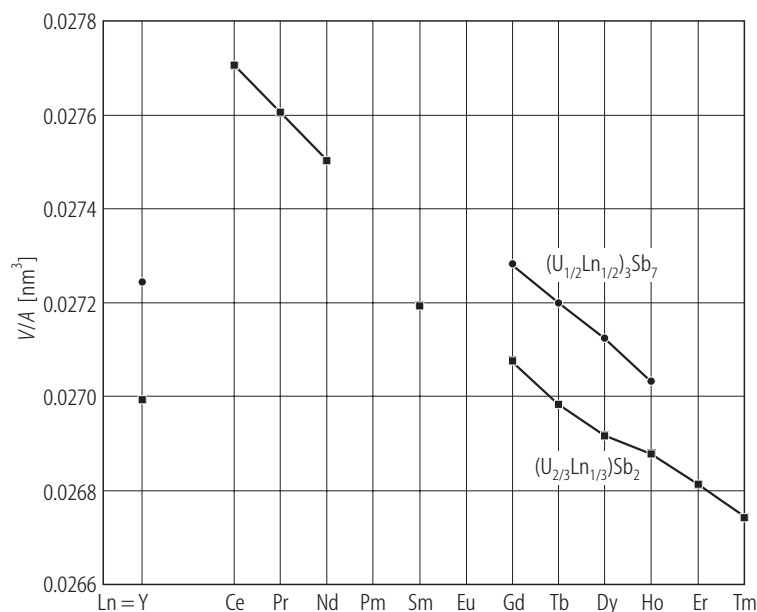
## 1.3.3.5.2. Figures and tables



**Fig. 1.**  $U_{0.5}Y_{0.5}Se_2$ . Reciprocal mass magnetic susceptibility,  $\chi_g^{-1}$ , vs. temperature,  $T$  [84NCCC]. The straight line marks a Curie-Weiss behaviour with the paramagnetic Curie temperature  $\Theta$  of  $-30$  K and the effective magnetic moment  $p_{\text{eff}}$  of  $2.7 \mu_B/U$  atom.

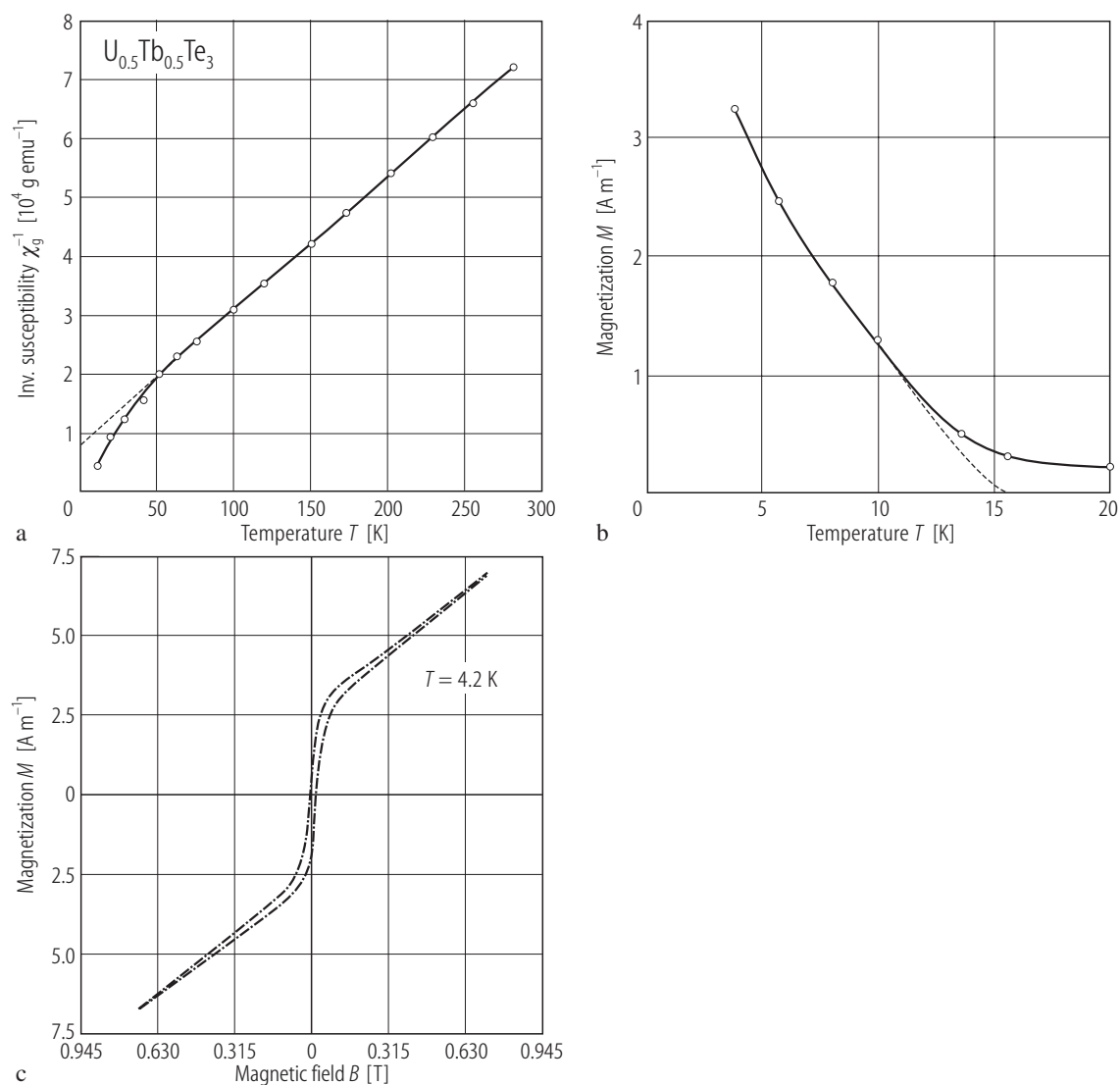


**Fig. 2.**  $U_{0.5}Ln_{0.5}Se_2$ ,  $Ln = Tb, Dy, Ho, Er, Tm, Yb$ . Reciprocal mass magnetic susceptibility,  $\chi_g^{-1}$ , vs. temperature,  $T$  [84NCCC]. Crosses:  $U_{0.5}Tb_{0.5}Se_2$ ; full circles:  $U_{0.5}Dy_{0.5}Se_2$ ; open circles:  $U_{0.5}Ho_{0.5}Se_2$ ; open triangles:  $U_{0.5}Er_{0.5}Se_2$ ; squares:  $U_{0.5}Tm_{0.5}Se_2$ ; diamonds:  $U_{0.5}Yb_{0.5}Se_2$ . Note different (right-hand side scale) vertical scale for  $U_{0.5}Tb_{0.5}Se_2$ . The straight lines mark a Curie-Weiss behaviour with the paramagnetic Curie temperatures  $\Theta$  of 27, 25, 22, 20, 30 and  $-18$  K for  $Ln = Tb, Dy, Ho, Er, Tm$  and  $Yb$ , respectively.

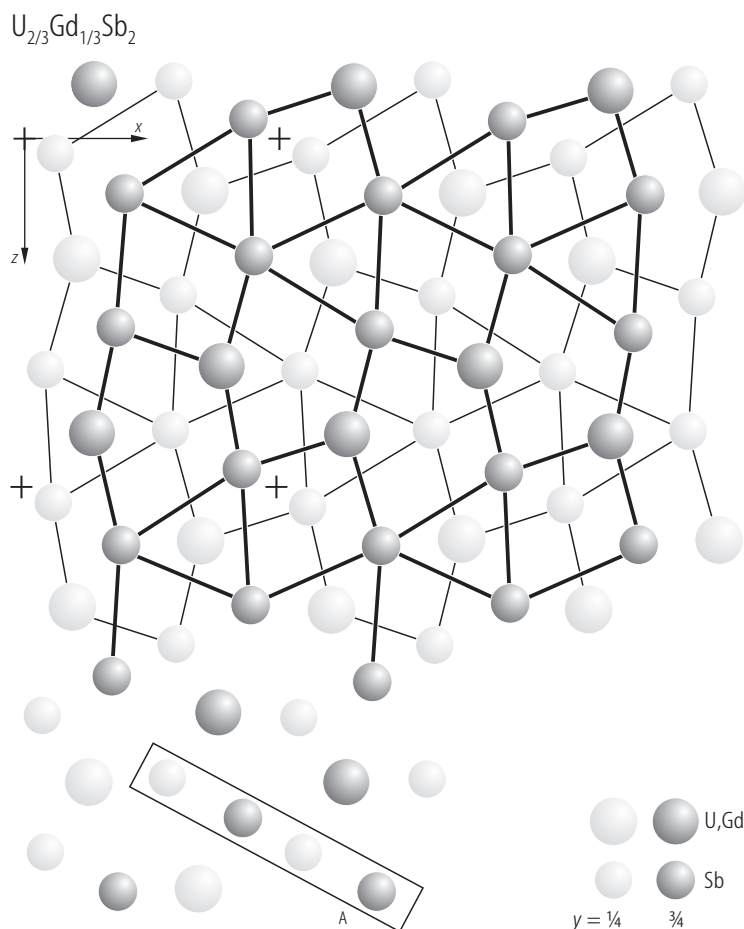


For Fig. 3 see next page

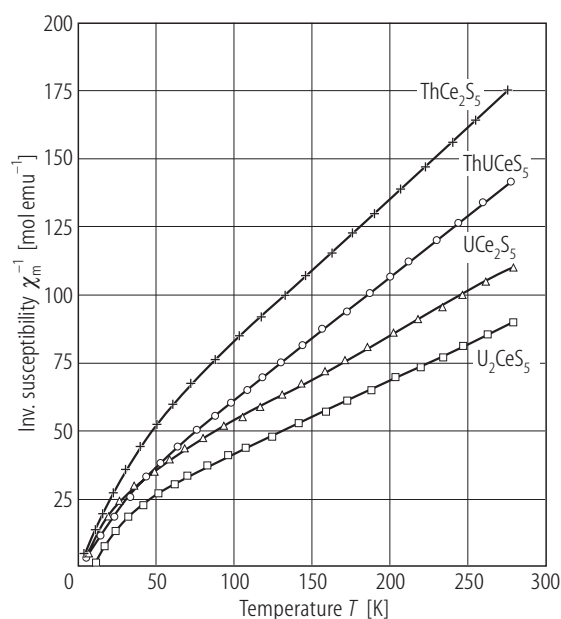
**Fig. 4.**  $U_{2/3}Ln_{1/3}Sb_2$ ,  $Ln = Y, Ce-Nd, Sm, Gd-Tm$ , and  $(U_{1/2}Ln_{1/2})_3Sb_7$ ,  $Ln = Y, Gd-Ho$ . Volume per atom ratio,  $V/A$  [01SJ]. Note that  $V/A$  of  $U_{2/3}Ce_{1/3}Sb_2$  follows lanthanide contraction indicating that cerium in this compound is trivalent.



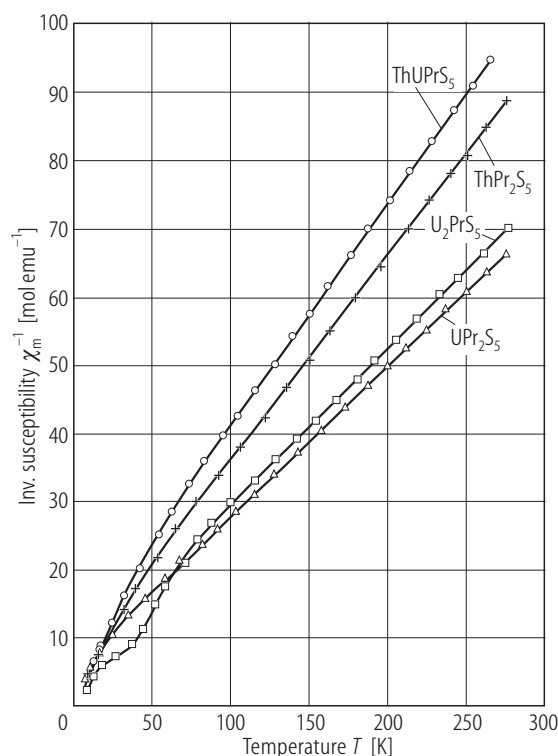
**Fig. 3.**  $\text{U}_{0.5}\text{Tb}_{0.5}\text{Te}_3$ . (a) Reciprocal specific magnetic susceptibility,  $\chi_g^{-1}$ , vs. temperature,  $T$  [85SKGK]. The line marks a Curie-Weiss behaviour (no fit parameters given in the paper). (b) Magnetisation,  $M$ , vs. temperature,  $T$ , in the range 3...20 K [85SKGK]. The compound orders ferromagnetically at  $T_C = 15 \text{ K}$ . (c) Hysteresis loop,  $M(B)$ , taken at  $T = 4.2 \text{ K}$  [85SKGK].



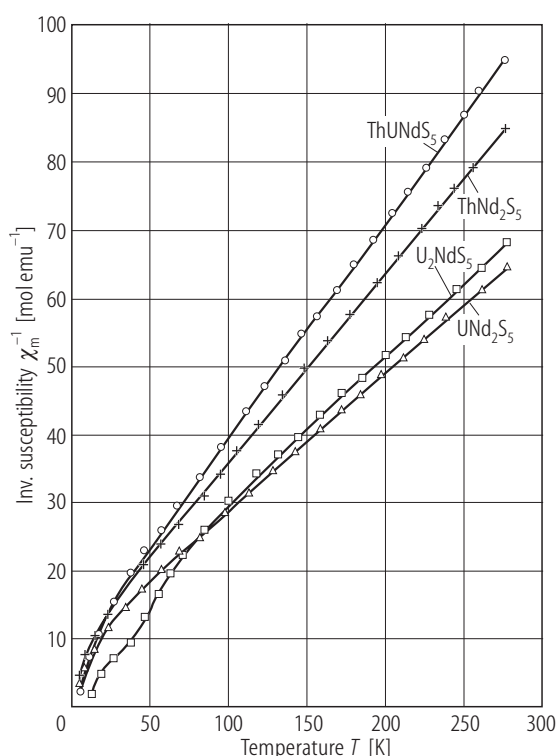
**Fig. 5.**  $U_{2/3}Gd_{1/3}Sb_2$ . Crystal structure projected on the (010) plane [01SJ]. Thick and thin lines connect atoms situated on mirror planes at  $y = \frac{3}{4}$  and  $\frac{1}{4}$ , respectively. The four Sb atoms in frame A form a polyanionic band with weak Sb-Sb bonds. The U and Gd atoms statistically occupy the same crystallographic position coordinated by nine Sb atoms. The valency of U atoms is mixed (+3/+4) or intermediate (+3.69).



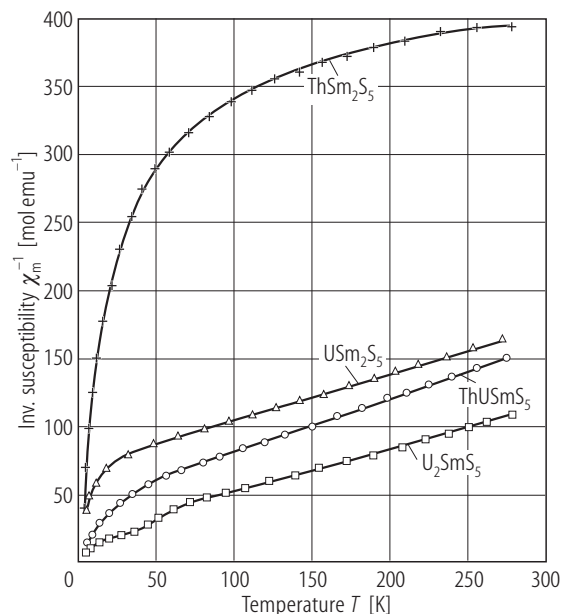
**Fig. 6.**  $ThCe_2S_5$ ,  $ThUCeS_5$ ,  $UCe_2S_5$ ,  $U_2CeS_5$ . Reciprocal molar magnetic susceptibility,  $\chi_m^{-1}$ , vs. temperature,  $T$  [80NP]. Crosses:  $ThCe_2S_5$ ; circles:  $ThUCeS_5$ ; triangles:  $UCe_2S_5$ ; squares:  $U_2CeS_5$ .  $U_2CeS_5$  shows weak ferromagnetism below  $T_C = 13$  K. The other compounds remain paramagnetic down to 4.2 K. At high temperatures all four compounds exhibit Curie-Weiss behaviour with the fit parameters given in Table B. The effective magnetic moment of cerium in  $ThCe_2S_5$  is  $2.56 \mu_B$ . Subtracting this Ce contribution in  $UCe_2S_5$  yields the uranium effective moment of  $3.19 \mu_B$ .



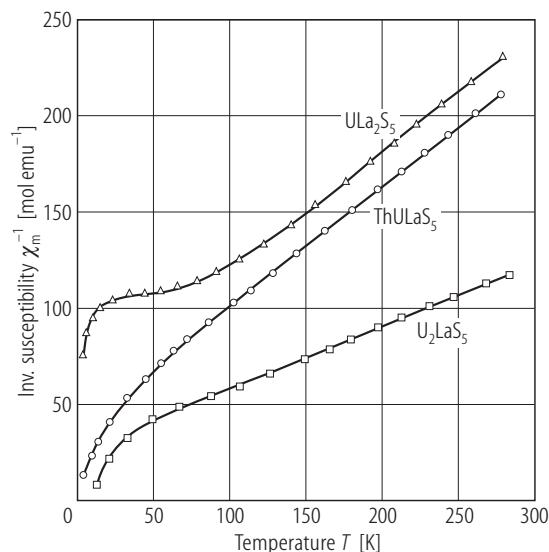
**Fig. 7.**  $\text{ThPr}_2\text{S}_5$ ,  $\text{ThUPrS}_5$ ,  $\text{UPr}_2\text{S}_5$ ,  $\text{U}_2\text{PrS}_5$ . Reciprocal molar magnetic susceptibility,  $\chi_m^{-1}$ , vs. temperature,  $T$  [80NP]. Crosses:  $\text{ThPr}_2\text{S}_5$ ; circles:  $\text{ThUPrS}_5$ ; triangles:  $\text{UPr}_2\text{S}_5$ ; squares:  $\text{U}_2\text{PrS}_5$ .  $\text{U}_2\text{PrS}_5$  is a weak ferromagnet with  $T_C = 9$  K. The other compounds remain paramagnetic down to 4.2 K. At high temperatures all four compounds exhibit Curie-Weiss behaviour with the fit parameters given in Table B. The effective magnetic moment of praseodymium in  $\text{ThPr}_2\text{S}_5$  is  $3.62 \mu_B$ .



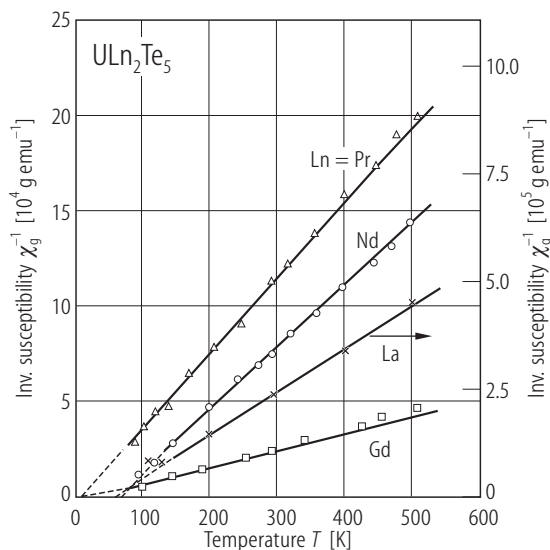
**Fig. 8.**  $\text{ThNd}_2\text{S}_5$ ,  $\text{ThUNdS}_5$ ,  $\text{UNd}_2\text{S}_5$ ,  $\text{U}_2\text{NdS}_5$ . Reciprocal molar magnetic susceptibility,  $\chi_m^{-1}$ , vs. temperature,  $T$  [80NP]. Crosses:  $\text{ThNd}_2\text{S}_5$ ; circles:  $\text{ThUNdS}_5$ ; triangles:  $\text{UNd}_2\text{S}_5$ ; squares:  $\text{U}_2\text{NdS}_5$ .  $\text{U}_2\text{NdS}_5$  exhibits weak ferromagnetism below  $T_C = 13$  K. The other compounds remain paramagnetic down to 4.2 K. At high temperatures all four compounds show Curie-Weiss behaviour with the fit parameters given in Table B. The effective magnetic moment of neodymium in  $\text{ThNd}_2\text{S}_5$  is  $3.77 \mu_B$ .



**Fig. 9.**  $\text{ThSm}_2\text{S}_5$ ,  $\text{ThUSmS}_5$ ,  $\text{USm}_2\text{S}_5$ ,  $\text{U}_2\text{SmS}_5$ . Reciprocal molar magnetic susceptibility,  $\chi_m^{-1}$ , vs. temperature,  $T$  [80NP]. Crosses:  $\text{ThSm}_2\text{S}_5$ ; circles:  $\text{ThUSmS}_5$ ; triangles:  $\text{USm}_2\text{S}_5$ ; squares:  $\text{U}_2\text{SmS}_5$ . Note a non Curie-Weiss behaviour for  $\text{ThSm}_2\text{S}_5$ . The other phases are Curie-Weiss paramagnets (for the fit parameters see Table B). Rather high molar paramagnetic Curie constants indicate that Sm is partly divalent in these compounds.

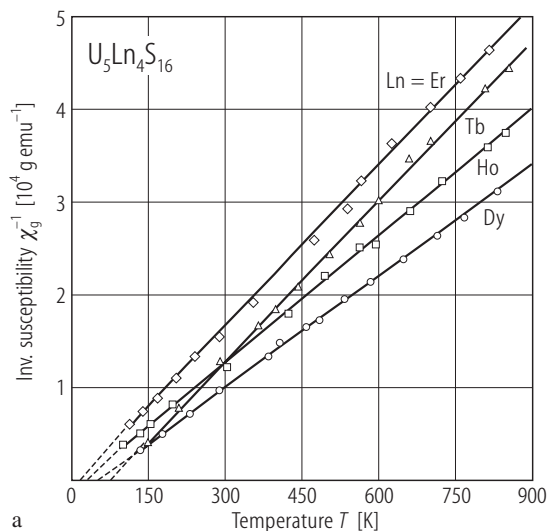


**Fig. 10.**  $\text{ULa}_2\text{S}_5$ ,  $\text{ThULaS}_5$ ,  $\text{U}_2\text{LaS}_5$ . Reciprocal molar magnetic susceptibility,  $\chi_m^{-1}$ , vs. temperature,  $T$  [80NP]. Triangles:  $\text{ULa}_2\text{S}_5$ ; circles:  $\text{ThULaS}_5$ ; squares:  $\text{U}_2\text{LaS}_5$ . The susceptibility of  $\text{ULa}_2\text{S}_5$  is nearly temperature independent in the range 30...60 K, signaling the presence of a singlet crystal field ground state. For  $\text{ThULaS}_5$  one observes  $\chi_m^{-1}(T)$  tending to zero with  $T \rightarrow 0$ , characteristic of  $\text{U}^{3+}$  Kramers ions.  $\text{U}_2\text{LaS}_5$  orders ferromagnetically at  $T_C = 14$  K. At high temperatures all three compounds exhibit Curie-Weiss behaviour with the fit parameters given in Table B.

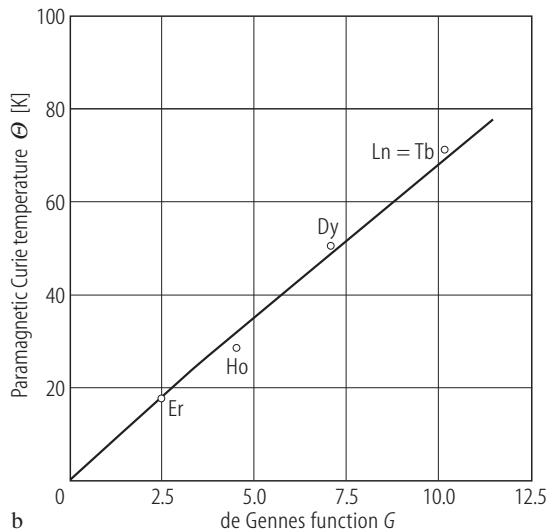


**Fig. 11.**  $\text{ULn}_2\text{Te}_5$ ,  $\text{Ln} = \text{La}, \text{Pr}, \text{Nd}, \text{Gd}$ . Reciprocal mass magnetic susceptibility,  $\chi_g^{-1}$ , vs. temperature,  $T$  [84NCCC]. Triangles:  $\text{UPr}_2\text{Te}_5$ ; circles:  $\text{UNd}_2\text{Te}_5$ ; squares:  $\text{UGd}_2\text{Te}_5$ ; crosses:  $\text{ULa}_2\text{Te}_5$ . Note different (right-hand side scale) vertical scale for  $\text{ULa}_2\text{Te}_5$ . The lines mark a Curie-Weiss behaviour with the paramagnetic Curie temperatures  $\Theta$  of 60, 6, 60 and 10 K for  $\text{Ln} = \text{La}, \text{Pr}, \text{Nd}$  and  $\text{Gd}$ , respectively.

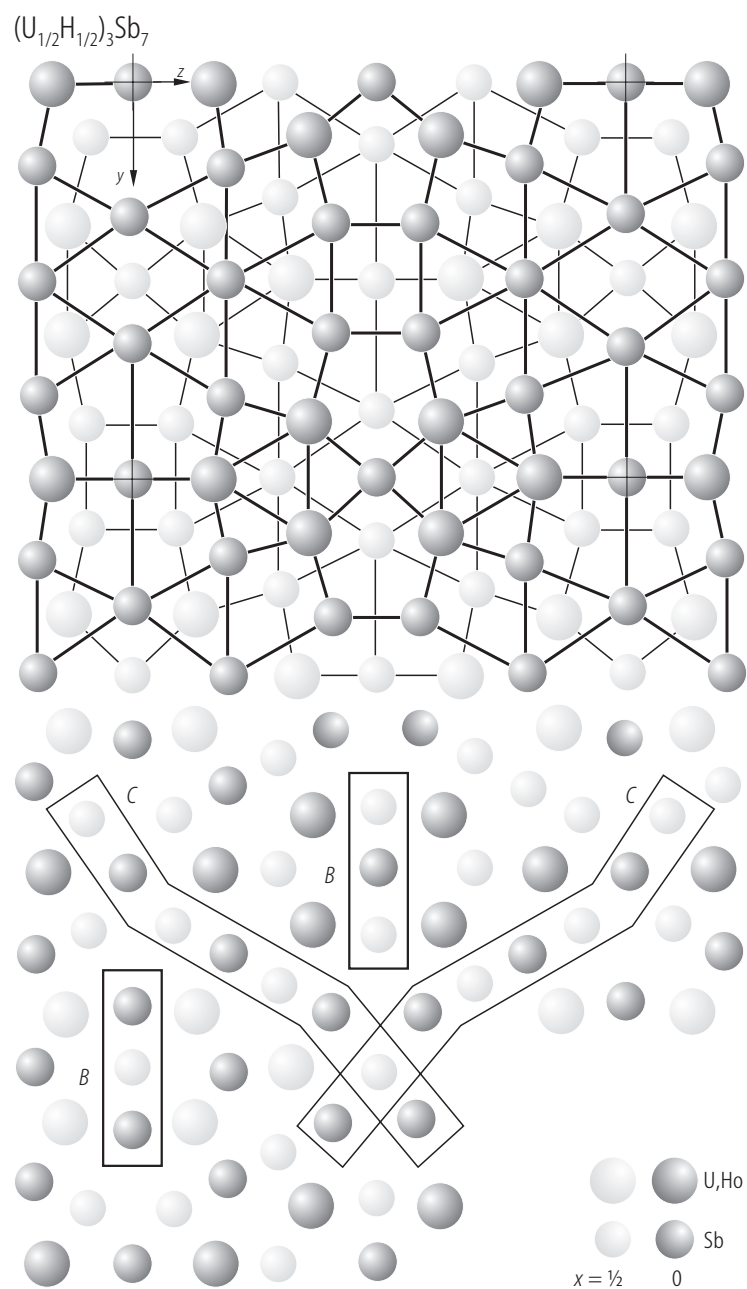
For Fig. 12 see next page



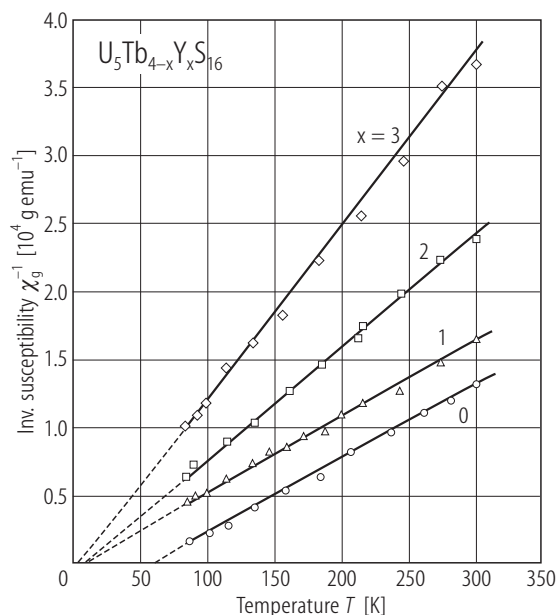
**Fig. 13.**  $\text{U}_5\text{Ln}_4\text{S}_{16}$ ,  $\text{Ln} = \text{Tb}, \text{Dy}, \text{Ho}, \text{Er}$ . (a) Reciprocal mass magnetic susceptibility,  $\chi_g^{-1}$ , vs. temperature,  $T$  [82CNPS]. Triangles:  $\text{U}_5\text{Tb}_4\text{S}_{16}$ ; circles:  $\text{U}_5\text{Dy}_4\text{S}_{16}$ ; squares:  $\text{U}_5\text{Ho}_4\text{S}_{16}$ ; diamonds:  $\text{U}_5\text{Er}_4\text{S}_{16}$ . The lines mark a Curie-Weiss behaviour. Assuming for the U contribution the effective magnetic moment of  $2.84 \mu_B$ , as found for  $\text{U}_5\text{Y}_4\text{S}_{16}$  (see Fig. 15), one obtains for the  $\text{U}_5\text{Ln}_4\text{S}_{16}$  compounds  $p_{\text{eff}} = 22.32, 25.2, 24.58$  and  $22.32 \mu_B$  per Tb, Dy, Ho and Er ion,



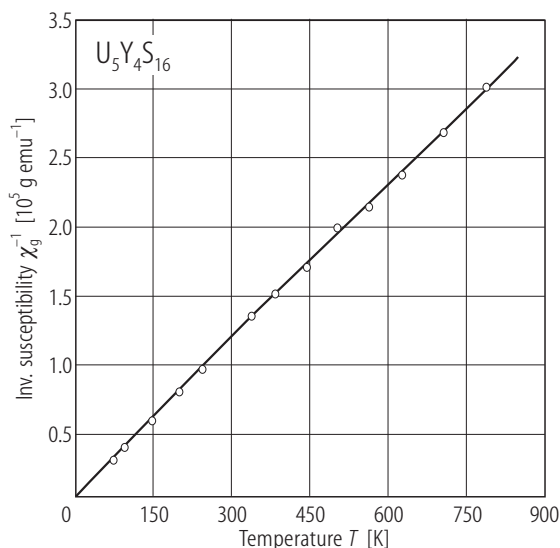
respectively. These values are lower than those expected for free  $\text{Ln}^{3+}$  ions, and this reduction results presumably from crystal field effects. (b) Paramagnetic Curie temperature,  $\Theta$ , vs. de Gennes function,  $G = (g-1)^2 J(J+1)$  [82CNPS]. Note a good linear scaling, which indicates that magnetism of the  $\text{U}_5\text{Ln}_4\text{S}_{16}$  compounds is governed mainly by RKKY interactions between rare-earth atoms, which are much stronger than U-U exchange.



**Fig. 12.**  $(U_{0.5}Ho_{0.5})_3Sb_7$ . Crystal structure projected on the (100) plane [01SJ]. Thick and thin lines connect atoms situated on mirror planes at  $x = 0.5$  and 0, respectively. Frames B and C outline chains and three-dimensionally infinite network of Sb atoms, respectively. The U and Ho atoms statistically occupy the same crystallographic position surrounded by nine Sb atoms. The valency of U atoms is mixed (+3/+4) or intermediate (+3.80).

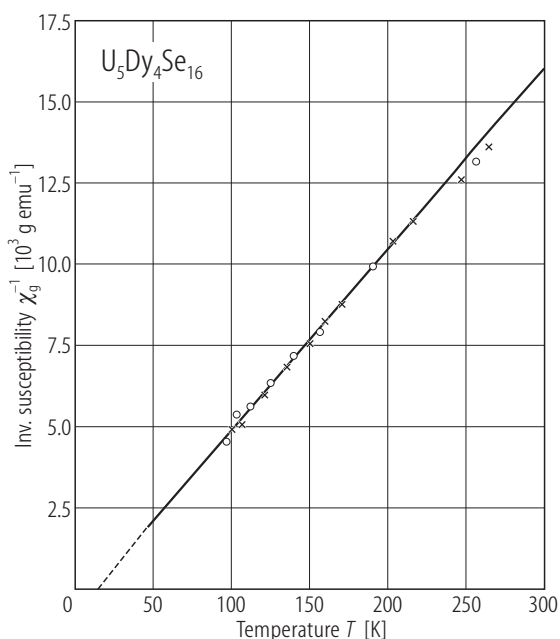


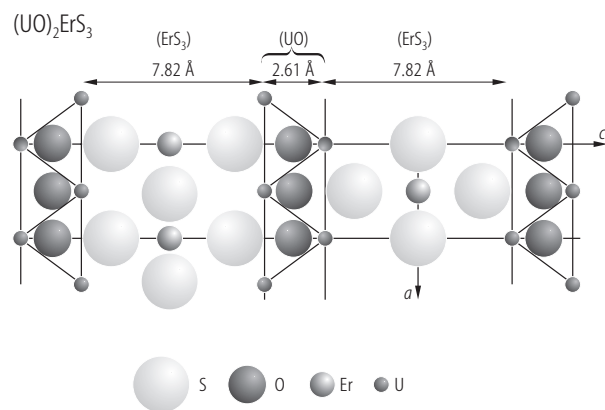
**Fig. 14.**  $\text{U}_5\text{Tb}_{4-x}\text{Y}_x\text{S}_{16}$ . Reciprocal mass magnetic susceptibility,  $\chi_g^{-1}$ , vs. temperature,  $T$ , in the range 80...300 K for  $x = 0$  (circles), 1 (triangles), 2 (squares) and 3 (diamonds) [84NCKS1]. The solid lines are Curie-Weiss fits with the parameters given in Table C. The effective magnetic moment of the  $\text{U}^{4+}$  ion in  $\text{U}_5\text{Y}_4\text{S}_{16}$  is  $2.84 \mu_B$  (see Fig. 15). Assuming that in the other compounds the uranium moment does not change significantly, and the terbium moment is parallel to the uranium one the authors derived the effective magnetic moments of the  $\text{Tb}^{3+}$  ions (see Table C). Note that the latter are considerably lower than the theoretical value ( $p_{\text{eff}}^{\text{Tb}^{3+}} = 9.72 \mu_B$ ), probably because of crystal field effect.



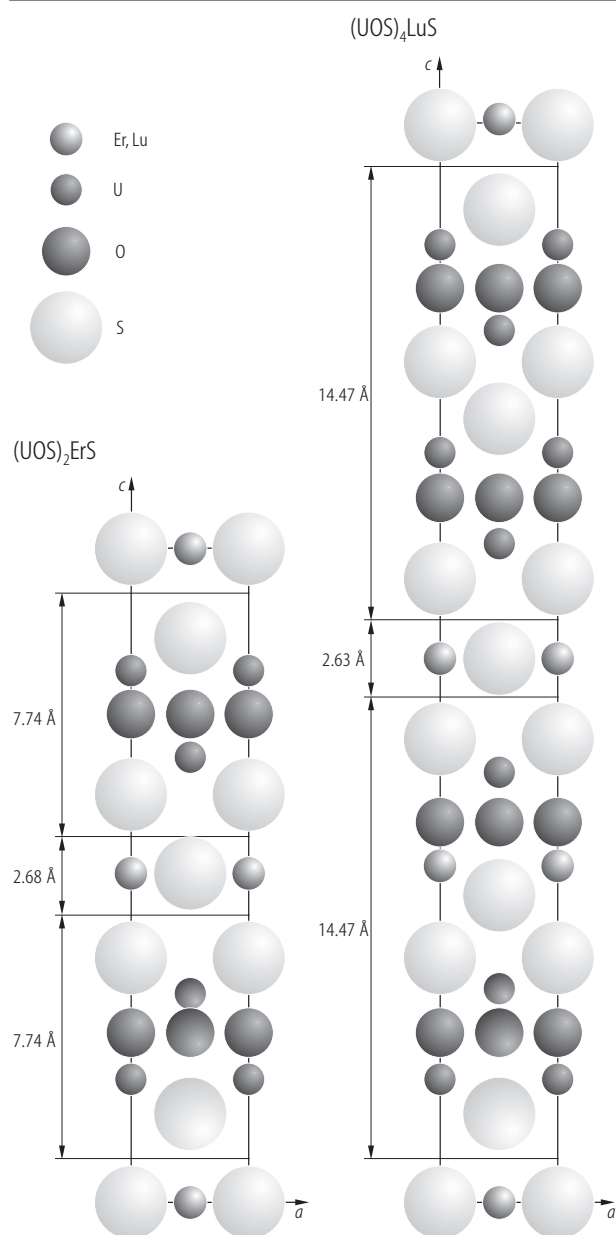
**Fig. 15.**  $\text{U}_5\text{Y}_4\text{S}_{16}$ . Reciprocal mass magnetic susceptibility,  $\chi_g^{-1}$ , vs. temperature,  $T$  in the range 80...800 K [82CNPS]. The line marks a Curie-Weiss behaviour with the paramagnetic Curie temperature of nearly zero and the effective magnetic moment of  $2.84 \mu_B/\text{U}$  atom.

**Fig. 16.**  $\text{U}_5\text{Dy}_4\text{Se}_{16}$ . Reciprocal mass magnetic susceptibility,  $\chi_g^{-1}$ , vs. temperature,  $T$ , in the range 100...270 K, measured on heating (crosses) and cooling (circles) [81PLSK3]. The solid line is a Curie-Weiss fit with the parameters:  $p_{\text{eff}} = 21.6 \mu_B/\text{mol}$  and  $\Theta = 16 \text{ K}$ . Both uranium and dysprosium atoms carry magnetic moments. Assuming that the contribution coming from uranium is equal to  $p_{\text{eff}}(\text{U}) = 2.84 \mu_B/(\text{U atom})$ , as found for  $\text{U}_5\text{Y}_4\text{S}_{16}$ , the authors derived for dysprosium the effective magnetic moment of  $9.2 \mu_B/(\text{Dy atom})$ .





**Fig. 17.**  $(\text{UO})_2\text{ErS}_3$ . Crystal structure projected on the (010) plane [86JJGV].



**Fig. 18.**  $(\text{UOS})_2\text{ErS}$ ,  $(\text{UOS})_4\text{LuS}$ . Crystal structures projected on the (010) plane [90JJDL].



**Table A.** Crystallographic data for actinide pnictides and chalcogenides containing lanthanide atoms.

Compound	Sym- metry	Point group (structure type)	Lattice parameters				Ref.
			<i>a</i> [pm]	<i>b</i> [pm]	<i>c</i> [pm]	$\beta$	
<b>An<sub>0.5</sub>Ln<sub>0.5</sub>Y<sub>2</sub></b>							
U <sub>0.5</sub> Tb <sub>0.5</sub> Se <sub>2</sub>	orth.	P2 <sub>1</sub> ca	713.3	754.4	559.3		<a href="#">82SKG2</a>
U <sub>0.5</sub> Dy <sub>0.5</sub> Se <sub>2</sub>	orth.	Pnnm	700(1)	755(1)	559(1)		<a href="#">81PLSK1</a>
		P2 <sub>1</sub> ca	701.2	755.3	560.6		<a href="#">82SKG2</a>
U <sub>0.5</sub> Ho <sub>0.5</sub> Se <sub>2</sub>	orth.	P2 <sub>1</sub> ca	699.3	753.6	557.2		<a href="#">82SKG2</a>
U <sub>0.5</sub> Er <sub>0.5</sub> Se <sub>2</sub>	orth.	P2 <sub>1</sub> ca	699.7	753.8	558.3		<a href="#">82SKG2</a>
U <sub>0.5</sub> Tm <sub>0.5</sub> Se <sub>2</sub>	orth.	P2 <sub>1</sub> ca	700.8	750.5	560.7		<a href="#">82SKG2</a>
U <sub>0.5</sub> Yb <sub>0.5</sub> Se <sub>2</sub>	orth.	P2 <sub>1</sub> ca	693.9	747.3	556.3		<a href="#">82SKG2</a>
U <sub>0.5</sub> Y <sub>0.5</sub> Se <sub>2</sub>	orth.	P2 <sub>1</sub> ca	699.0	756.5	559.8		<a href="#">82SKG2</a>
U <sub>0.5</sub> Tb <sub>0.5</sub> Te <sub>2</sub>	orth.	Pnnn (UTe <sub>2</sub> )	418	609	1392		<a href="#">85SKG3</a>
U <sub>0.5</sub> Dy <sub>0.5</sub> Te <sub>2</sub>	orth.	Pnnn (UTe <sub>2</sub> )	418 419	609 608	1374 1377		<a href="#">85SKG1</a> , <a href="#">85SKG3</a> , <a href="#">85SKG4</a>
U <sub>0.5</sub> Ho <sub>0.5</sub> Te <sub>2</sub>	orth.	Pnnn (UTe <sub>2</sub> )	415	605	1386		<a href="#">85SKG3</a>
U <sub>0.5</sub> Er <sub>0.5</sub> Te <sub>2</sub>	orth.	Pnnn (UTe <sub>2</sub> )	417	607	1390		<a href="#">85SKG3</a>
U <sub>0.5</sub> Tm <sub>0.5</sub> Te <sub>2</sub>	orth.	Pnnn (UTe <sub>2</sub> )	413	603	1390		<a href="#">85SKG3</a>
<b>An<sub>0.5</sub>Ln<sub>0.5</sub>Y<sub>3</sub></b>							
U <sub>0.5</sub> Tb <sub>0.5</sub> Te <sub>2.9</sub>	tetr.	(NdTe <sub>3</sub> )	434		2493		<a href="#">85SKGK</a>
U <sub>0.5</sub> Dy <sub>0.5</sub> Te <sub>2.9</sub>	tetr.	(NdTe <sub>3</sub> )	434		2483		<a href="#">85SKG1</a> , <a href="#">85SKGK</a>
U <sub>0.5</sub> Ho <sub>0.5</sub> Te <sub>2.9</sub>	tetr.	(NdTe <sub>3</sub> )	432		2490		<a href="#">85SKGK</a>
U <sub>0.5</sub> Er <sub>0.5</sub> Te <sub>2.9</sub>	tetr.	(NdTe <sub>3</sub> )	435		2485		<a href="#">85SKGK</a>
U <sub>0.5</sub> Tm <sub>0.5</sub> Te <sub>2.9</sub>	tetr.	(NdTe <sub>3</sub> )	432		2490		<a href="#">85SKGK</a>
U <sub>0.5</sub> Yb <sub>0.5</sub> Te <sub>2.9</sub>	tetr.	(NdTe <sub>3</sub> )	432		2495		<a href="#">85SKGK</a>
U <sub>0.5</sub> Lu <sub>0.5</sub> Te <sub>2.9</sub>	tetr.	(NdTe <sub>3</sub> )	433		2480		<a href="#">85SKGK</a>
U <sub>0.5</sub> Y <sub>0.5</sub> Te <sub>2.9</sub>	tetr.	(NdTe <sub>3</sub> )	433		2504		<a href="#">85SKGK</a>
<b>An<sub>2/3</sub>Ln<sub>1/3</sub>X<sub>2</sub></b>							
U <sub>2/3</sub> Y <sub>1/3</sub> Sb <sub>2</sub>	orth.	Pnma (PbCl <sub>2</sub> )	754.4(2)	418.6(1)	1025.7(2)		<a href="#">01SJ</a>
U <sub>2/3</sub> Ce <sub>1/3</sub> Sb <sub>2</sub>	orth.	Pnma (PbCl <sub>2</sub> )	758.2(1)	423.7(1)	1034.8(2)		<a href="#">01SJ</a>
U <sub>2/3</sub> Pr <sub>1/3</sub> Sb <sub>2</sub>	orth.	Pnma (PbCl <sub>2</sub> )	758.2(1)	423.1(1)	1032.4(2)		<a href="#">01SJ</a>
U <sub>2/3</sub> Nd <sub>1/3</sub> Sb <sub>2</sub>	orth.	Pnma (PbCl <sub>2</sub> )	758.0(1)	422.6(1)	1031.7(3)		<a href="#">01SJ</a>
U <sub>2/3</sub> Sm <sub>1/3</sub> Sb <sub>2</sub>	orth.	Pnma (PbCl <sub>2</sub> )	755.4(1)	420.3(1)	1027.5(2)		<a href="#">01SJ</a>

Compound	Symmetry	Point group (structure type)	Lattice parameters				Ref.
			<i>a</i> [pm]	<i>b</i> [pm]	<i>c</i> [pm]	$\beta$	
$U_{2/3}Gd_{1/3}Sb_2$	orth.	Pnma (PbCl <sub>2</sub> )	754.6(1)	419.6(1)	1025.7(3)		<a href="#">01SJ</a>
$U_{2/3}Tb_{1/3}Sb_2$	orth.	Pnma (PbCl <sub>2</sub> )	754.7(1)	418.7(1)	1024.3(2)		<a href="#">01SJ</a>
$U_{2/3}Dy_{1/3}Sb_2$	orth.	Pnma (PbCl <sub>2</sub> )	754.3(1)	418.2(1)	1023.6(2)		<a href="#">01SJ</a>
$U_{2/3}Ho_{1/3}Sb_2$	orth.	Pnma (PbCl <sub>2</sub> )	754.0(1)	418.0(1)	1023.1(2)		<a href="#">01SJ</a>
$U_{2/3}Er_{1/3}Sb_2$	orth.	Pnma (PbCl <sub>2</sub> )	753.4(1)	417.9(1)	1022.0(2)		<a href="#">01SJ</a>
$U_{2/3}Tm_{1/3}Sb_2$	orth.	Pnma (PbCl <sub>2</sub> )	753.2(1)	417.3(1)	1020.9(2)		<a href="#">01SJ</a>
<b>AnLn<sub>2</sub>Y<sub>5</sub></b>							
ThLa <sub>2</sub> S <sub>5</sub>	orth.	Pnma (HfY <sub>2</sub> S <sub>5</sub> )	1208.1(2)	837.1(2)	760.7(1)		<a href="#">75JD</a>
		(U <sub>3</sub> S <sub>5</sub> )	1206	836	759		<a href="#">80NP</a>
ThCe <sub>2</sub> S <sub>5</sub>	orth.	Pnma (U <sub>3</sub> S <sub>5</sub> )	1201	829	756		<a href="#">80NP</a>
ThPr <sub>2</sub> S <sub>5</sub>	orth.	Pnma (U <sub>3</sub> S <sub>5</sub> )	1199	824	753		<a href="#">80NP</a>
ThNd <sub>2</sub> S <sub>5</sub>	orth.	Pnma (U <sub>3</sub> S <sub>5</sub> )	1196	821	750		<a href="#">80NP</a>
ThSm <sub>2</sub> S <sub>5</sub>	orth.	Pnma (U <sub>3</sub> S <sub>5</sub> )	1193	814	745		<a href="#">80NP</a>
ThLa <sub>2</sub> Se <sub>5</sub>	orth.	Pnma (U <sub>3</sub> S <sub>5</sub> )	1256.2(3)	864.8(3)	793.7(2)		<a href="#">75JD</a>
ULa <sub>2</sub> S <sub>5</sub>	orth.	Pnma (U <sub>3</sub> S <sub>5</sub> )	756	826	1194		<a href="#">75TGFR</a>
		(U <sub>3</sub> S <sub>5</sub> )	753	826	1190		<a href="#">80NP</a>
UCe <sub>2</sub> S <sub>5</sub>	orth.	Pnma (U <sub>3</sub> S <sub>5</sub> )	753	816	1182		<a href="#">75TGFR</a>
		(U <sub>3</sub> S <sub>5</sub> )	749	820	1187		<a href="#">80NP</a>
UPr <sub>2</sub> S <sub>5</sub>	orth.	Pnma (U <sub>3</sub> S <sub>5</sub> )	752	814	1180		<a href="#">75TGFR</a>
		(U <sub>3</sub> S <sub>5</sub> )	747	815	1184		<a href="#">80NP</a>
UNd <sub>2</sub> S <sub>5</sub>	orth.	Pnma (U <sub>3</sub> S <sub>5</sub> )	749	809	1176		<a href="#">75TGFR</a>
		(U <sub>3</sub> S <sub>5</sub> )	745	811	1180		<a href="#">80NP</a>
USm <sub>2</sub> S <sub>5</sub>	orth.	Pnma (U <sub>3</sub> S <sub>5</sub> )	744	806	1173		<a href="#">75TGFR</a>
		(U <sub>3</sub> S <sub>5</sub> )	741	806	1178		<a href="#">80NP</a>
UGd <sub>2</sub> S <sub>5</sub>	orth.	Pnma (U <sub>3</sub> S <sub>5</sub> )	739	806	1166		<a href="#">75TGFR</a>
ULa <sub>2</sub> Se <sub>5</sub>	orth.	Pnma (U <sub>3</sub> Se <sub>5</sub> )	782	852	1219		<a href="#">84SKG</a>
UCe <sub>2</sub> Se <sub>5</sub>	orth.	Pnma (U <sub>3</sub> Se <sub>5</sub> )	778	847	1218		<a href="#">84SKG</a>
UPr <sub>2</sub> Se <sub>5</sub>	orth.	Pnma (U <sub>3</sub> Se <sub>5</sub> )	777	843	1218		<a href="#">84SKG</a>
UNd <sub>2</sub> Se <sub>5</sub>	orth.	Pnma (U <sub>3</sub> Se <sub>5</sub> )	773	841	1217		<a href="#">84SKG</a>

Compound	Symmetry	Point group (structure type)	Lattice parameters				Ref.
			<i>a</i> [pm]	<i>b</i> [pm]	<i>c</i> [pm]	$\beta$	
USm <sub>2</sub> Se <sub>5</sub>	orth.	Pnma (U <sub>3</sub> Se <sub>5</sub> )	770	845	1224		<a href="#">84SKG</a>
UGd <sub>2</sub> Se <sub>5</sub>	orth.	Pnma (U <sub>3</sub> Se <sub>5</sub> )	763	829	1215		<a href="#">84SKG</a>
<b>(An<sub>0.5</sub>Ln<sub>0.5</sub>)<sub>3</sub>X<sub>7</sub></b>							
(U <sub>0.5</sub> Y <sub>0.5</sub> ) <sub>3</sub> Sb <sub>7</sub>	orth.	Immm ((U <sub>0.5</sub> Ho <sub>0.5</sub> ) <sub>3</sub> Sb <sub>7</sub> )	411.2(2)		1824.1(2)		<a href="#">01SJ</a>
(U <sub>0.5</sub> Gd <sub>0.5</sub> ) <sub>3</sub> Sb <sub>7</sub>	orth.	Immm ((U <sub>0.5</sub> Ho <sub>0.5</sub> ) <sub>3</sub> Sb <sub>7</sub> )	411.4(1)	1452.0(2) 1453.2(4)	1825.2(5)		<a href="#">01SJ</a>
(U <sub>0.5</sub> Tb <sub>0.5</sub> ) <sub>3</sub> Sb <sub>7</sub>	orth.	Immm ((U <sub>0.5</sub> Ho <sub>0.5</sub> ) <sub>3</sub> Sb <sub>7</sub> )	411.0(1)	1451.7(3)	1823.4(5)		<a href="#">01SJ</a>
(U <sub>0.5</sub> Dy <sub>0.5</sub> ) <sub>3</sub> Sb <sub>7</sub>	orth.	Immm ((U <sub>0.5</sub> Ho <sub>0.5</sub> ) <sub>3</sub> Sb <sub>7</sub> )	410.3(1)	1450.0(3)	1825.8(6)		<a href="#">01SJ</a>
(U <sub>0.5</sub> Ho <sub>0.5</sub> ) <sub>3</sub> Sb <sub>7</sub>	orth.	Immm (own)	410.1(1)	1447.7(3)	1821.2(5)		<a href="#">01SJ</a>
<b>An<sub>2</sub>LnY<sub>5</sub></b>							
ThULaS <sub>5</sub>	orth.	Pnma (U <sub>3</sub> S <sub>5</sub> )	1198	827	753		<a href="#">80NP</a>
ThUCeS <sub>5</sub>	orth.	Pnma (U <sub>3</sub> S <sub>5</sub> )	1193	823	751		<a href="#">80NP</a>
ThUPrS <sub>5</sub>	orth.	Pnma (U <sub>3</sub> S <sub>5</sub> )	1190	819	749		<a href="#">80NP</a>
ThUNdS <sub>5</sub>	orth.	Pnma (U <sub>3</sub> S <sub>5</sub> )	1189	818	747		<a href="#">80NP</a>
ThUSmS <sub>5</sub>	orth.	Pnma (U <sub>3</sub> S <sub>5</sub> )	1186	818	746		<a href="#">80NP</a>
U <sub>2</sub> LaS <sub>5</sub>	orth.	Pnma (U <sub>3</sub> S <sub>5</sub> )	749	819	1184		<a href="#">80NP</a>
U <sub>2</sub> CeS <sub>5</sub>	orth.	Pnma (U <sub>3</sub> S <sub>5</sub> )	746	815	1182		<a href="#">80NP</a>
U <sub>2</sub> PrS <sub>5</sub>	orth.	Pnma (U <sub>3</sub> S <sub>5</sub> )	745	813	1181		<a href="#">80NP</a>
U <sub>2</sub> NdS <sub>5</sub>	orth.	Pnma (U <sub>3</sub> S <sub>5</sub> )	744	811	1179		<a href="#">80NP</a>
U <sub>2</sub> SmS <sub>5</sub>	orth.	Pnma (U <sub>3</sub> S <sub>5</sub> )	748 741	814 808	1186 1177		<a href="#">75TGFR</a> <a href="#">80NP</a>
U <sub>2</sub> EuS <sub>5</sub>	orth.	P <sub>2</sub> 122 <sub>1</sub> Pnma (U <sub>3</sub> S <sub>5</sub> )	744(1) 744	826(1) 826	1175(2) 1176		<a href="#">72BPP</a> <a href="#">75TGFR</a>
U <sub>2</sub> SmSe <sub>5</sub>	orth.	Pnma (U <sub>3</sub> Se <sub>5</sub> )	767	845	1223		<a href="#">84SKG</a>
U <sub>2</sub> EuSe <sub>5</sub>	orth.	P <sub>2</sub> 122 <sub>1</sub> Pnma (U <sub>3</sub> Se <sub>5</sub> )	779(1) 771	859.0(5) 852	1227(2) 1219		<a href="#">72BPP</a> <a href="#">84SKG</a>

Compound	Sym- metry	Point group (structure type)	Lattice parameters				Ref.
			<i>a</i> [pm]	<i>b</i> [pm]	<i>c</i> [pm]	$\beta$	
U <sub>2</sub> LaTe <sub>5</sub>	tetr.	P4/nmm (Fe <sub>2</sub> As)	448		912		<a href="#">79KSG</a>
U <sub>2</sub> PrTe <sub>5</sub>	tetr.	P4/nmm (Fe <sub>2</sub> As)	440		902		<a href="#">79KSG</a>
U <sub>2</sub> NdTe <sub>5</sub>	tetr.	P4/nmm (Fe <sub>2</sub> As)	438		900		<a href="#">79KSG</a>
U <sub>2</sub> SmTe <sub>5</sub>	tetr.	P4/nmm (Fe <sub>2</sub> As)	438		899		<a href="#">79KSG</a>
U <sub>2</sub> GdTe <sub>5</sub>	tetr.	P4/nmm (Fe <sub>2</sub> As)	433		877		<a href="#">79KSG</a>
<b>An<sub>5</sub>Ln<sub>4</sub>Y<sub>16</sub></b>							
Th <sub>5</sub> Tb <sub>4</sub> S <sub>16</sub>	mon.	B2 or Bm or B2/m	1627	1060	1369	102°58'	<a href="#">74TG</a>
Th <sub>5</sub> Dy <sub>4</sub> S <sub>16</sub>	mon.	B2 or Bm or B2/m	1622	1052	1361	102°37'	<a href="#">74TG</a>
Th <sub>5</sub> Ho <sub>4</sub> S <sub>16</sub>	mon.	B2 or Bm or B2/m	1610	1039	1343	101°90'	<a href="#">74TG</a>
Th <sub>5</sub> Er <sub>4</sub> S <sub>16</sub>	mon.	B2 or Bm or B2/m	1604	1031	1336	101°72'	<a href="#">74TG</a>
Th <sub>5</sub> Tm <sub>4</sub> S <sub>16</sub>	mon.	B2 or Bm or B2/m	1594	1017	1328	101°05'	<a href="#">74TG</a>
Th <sub>5</sub> Yb <sub>4</sub> S <sub>16</sub>	mon.	B2 or Bm or B2/m	1589	1010	1320	100°82'	<a href="#">74TG</a>
Th <sub>5</sub> Lu <sub>4</sub> S <sub>16</sub>	mon.	B2 or Bm or B2/m	1583	1003	1312	100°60'	<a href="#">74TG</a>
Th <sub>5</sub> Y <sub>4</sub> S <sub>16</sub>	mon.	B2 or Bm or B2/m	1616	1046	1351	102°12'	<a href="#">74TG</a>
U <sub>5</sub> Tb <sub>4</sub> S <sub>16</sub>	mon.	B2 or Bm or B2/m	1602(1)	1045(1)	1367(1)	102.0(1)°	<a href="#">74TG</a>
U <sub>5</sub> Dy <sub>4</sub> S <sub>16</sub>	mon.	B2 or Bm or B2/m	1602	1035	1341	101°75'	<a href="#">74TG</a>
U <sub>5</sub> Ho <sub>4</sub> S <sub>16</sub>	mon.	B2 or Bm or B2/m	1593	1020	1321	101°	<a href="#">74TG</a>
U <sub>5</sub> Er <sub>4</sub> S <sub>16</sub>	mon.	B2 or Bm or B2/m	1590	1011	1309	100°76'	<a href="#">74TG</a>
U <sub>5</sub> Tm <sub>4</sub> S <sub>16</sub>	mon.	B2 or Bm or B2/m	1585	1004	1301	100°54'	<a href="#">74TG</a>
U <sub>5</sub> Yb <sub>4</sub> S <sub>16</sub>	mon.	B2 or Bm or B2/m	1579	997	1293	100°31'	<a href="#">74TG</a>
U <sub>5</sub> Lu <sub>4</sub> S <sub>16</sub>	mon.	B2 or Bm or B2/m	1574	989	1285	100°	<a href="#">74TG</a>
U <sub>5</sub> Y <sub>4</sub> S <sub>16</sub>	mon.	B2 or Bm or B2/m	1597	1029	1331	101°50'	<a href="#">74TG</a>
U <sub>5</sub> Tb <sub>4</sub> Se <sub>16</sub>	mon.	B2 or Bm or B2/m	1650	1081	1423	102°32'	<a href="#">82SKG1</a>

Compound	Symmetry	Point group (structure type)	Lattice parameters				Ref.
			<i>a</i> [pm]	<i>b</i> [pm]	<i>c</i> [pm]	$\beta$	
U <sub>5</sub> Dy <sub>4</sub> Se <sub>16</sub>	mon.	B2 or Bm or B2/m	1667(2) 1658	1084(2) 1072	1429(2) 1419	102°16' 102°16'	<a href="#">81PLSK3</a> <a href="#">82SKG1</a>
U <sub>5</sub> Ho <sub>4</sub> Se <sub>16</sub>	mon.	B2 or Bm or B2/m	1649	1072	1410	102°17'	<a href="#">82SKG1</a>
U <sub>5</sub> Er <sub>4</sub> Se <sub>16</sub>	mon.	B2 or Bm or B2/m	1654	1080	1405	101°45'	<a href="#">82SKG1</a>
U <sub>5</sub> Y <sub>4</sub> Se <sub>16</sub>	mon.	B2 or Bm or B2/m	1659	1092	1377	102°10'	<a href="#">82SKG1</a>
<b>others</b>							
U <sub>0.87</sub> Yb <sub>2.0</sub> Se <sub>4</sub>	orth.	P2 <sub>1</sub> 22 <sub>1</sub>	1361	1325	397.2		<a href="#">82SKG4</a>
UTbTe <sub>3</sub>	orth.	Pbnm (Sb <sub>2</sub> S <sub>3</sub> )	1204	1163	434		<a href="#">85SKG2</a>
UDyTe <sub>3</sub>	orth.	Pbnm (Sb <sub>2</sub> S <sub>3</sub> )	1203	1161	433		<a href="#">85SKG2</a> , <a href="#">85SKG4</a>
UHoTe <sub>3</sub>	orth.	Pbnm (Sb <sub>2</sub> S <sub>3</sub> )	1202	1157	429		<a href="#">85SKG2</a>
ULaSe <sub>4</sub>	tetr.	P $\bar{4}$ 2 <sub>1</sub> c	550		1065		<a href="#">83SKG</a>
UCeSe <sub>4</sub>	tetr.	P $\bar{4}$ 2 <sub>1</sub> c	551		1063		<a href="#">83SKG</a>
UPrSe <sub>4</sub>	tetr.	P $\bar{4}$ 2 <sub>1</sub> c	552		1066		<a href="#">83SKG</a>
UNdSe <sub>4</sub>	orth.	P2 <sub>1</sub> ca	710	766	568		<a href="#">83SKG</a>
USmSe <sub>4</sub>	orth.	P2 <sub>1</sub> ca	706	759	564		<a href="#">83SKG</a>
UGdSe <sub>4</sub>	orth.	P2 <sub>1</sub> ca	699	753	558		<a href="#">83SKG</a>
U <sub>1.5</sub> Tb <sub>1.5</sub> Te <sub>5</sub>	orth.		426	652	1163		<a href="#">85SKG2</a>
U <sub>1.5</sub> Dy <sub>1.5</sub> Te <sub>5</sub>	orth.		423	651	1167		<a href="#">85SKG1</a> , <a href="#">85SKG4</a>
			424	648	1167		<a href="#">85SKG2</a>
U <sub>1.5</sub> Ho <sub>1.5</sub> Te <sub>5</sub>	orth.		425	651	1156		<a href="#">85SKG1</a>
U <sub>1.5</sub> Er <sub>1.5</sub> Te <sub>5</sub>	orth.		422	648	1156		<a href="#">85SKG1</a>
U <sub>2</sub> Tb <sub>2</sub> Se <sub>7</sub>	mon.	C2 or Cm or C2/m	896	407	1728	121°43'	<a href="#">81PLSK2</a> , <a href="#">82SKG3</a>
U <sub>2</sub> Dy <sub>2</sub> Se <sub>7</sub>	mon.	C2 or Cm or C2/m	878	405	1713	120°23'	<a href="#">82SKG3</a>
U <sub>2</sub> Ho <sub>2</sub> Se <sub>7</sub>	mon.	C2 or Cm or C2/m	892	404	1723	121°53'	<a href="#">82SKG3</a>
U <sub>2</sub> Er <sub>2</sub> Se <sub>7</sub>	mon.	C2 or Cm or C2/m	888	401	1700	121°29'	<a href="#">82SKG3</a>
U <sub>2</sub> Tm <sub>2</sub> Se <sub>7</sub>	mon.	C2 or Cm or C2/m	890	399	1705	121°43'	<a href="#">82SKG3</a>
U <sub>2</sub> Y <sub>2</sub> Se <sub>7</sub>	mon.	C2 or Cm or C2/m	896	407	1744	121°14'	<a href="#">82SKG3</a>

Compound	Symmetry	Point group (structure type)	Lattice parameters				Ref.
			<i>a</i> [pm]	<i>b</i> [pm]	<i>c</i> [pm]	$\beta$	
U <sub>2</sub> La <sub>2</sub> O <sub>4</sub> S <sub>3</sub>	orth.	Pbam	693.0	1471	402.4		<a href="#">87VCEG</a>
U <sub>2</sub> La <sub>4</sub> O <sub>6</sub> S <sub>4</sub>	orth.	Pnam	695.3	2171	405.3		<a href="#">87VCEG</a>
U <sub>2</sub> La <sub>6</sub> O <sub>8</sub> S <sub>5</sub>	orth.	Pbam	696.3	2891	405.7		<a href="#">87VCEG</a>
U <sub>2</sub> La <sub>8</sub> O <sub>10</sub> S <sub>6</sub>	orth.	Pnam	697.7	3615	406.6		<a href="#">87VCEG</a>
U <sub>2</sub> La <sub>10</sub> O <sub>12</sub> S <sub>7</sub>	orth.	Pbam	698.7	4346	407.3		<a href="#">87VCEG</a>
(U <sub>0.5</sub> Lu <sub>0.5</sub> )LiS <sub>2</sub>	cub.	Fm3m (NaCl)	542.0				<a href="#">98SMFY</a>
(UO) <sub>2</sub> ErS <sub>3</sub>	tetr.	I4/mmm	378.5(2)		2083(1)		<a href="#">86JJGV</a>
(UOS) <sub>4</sub> LuS	tetr.	I4/mmm	380.14(8)		3420(2)		<a href="#">90JJDL</a>

**Table B.** Curie-Weiss fit parameters for the magnetic susceptibility of ternary actinide sulphides with the U<sub>3</sub>S<sub>5</sub>-type crystal structure [80NP].  
 $C = \chi_m(T - \Theta)$  – molar Curie constant.

Compound	$T_N$ ( $T_C$ ) [K]	$\Theta$ [K]	$C$ [K emu/mol]
ULa <sub>2</sub> S <sub>5</sub>		–80	1.51
ThULaS <sub>5</sub>		–67	1.62
U <sub>2</sub> LaS <sub>5</sub>	(14)	–73	2.92
ThCe <sub>2</sub> S <sub>5</sub>		–53	1.89
UCe <sub>2</sub> S <sub>5</sub>		–69	3.16
ThUCeS <sub>5</sub>		–32	2.23
U <sub>2</sub> CeS <sub>5</sub>	(13)	–52	3.68
ThPr <sub>2</sub> S <sub>5</sub>		–22	3.28
UPr <sub>2</sub> S <sub>5</sub>		–27	4.62
ThUPrS <sub>5</sub>		–26	3.09
U <sub>2</sub> PrS <sub>5</sub>	(9)	–30	4.43
ThNd <sub>2</sub> S <sub>5</sub>		–27	3.56
UNd <sub>2</sub> S <sub>5</sub>		–37	4.81
ThUNdS <sub>5</sub>		–24	3.16
U <sub>2</sub> NdS <sub>5</sub>	(13)	–40	4.72
USm <sub>2</sub> S <sub>5</sub>		–205	2.29
ThUSmS <sub>5</sub>		–98	2.48
U <sub>2</sub> SmS <sub>5</sub>		–75	3.36

**Table C.** Curie-Weiss fit parameters for the magnetic susceptibility of the series U<sub>5</sub>Tb<sub>4–x</sub>Y<sub>x</sub>S<sub>16</sub> [84NCKS1].

Compound	$\Theta$ [K]	$P_{\text{eff}}$ [ $\mu_B$ /U atom]	$P_{\text{eff}}$ [ $\mu_B$ /Tb atom]	Temperature range [K]
U <sub>5</sub> Y <sub>4</sub> S <sub>16</sub>	0	2.84	–	80...800
U <sub>5</sub> Y <sub>3</sub> TbS <sub>16</sub>	6	2.84*	9.69	80...300
U <sub>5</sub> Y <sub>2</sub> Tb <sub>2</sub> S <sub>16</sub>	9	2.84*	9.29	80...300
U <sub>5</sub> YTb <sub>3</sub> S <sub>16</sub>	14	2.84*	9.50	80...300
U <sub>5</sub> Tb <sub>4</sub> S <sub>16</sub>	70	2.84*	8.59	80...300

\*fixed as found in U<sub>5</sub>Y<sub>4</sub>S<sub>16</sub>