Crystal Structures and Cell Parameters of Allotropes of the Chemical Elements

The crystal structures of the allotropic forms of the metallic elements are presented in terms of the Pearson symbol, space group, Strukturbericht designation, and prototype of the structure. The temperatures of the phase transformations are listed in degrees Celsius and the pressures are in GPa. A consistent nomenclature is used, whereby all allotropes are labeled by Greek letters. The lattice parameters of the unit cells are given in nanometers (nm) and are considered to be accurate to ±2 in the last reported digit.

This compilation is restricted to changes in crystal structure that occur as a result of a change in temperature or pressure. Low-temperature structures are included for the diatomic and rare gases, which show many similarities with respect to the metallic elements.

This compilation updates and supersedes previous compilations published in the *Bulletin of Alloy Phase Diagrams.*

Most of the data given below are the same as in the first edition. However, occasionally changes were made when updated information was supplied by a category editor, or by present volume editors. The reader's attention is drawn to the fact that there may differences between values quoted below and similar values given in another table in this edition that has been reproduced from another source. For example, the allotropic transformation temperatures of Mn may differ by as much as 23 °C, etc.

								Cell parameters, nm			
Element phase	**Common name**	**Temperature,°C**	**Pressure,GPa**	**Struktur-bericht designation**	**Prototype**	**Pearson symbol**	**Space group**	***a***	***b***	***c***	**Comment,c/a, or α or β**
(Ac)	Ac	25	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.5311	...	...	...
(Ag)	Ag	25	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.40857	...	...	...
(Al)	αAl	25	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.40496	...	...	...
(Al) hp	βAl	25	20.5	*A*3	Mg	*hP*2	$P6_3/mmc$	0.2693	...	0.4398	1.6331
(Am) rt	αAm	25	atm	*A*3′	Nd	*hP*4	$P6_3/mmc$	0.34681	...	1.1241	2 x 1.621
(Am) ht1	βAm	>769	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.4894	...	...	...
(Am) ht2	γAm	>1077	atm	*A*2	W	*cI*2	$Im\bar{3}m$	?	...	...	...
(Am) hp	δAm	25	>15	*A*20	U	*oS*4	*Cmcm*	0.3063	0.5968	0.5169	...

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(Ar)	αAr	<-189.2	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.53109	...	...	...
(As)	As	25	atm	*A*7	As	*hR*6	$R\bar{3}m$	0.41319	...	...	α = 54.12°
(Au)	Au	25	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.40782	...	...	...
(B) rhom1	βB	25	atm	...	B	*hR*423	$R\bar{3}m$	1.017	...	...	α = 65.12°
(Ba)	αBa	25	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.50227	...	...	...
(Ba) hp1	βBa	25	>5.33	*A*3	Mg	*hP*2	$P6_3/mmc$	0.3901	...	0.6154	1.5775
(Ba) hp2	γBa	25	>23	...	...	?	?	...	...	...	...
(Be) rt	αBe	25	atm	*A*3	Mg	*hP*2	$P6_3/mmc$	0.22859	...	0.35845	1.5681
(Be) ht	βBe	>1270	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.25515	...	...	...
(Be) hp	BeII	25	>28.3	...	...	*hP**	...	0.4328	...	0.3416	0.7893
(Bi)	αBi	25	atm	*A*7	As	*hR*6	$R\bar{3}m$	0.47460	...	...	α = 57.23°
(Bi) hp1	βBi	25	>2.6	...	βBi	*mS*4	$C12/m1$	0.6674	0.6117	0.3304	β = 110.33°
(Bi) hp2	γBi	25	>3.0	...	...	*mP*4	$P12_1/m1$	0.665	0.420	0.465	β = 85.33°
(Bi) hp3	δBi	25	>4.3	...	...	?	?	...	...	...	...
(Bi) hp4	ζBi	25	>9.0	*A*2	W	*cI*2	$Im\bar{3}m$	0.3800	...	...	...
(Bk) rt	αBk	25	atm	*A*3´	Nd	*hP*4	$P6_3/mmc$	0.3416	...	1.1069	2 x 1.620
(Bk) ht	βBk	>977	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.4997	...	...	...
($[Br_2]$)	Br	<-7.25	atm	*A*14	$[I_2]$	*oS*8	*Cmce*	0.668	0.449	0.874	...
(C) gra	C(graphite)	25	atm	*A*9	C	*hP*4	$P6_3/mmc$	0.24612	...	0.6709	2.7258
(C) dia	C(diamond)	25	>60	*A*4	C	*cF*8	$Fd\bar{3}m$	0.35669	...	...	...

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(Ca) rt	αCa	25	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.55884	...	...	...
(Ca) ht	βCa	>443	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.4480	...	...	...
(Ca) stab	γCa	25	>1.5	*A*3	Mg	*hP*2	$P6_3/mmc$	...	...	...	...
(Cd)	Cd	25	atm	*A*3	Mg	*hP*2	$P6_3/mmc$	0.29793	...	0.56196	1.8862
(Ce) ht1	αCe	<-177	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.485	...	...	...
(Ce) rt	βCe	25	atm	*A*3´	Nd	*hP*4	$P6_3/mmc$	0.36810	...	1.1857	2 x 1.611
(Ce) ht1	γCe	>61	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.51610	...	...	...
(Ce) ht2	δCe	>726	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.412	...	...	...
(Ce) hp	α´Ce	25	>5.4	*A*20	U	*oS*4	*Cmcm*	0.3049	0.5998	0.5215	...
(Cf) rt	αCf	25	atm	*A*3´	Nd	*hP*4	$P6_3/mmc$	0.339	...	1.1015	2 x 1.625
(Cf) ht	βCf	>590	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	?	...	...	...
([Cl_2])	Cl	<-100.97	atm	*A*14	[I_2]	*oS*8	*Cmce*	0.624	0.448	0.826	...
(Cm) rt	αCm	25	atm	*A*3´	Nd	*hP*4	$P6_3/mmc$	0.3496	...	1.1331	2 x 1.621
(Cm) ht	βCm	>1277	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.4382	...	...	...
(Co) rt	εCo	25	atm	*A*3	Mg	*hP*2	$P6_3/mmc$	0.25071	...	0.40686	1.6228
(Co) ht	αCo	>422	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.35447	...	...	...
(Cr)	αCr	25	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.28848	...	...	...
(Cr) hp	α´Cr	25	hp	...	Cr	*tI*2	*I*4/*mmm*	0.2882	...	0.2887	1.002
(Cs)	αCs	25	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.6141	...	...	...
(Cs) hp1	βCs	25	>2.37	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.6465	...	...	...
(Cs) hp2	β´Cs	25	>4.22	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.5800	...	...	...

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(Cs) hp3	γCs	25	>4.27	...	...	?	...	...	...	...	...
(Cu)	Cu	25	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.36146	...	...	...
(Dy) lt	α´Dy	<-187	atm	...	U	*oS*4	*Cmcm*	0.3595	0.6184	0.5678	...
(Dy) rt	αDy	25	atm	*A*3	Mg	*hP*2	$P6_3/mmc$	0.35915	...	0.56501	1.5732
(Dy) ht	βDy	>1381	atm	*A*2	W	*cI*2	$Im\bar{3}m$	(0.398)	...	...	...
(Dy) hp	γDy	25	>7.5	*C*19	$CdCl_2$	*hR*9	$R\bar{3}m$	0.3436	...	2.483	4.5 x 1.606
(Er)	Er	25	atm	*A*3	Mg	*hP*2	$P6_3/mmc$	0.35592	...	0.55850	1.5692
(Es)	αEs	25	atm	*A*3´	Nd	*hP*4	$P6_3/mmc$	?	...	...	...
(Es?)	βEs	?	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	?	...	...	...
(Eu)	Eu	25	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.45827	...	...	...
($[F_2]$) lt2	αF	<-227.60	atm	...	$[F_2]$	*mS*8	*C*12/*c*1	0.550	0.338	0.728	β = 102.17°
($[F_2]$) lt1	βF	<-219.67	atm	...	$[F_2]$	*cP*64	$Pm\bar{3}n$	0.667	...	...	...
(Fe) rt	αFe	25	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.28665	...	...	...
(Fe) ht	γFe	>912	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.36467	...	...	...
(Fe) rt	δFe	>1394	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.29315	...	...	...
(Fe) hp	εFe	25	>13	*A*3	Mg	*hP*2	$P6_3/mmc$	0.2468	...	0.396	1.603
(Ga)	αGa	25	atm	*A*11	Ga	*oS*8	*Cmce*	0.45186	0.76570	0.45258	...
(Ga) lt	βGa	25	>1.2	*A*6	In	*tI*2	*I*4/*mmm*	0.2808	...	0.4458	1.588
(Ga) hp	γGa	-53	>3.0	...	Ga	*oS*40	*Cmcm*	1.0593	1.3523	0.5203	...
(Gd) rt	αGd	25	atm	*A*3	Mg	*hP*2	$P6_3/mmc$	0.36336	...	0.57810	1.5910
(Gd) ht	βGd	>1235	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.406	...	...	...

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(Gd) hp	γGd	25	>3.0	*C*19	Sm	*hR*9	$R\bar{3}m$	0.361	...	2.603	4.5 x 1.60
(Ge)	αGe	25	atm	*A*4	C	*cF*8	$Fd\bar{3}m$	0.56574	...	...	...
(Ge) hp1	βGe	25	>12	*A*5	Sn	*tI*4	$I4_1/amd$	0.4884	...	0.2692	0.551
(Ge) hp2	γGe	25	>12 → atm	...	Ge	*tP*12	$P4_12_12$	0.593	...	0.698	1.18
(Ge) hp3	δGe	LT	>12	...	Si	*cI*16	$Ia\bar{3}$	0.692	...	...	...
([H_2]) lt1	αH	<-271.9	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.5338	...	...	...
([H_2])	βH	<-259.34	atm	*A*3	Mg	*hP*2	$P6_3/mmc$	0.3776	...	0.6162	1.632
(He) lt2	He3	-269.67	0.163	*A*3	Mg	*hP*2	$P6_3/mmc$	0.3501	...	0.5721	1.634
(He) lt1	He4	-269.2	0.129	*A*3	Mg	*hP*2	$P6_3/mmc$	0.3470	...	0.5540	1.597
(Hf) rt	αHf	25	atm	*A*3	Mg	*hP*2	$P6_3/mmc$	0.31946	...	0.50510	1.5811
(Hf) ht	βHf	>1743	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.3610	...	...	...
(Hg)	αHg	<-38.836	atm	*A*10	Hg	*hR*3	$R\bar{3}m$	0.3005	...	...	α = 70.53°
(Hg) hp	βHg	<-194	hp	...	Hg	*tI*2	$I4/mmm$	0.3995	...	0.2825	0.707
(Ho)	αHo	25	atm	*A*3	Mg	*hP*2	$P6_3/mmc$	0.35778	...	0.56178	1.5702
(Ho) hp	βHo	25	>7.5	*C*19	Sm	*hR*9	$R\bar{3}m$	0.334	...	2.45	4.5 x 1.63
([I_2])	I	25	atm	*A*14	[I_2]	*oS*8	*Cmce*	0.72697	0.47903	0.97942	...
(In)	In	25	atm	*A*6	In	*tI*2	$I4/mmm$	0.3253	...	0.49470	1.5210
(Ir)	Ir	25	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.38392	...	...	...
(K)	K	25	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.5321	...	...	...
(Kr)	Kr	<-157.385	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.5810	...	...	...
(La) rt	αLa	25	atm	*A*3′	Nd	*hP*4	$P6_3/mmc$	0.37740	...	1.2171	2 x 1.6125

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(La) ht1	βLa	>310	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.5303	...	...	...
(La) ht2	γLa	>865	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.426	...	...	...
(La) hp	β´La	25	>2.0	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.517	...	...	...
(Li) lt	αLi	<-193	atm	*A*3	Mg	*hP*2	$P6_3/mmc$	0.3111	...	0.5093	1.637
(Li) rt	βLi	25	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.35093	...	...	...
(Lu)	Lu	25	atm	*A*3	Mg	*hP*2	$P6_3/mmc$	0.35052	...	0.55494	1.5832
(Mg)	Mg	25	atm	*A*3	Mg	*hP*2	$P6_3/mmc$	0.32094	...	0.52107	1.6236
(Mn) rt	αMn	25	atm	*A*12	Mn	*cI*58	$I\bar{4}3m$	0.89126	...	...	...
(Mn) ht1	βMn	>727	atm	*A*13	Mn	*cP*20	$P4_132$	0.63152	...	...	...
(Mn) ht3	γMn	>1100	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.3860	...	...	...
(Mn) ht4	δMn	>1138	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.3080	...	...	...
(Mo)	Mo	25	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.31470	...	...	...
($[N_2]$) lt2	αN	<-237.54	atm	...	$[N_2]$	*cP*8	$P2_13$	0.5661	...	...	...
($[N_2]$) lt1	βN	<-210.004	atm	...	$[N_2]$	*hP*24	$P6_3/mmc$	0.4050	...	0.6604	1.631
($[N_2]$) hp	γN	<-253	>3.3	...	$[N_2]$	*tP*4	$P4_2/mnm$	0.3957	...	0.5109	1.291
(Na) lt	αNa	<-233	atm	*A*3	Mg	*hP*2	$P6_3/mmc$	0.3767	...	0.6154	1.634
(Na) rt	βNa	25	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.42906	...	...	...
(Nb)	Nb	25	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.33004	...	...	...
(Nd) rt	αNd	25	atm	*A*3´	Nd	*hP*4	$P6_3/mmc$	0.36582	...	1.17966	2 x 1.6124
(Nd) ht	βNd	>863	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.413	...	...	...
(Nd) hp	γNd	25	>5.0	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.480	...	...	...

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(Ne)	Ne	<-248.587	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.4462	...	...	...
(Ni)	Ni	25	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.35240	...	...	...
(Np) rt	αNp	25	atm	A_c	Np	*oP*8	*Pnma*	0.6663	0.4723	0.4887	...
(Np) ht1	βNp	>280	atm	A_d	Np	*tP*4	*P*4/nmm	0.4883	...	0.3389	0.694
(Np) ht2	γNp	>576	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.352	...	...	...
([O_2]) lt3	αO	<-249.283	atm	...	[O_2]	*mS*4	*C*12/*m*1	0.5403	0.3429	0.5086	β = 132.53°
([O_2])	βO	<-229.349	atm	...	[O_2]	*hR*6	$R\bar{3}m$	0.4210	...	...	α = 46.27°
([O_2]) lt1	γO	<-218.789	atm	...	[O_2]	*cP*64	$Pm\bar{3}n$	0.683	...	...	...
(Os)	Os	25	atm	*A*3	Mg	*hP*2	$P6_3/mmc$	0.27341	...	0.43198	1.5800
(P) whi rt	αP(white)	25	atm	...	Mn	*cI*58	$I\bar{4}3m$	0.718	...	...	...
(P) bla	P(black)	25	atm	*A*17	P	*oS*8	*Cmce*	0.33136	1.0478	0.43763	...
(Pa) rt	αPa	25	atm	A_a	Pa	*tI*2	*I*4/*mmm*	0.3921	...	0.3235	0.825
(Pa) ht	βPa	>1170	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.381	...	...	...
(Pb)	αPb	25	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.49502	...	...	...
(Pb) hp	βPb	25	>10.3	*A*3	Mg	*hP*2	$P6_3/mmc$	0.3265	...	0.5387	1.650
(Pd)	Pd	25	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.38903	...	...	...
(Pm) rt	αPm	25	atm	*A*3´	Nd	*hP*4	$P6_3/mmc$	0.365	...	1.165	2 x 1.60
(Po) rt	αPo	25	atm	A_h	Po	*cP*1	$Pm\bar{3}m$	0.3366	...	...	...
(Po) ht	βPo	>54	atm	A_i	Po	*hR*3	*R*3*m*	0.3373	...	...	α = 98.08°
(Pr) rt	αPr	25	atm	*A*3´	Nd	*hP*4	$P6_3/mmc$	0.36721	...	1.18326	2 x 1.6111
(Pr) ht	βPr	>795	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.413	...	...	...

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								Cell parameters, nm			
Element phase	**Common name**	**Temperature,°C**	**Pressure,GPa**	**Struktur-bericht designation**	**Prototype**	**Pearson symbol**	**Space group**	***a***	***b***	***c***	**Comment,c/a, or α or β**
(Pr) hp	γPr	25	>4.0	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.488	...	...	...
(Pt)	Pt	25	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.39236	...	...	...
(Pu) rt	αPu	25	atm	...	Pu	*mP*16	$P12_1/m1$	0.6183	0.4822	1.0963	β = 101.97°
(Pu) ht1	βPu	>125	atm	...	Pu	*mS*34	$C12/m1$	0.9284	1.0463	0.7859	β = 92.13°
(Pu) ht2	γPu	>215	atm	...	Pu	*oF*8	*Fddd*	0.31587	0.57682	1.0162	...
(Pu) ht3	δPu	>320	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.46371	...	...	...
(Pu) ht4	δ´Pu	>463	atm	*A*6	In	*tI*2	*I*4/*mmm*	0.33261	...	0.44630	1.3418
(Pu) ht5	εPu	>483	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.36343	...	...	...
(Ra)	Ra	25	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.5148	...	...	...
(Rb)	αRb	25	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.5705	...	...	...
(Rb) hp1	βRb	25	>1.08	...	...	?	...	...	...	...	...
(Rb) hp2	γRb	25	>2.05	...	...	?	...	...	...	...	...
(Re)	Re	25	atm	*A*3	Mg	*hP*2	$P6_3/mmc$	0.27609	...	0.4458	1.6145
(Rh)	Rh	25	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.38032	...	...	...
(Ru)	Ru	25	atm	*A*3	Mg	*hP*2	$P6_3/mmc$	0.27058	...	0.42816	1.5824
(S) 8αrt	αS	25	atm	*A*16	S	*oF*128	*Fddd*	1.0464	1.28660	2.44860	...
(S) 8βht	βS	>95.5	atm	...	S	*mP*64	$P2_1/c1$	1.102	1.096	1.090	β = 96.7°
(Sb)	αSb	25	atm	*A*7	As	*hR*6	$R\bar{3}m$	0.45067	...	...	α = 57.11°
(Sb) hp1	βSb	25	>5.0	A_h	Po	*cP*1	$Pm\bar{3}m$	0.2992	...	...	...
(Sb) hp2	δSb	25	>14.0	...	...	*mP*3	?	0.556	0.404	0.422	β = 86.0°
(Sc) rt	αSc	25	atm	*A*3	Mg	*hP*2	$P6_3/mmc$	0.33088	...	0.52680	1.5921

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(Sc) ht	βSc	>1337	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.373	...	...	...
(Se)	γSe	25	atm	*A*8	Se	*hP*3	$P3_121$	0.43659	...	0.49537	1.1346
(Si)	αSi	25	atm	*A*4	C	*cF*8	$Fd\bar{3}m$	0.54306	...	...	...
(Si) hp1	βSi	25	>9.5	*A*5	Sn	*tI*4	$I4_1/amd$	0.4686	...	0.2585	0.552
(Si) hp2	γSi	25	>16.0	...	Si	*cI*16	$Ia\bar{3}$	0.6636	...	...	...
(Si) hp3	δSi	25	>16 → atm	*A*3´	Nd	*hP*4	$P6_3/mmc$	0.380	...	0.628	1.653
(Sm) rt	αSm	25	atm	*C*19	Sm	*hR*9	$R\bar{3}m$	0.36290	...	2.6207	4.5 x 1.6048
(Sm) ht1	βSm	>734	atm	*A*3	Mg	*hP*2	$P6_3/mmc$	0.36630	...	0.58448	1.5956
(Sm) ht2	γSm	>922	atm	*A*2	W	*cI*2	$Im\bar{3}m$	?	...	...	...
(Sm) hp	δSm	25	>4.0	*A*3´	La	*hP*4	$P6_3/mmc$	0.3618	...	1.166	2 x 1.611
(Sn) lt	αSn	<13	atm	*A*4	C	*cF*8	$Fd\bar{3}m$	0.64892	...	...	...
(Sn) rt	βSn	25	atm	*A*5	Sn	*tI*4	$I4_1/amd$	0.58318	...	0.31818	0.5456
(Sn) hp	γSn	25	>9.0	...	Pa	*tI*2	$I4/mmm$	0.370	...	0.337	0.91
(Sr) rt	αSr	25	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.6084	...	...	...
(Sr) ht	βSr	>547	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.487	...	...	...
(Sr) hp	β´Sr	25	>3.5	*A*2	W	*cI*2	$Im\bar{3}m$	0.4437	...	...	...
(Ta)	Ta	25	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.33030	...	...	...
(Tb) lt	αTb	<-53	atm	...	Dy	*oS*4	*Cmcm*	0.3605	0.6244	0.5706	...
(Tb) rt	α´Tb	25	atm	*A*3	Mg	*hP*2	$P6_3/mmc$	0.36055	...	0.56966	1.5800
(Tb) ht	βTb	>1289	atm	*A*2	W	*cI*2	$Im\bar{3}m$	(0.402)	...	...	...
(Tb) hp	γTb	25	>6.0	*C*19	Sm	*hR*9	$R\bar{3}m$	0.341	...	2.45	4.5 x 1.60

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(Te)	αTe	25	atm	*A*8	Se	*hP*3	$P3_121$	0.44566	...	0.59264	1.3298
(Te) hp1	βTe	25	>2.0	*A*7	As	*hR*6	$R\bar{3}m$	0.469	...	...	α = 53.30°
(Te) hp2	γTe	25	>7.0	A_i	Po	*hR*3	$R\bar{3}m$	0.3002	...	...	α = 103.3°
(Th) rt	αTh	25	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.50842	...	...	...
(Th) ht	βTh	>1360	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.411	...	...	...
(Ti) rt	αTi	25	atm	*A*3	Mg	*hP*2	$P6_3/mmc$	0.29506	...	0.46835	1.5873
(Ti) ht	βTi	>882	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.33065	...	...	...
(Ti) hp1	ωTi	25	hp → atm	...	Ti	*hP*3	*P*6/*mmm*	0.4625	...	0.2813	0.6082
(Tl) rt	αTl	25	atm	*A*3	Mg	*hP*2	$P6_3/mmc$	0.34566	...	0.55248	1.5983
(Tl) ht	βTl	>230	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.3879	...	...	...
(Tl) hp	γTl	25	hp	*A*1	Cu	*cF*4	$Fm\bar{3}m$	?	...	...	...
(Tm)	Tm	25	atm	*A*3	Mg	*hP*2	$P6_3/mmc$	0.35375	...	0.55540	1.5700
(U) rt	αU	25	atm	*A*20	U	*oS*4	*Cmcm*	0.28537	0.58695	0.49548	...
(U) ht1	βU	>668	atm	A_b	U	*tP*30	$P4_2/mnm$	1.0759	...	0.5656	0.526
(U) ht2	γU	>776	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.3524	...	...	...
(V)	V	25	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.30240	...	...	...
(W)	W	25	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.31652	...	...	...
(Xe)	Xe	<-111.758	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.6350	...	...	...
(Y) rt	αY	25	atm	*A*3	Mg	*hP*2	$P6_3/mmc$	0.36482	...	0.57318	1.5711
(Y) ht	βY	>1478	atm	*A*2	W	*cI*2	$Im\bar{3}m$	(0.407)	...	...	...
(Yb) stab	αYb	<-3	atm	*A*3	Mg	*hP*2	$P6_3/mmc$	0.38799	...	0.63859	1.6459

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(Yb) rt	βYb	25	atm	*A*1	Cu	*cF*4	$Fm\bar{3}m$	0.54848	...	...	...
(Yb) ht	γYb	>795	atm	*A*2	W	*cI*2	$Im\bar{3}m$	0.444	...	...	...
(Zn)	αZr	25	atm	*A*3	Mg	*hP*2	$P6_3/mmc$	0.32316	...	0.51475	1.5929
(Zr) ht	βZr	>863	atm	*A*2	W	*cI*2	*Im*3*m*	0.36090	...	...	...
(Zr) rt	ωZr	25	hp → atm	...	ωTi	*hP*2	*P*6/*mmm*	0.5036	...	0.3109	0.617

Note: Values in parentheses are estimated.