FTlite Database for FactSage 8.3

The FTlite Database is designed for thermodynamic and phase equilibrium calculations involving **Al** alloys, **Mg** alloys and **Ti** alloys using the FactSage 8.0 Thermochemical Software Package (and later versions). The FTlite Database can also be used to perform calculations involving mixtures of **Li-Na-K-Mg-Ca-Sr-Ba** with several other elements.

Al Alloys
Ag, **Al**, As, Au, **B**, **Ba**, **Be**, **Bi**, **C**, **Ca**, **Ce**, **Co**, **Cr**, **Cu**, **Dy**, **Er**, **Eu**, **Fe**, Ga, **Gd**, **Ge**, **H**, Hf, **Ho**, **In**, **K**, **La**, **Li**, **Lu**, **Mg**, **Mn**, Mo, N, **Na**, Nb, **Nd**, **Ni**, O, P, **Pb**, **Pr**, **Pt**, **Sb**, **Sc**, **Si**, **Sm**, **Sn**, **Sr**, Ta, **Tb**, **Ti**, **Tm**, **V**, W, **Y**, **Yb**, **Zn**, **Zr**
Mg Alloys
Ag, **Al**, **B**, **Ba**, **Be**, **Bi**, **C**, **Ca**, **Ce**, **Co**, **Cr**, **Cu**, **Dy**, **Er**, **Eu**, **Fe**, **Ga**, **Gd**, **Ge**, **H**, **Ho**, **In**, **K**, **La**, **Li**, **Lu**, **Mg**, **Mn**, **Na**, **Nb**, **Nd**, **Ni**, O, **Pb**, **Pr**, **Pt**, **Sb**, **Sc**, **Si**, **Sm**, **Sn**, **Sr**, **Tb**, **Ti**, **Tm**, **V**, **Y**, **Yb**, **Zn**, **Zr**
Ti Alloys
Ag, **Al**, **B**, Ba, **C**, Ca, Ce, **Co**, **Cr**, **Cu**, Dy, Er, Eu, **Fe**, Ga, Gd, **H**, Ho, K, La, Li, Lu, **Mg**, **Mn**, **Mo**, **N**, Na, **Nb**, Nd, **Ni**, O, Pr, Sc, **Si**, Sm, **Sn**, **Sr**, **Ta**, Tb, **Ti**, Tm, **V**, **W**, Y, Yb, **Zn**, **Zr**
Color codes
Red : Al or Mg **Blue** : Major alloying elements (full optimisations of binary systems with **Al**, **Mg** and **Ti** and with several minor alloying elements, **Al-Mg-Xx** ternary systems evaluated (good for Al+Mg-rich regions), several quaternary systems included); **Green** : Minor alloying elements (full optimisations of binary systems with Al and Mg); Black : Optimized for the **M-Zz** system and few **M-Xx-Zz** and **M-Yy-Zz** systems (where **M** is Al, Mg or Ti);

Composition Ranges

The database is intended to allow calculations over all ranges of composition, although the assessed data are often most reliable for light metal rich composition ranges (Al-rich, Mg-rich and Ti-rich compositions. Alkali metal-rich compositions). The database can be used for Al alloys in the commercial series 1000, 2000, 3000, 4000, 5000, 6000 and 7000, and for a wide range cast alloys.

Figure 1 gives the list of optimized binary subsystems with the red, blue and green elements given above.

In FTlite 8.3, platinum (Pt) is added as a new element, and many updates are available for Pt-, Ga- and Ge- containing subsystems, for Al-, Mg- and Ti-alloys (except Ge-Ti).

Temperature Ranges

The database is generally valid for the temperature range of approximately room temperature to 2200°C (please remember that kinetics effects can strongly affect phase relationships in alloys in general and in particular at low temperature), although for some alloys containing high melting point metals the data are reliable to still higher temperatures.

In **Table 4**, comments appearing in red can be found for some binary systems which have spurious stable phases at high temperatures, such as inverted liquid-liquid miscibility gaps, or the presence of an inverted solid solutions. The temperature above which the problem occurs is given in **Table 4** as an indication. These inverted stability regions can cause problems in the computation of liquidus projection of ternary or higher order systems in the PHASE DIAGRAM Module and affect the computation of precipitation or formation targets in the EQUILIB Module.

Physical Properties

The density, viscosity and surface tension of the liquid phase can be computed for most important elements present in the database. The computation of the **surface tension** was a new feature in 8.2. Please be aware that we **use an approach that considers the presence of impurities**, such as oxygen, that have a very strong influence on the surface tension of the melt. As such, you should expect that high values of the surface tension of pure liquids and molten alloys will be computed if oxygen is not included in the calculations. However, the presence, **even at the ppm level**, of oxygen can substantially decrease the surface tension of the liquid. **For example, for pure molten Al, a surface tension of the order of 1.15 N/m is usually measured near the melting point, but this value falls to 0.85 N/m when 1 to 2 ppm of oxygen is present.** The model and its database will be able to compute such phenomena. Similar behaviour can be found for other metals. Special care in the selection of the proper amount of oxygen as impurity is necessary (for example, the surface tension of Al-Mg liquid alloys can be computed by considering $MgO_{(s)}$, $Al_2O_{3(s4)}$ and $MgAl_2O_{4(s)}$ in an EQUILIB calculation to compute the O solubility limit at solid oxide saturation, these specific solid oxides being present in the database). Coupling FTlite with FToxid may be necessary for computing the oxygen content of a complex liquid alloy saturated with solid oxides.

The thermal conductivity of most non-metallic stoichiometric solids (ex.: TiB_2, SiC, Al_2O_3, etc.) can be computed with the FTlite 8.3 database. See FactSage (EQUILIB) documentation on physical properties, and the list of phases at the end of the present document.

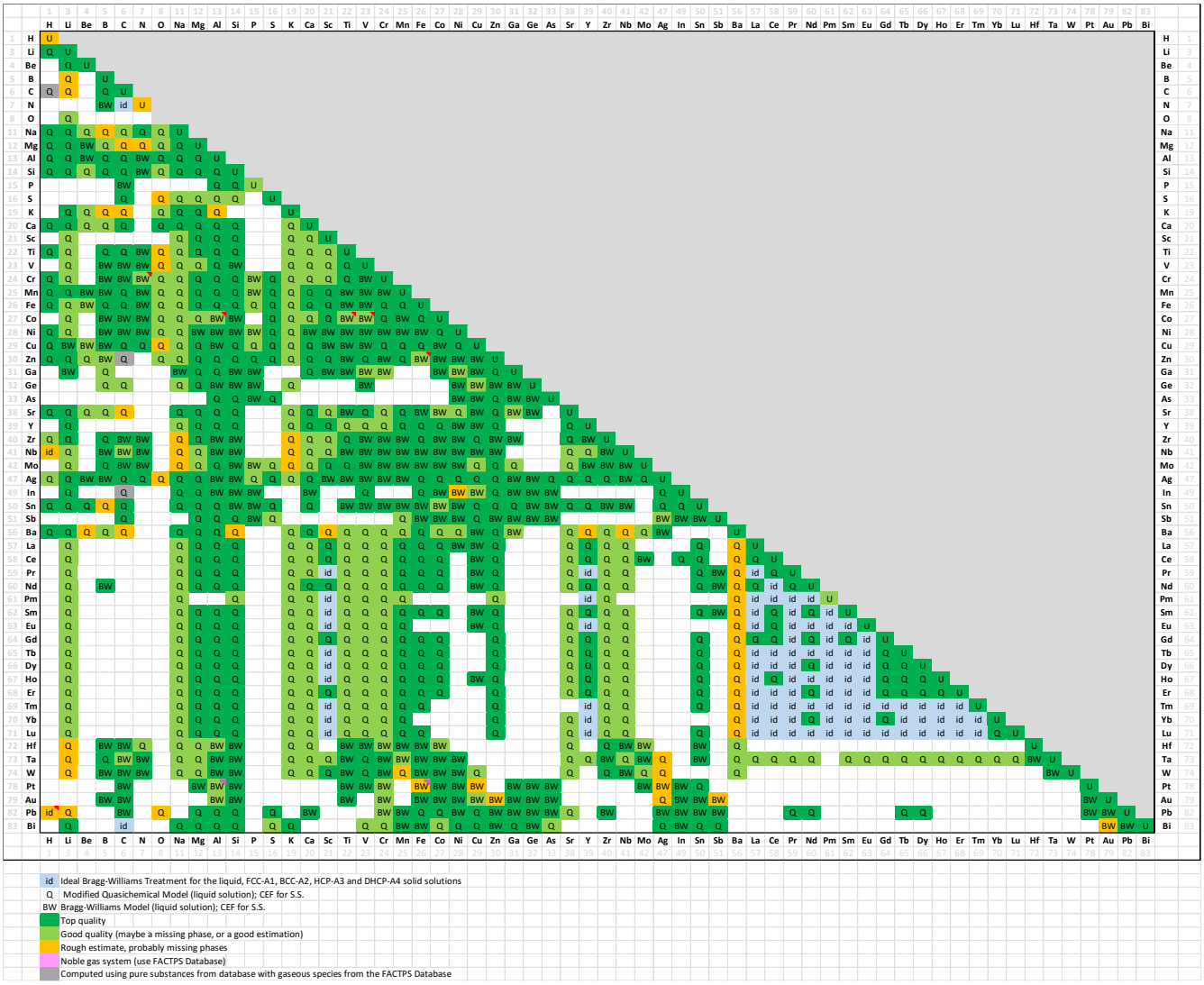

Figure 1: Optimized binary systems in the FTlite 8.3 Database (see also Table 4)

In **8.3**, a total of **992 binary systems** (vs **932** in 8.2) have been evaluated, for most of them over the entire range of composition and for all stable phases. A matrix of assessed binary systems is given in Figure 1, for the major and minor alloying elements of Al-, Mg- and Ti-alloys.

Several dozens of ternary systems have been assessed, and important quaternary systems have also been evaluated.

The FTlite 8.3 database contains **317 solution phases** (vs 287 in 8.2) and **2145 pure compounds** (vs 1926 in 8.2) with **2621 stoichiometric phases** counting allotropic forms (2374 in 8.2). **Table 1A** lists the important solutions for calculations involving Al alloys, while **Table 1B** is for solutions in Mg-alloys and **Table 1C** is for solutions in Ti-alloys. **Table 2** is a detailed list of all solutions. **Table 3** is a generic list of the pure compounds and their associated phases. **Table 4** gives the references for the binary data assessments.

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Use of the Database

The phase diagrams of all the binary systems listed above have been checked using FactSage 8.3.

Phase selection in the EQUILIB or PHASE DIAGRAM modules using FTlite is simple: simply follow these instructions:

- For pure solid compounds:
  - Right-click on "pure solids"
  - Then click "Select/Clear" > "Add all species from database" > "FTlite"
- For solutions:
  - Click on the "Select" button below the "Solution species" list box
  - Then click "Add all phases from database" > "FTlite"
  - Apply the recommendations related to the CBCC-A12, D82 and D88 solutions, as described in the warning text box in the following page;
- There is no need to select pure liquid phases (the FTlite-Liqu solution contains the liquid species). They may be selected as dormant (metastable, option "!") for purposes of computing their chemical activity.
- Click "Use V & phys. property data" in the EQUILIB Module if you intend to have density, viscosity, thermal conductivity and surface tension to be calculated for phases, when available. We recommend not to click this option in the PHASE DIAGRAM Module.

There might be cases when a chemical system with many elements results in more than 150 possible solutions to be selected. In these cases, it is recommended to change the selection of some solutions where the "I-option" ("possible 2-phase immiscibility") or the "J-option" ("possible 3-phase immiscibility") has been automatically selected, to either "+" (for "I") or "I-option" (for "J-option"). The solutions where this change must be done should then be selected at the user`s discretion based on his/her knowledge of which solutions might exhibit immiscibility in the composition range the user is interested in.

Within the solution database are hard coded default selections such as "+", "I" or "J" (for single phase, 2-phase immiscibility and 3-phase immiscibility). However, when the system has more than 5 elements, several specific solution phases will see their default selection changed to "!", "!I" or "!J", meaning they become "dormant" (metastable). If in the calculation(s) that will follow one of these phases has a calculated activity higher than 1.0, you should overwrite the "!" (dormant) selection. The following solution phases have this selection option:

A3" (hcp-Zn)	D88 (Mn_5Si_3 family)
A4 (diamond Si, Ge, α-Sn)	D88b (RE_5Sb_3)
A12 (α-Mn, γ-$Al_{12}Mg_{17}$, $Mg_{24}RE_5$)	D8b (σ-FeCr)
D82 (γ-brass family Cu_5Zn_8)	cF96 (Ti_2Co, Ti_2Ni, Hf_2Co)
D85 (μ-Fe_7W_6)	oP36 (RE_5Si_4, RE_5Sn_4)

CBCC-A12

It is recommended to select the CBCC-A12 solid solution with the "!I" option (metastable + 2-phase immiscibility) in calculations in the EQUILIB module for Al alloys when more than 6 elements are present in the system. This is due to the very numerous number of end-members (4860) in that solution, which increases substantially the computation time. If after a calculation the activity of the CBCC-A12 solution is greater than 1.0, then redo the calculation with the standard "I" option.

Note that for Mg-alloys, the CBCC-A12 phase is very often stable with Mg-HCP-A3 as both α-Mn, β-$Mg_{17}Al_{12}$ and $Mg_{24}RE_5$ solutions.

In Al-alloys, the CBCC-A12 phase is NOT often stable with Al-FCC-A1 but may form upon reaction of Al concentrating Mn, REE and/Mg in residual phases.

D82 Prototype Cu_5Zn_8

Similarly it is recommended to select the D82 solid solution (Cu_5Zn_8, Al_8M_5 with M = Fe, Cr, V) with the "!I" option (metastable + 2-phase immiscibility) in calculations in the EQUILIB module for Al alloys when more than 6 elements are present in the system. This is due to the very numerous number of end-members (8712) in that solution, which increases substantially the computation time. If after a calculation the activity of the D82 solution is greater than 1.0, then redo the calculation with the standard "I" option.

In both Al and Mg alloys, the D82 solution is rarely stable with either Al-FCC-A1 or Mg-HCP-A3 but may form upon reactions of Al and/or Mg concentrating D82-forming elements in residual phases.

Gamma-brass D88

Similarly it is recommended to select the D88 solid solution with the "!I" option (metastable + 2-phase immiscibility) in calculations in the EQUILIB module for Al alloys when more than 6 elements are present in the system. This is due to the very numerous number of end-members (6084) in that solution, which increases substantially the computation time. If after a calculation the activity of the D88 solution is greater than 1.0, then redo the calculation with the standard "I" option.

In both Al and Mg alloys, the D88 solution is rarely stable with either Al-FCC-A1 or Mg-HCP-A3 but may form upon reactions of Al and/or Mg concentrating D88-forming elements in residual phases.

Updates in 8.3 from 8.2

Here is a list of new assessments or new assessments integrated from publications in 8.3:

1) Ag – N
2) Ag – Pt
3) Ag – Y
4) Al – Pt
5) Al – Ta (replaced)
6) As – Pt
7) As – Zn (replaced)
8) Au – Ga
9) Au – Pt
10) B – Mo (replaced)
11) B – Ta
12) Ba – Ga
13) Bi – Mn
14) C – Pt
15) Ca – Cu (replaced)
16) Ca – Ga
17) Ca – Ge
18) Co – Ga
19) Co – Pt
20) Cr – Ga
21) Cr – Pt
22) Cu – N
23) Cu – Pt
24) Fe – In (replaced)
25) Fe – Pt
26) Ga – Li
27) Ga – Mo
28) Ga – N
29) Ga – Ni
30) Ga – Pt
31) Ga – Sc
32) Ga – Sr
33) Ga – V
34) Ga – Zr
35) Ge – K
36) Ge – Na

37) Ge – Ni
38) Ge – Pt
39) Ge – Sr
40) Ge – V
41) H – Sn
42) Hf – Li
43) Hf – N
44) Hf – Ni
45) In – Pt
46) Li – Sb
47) Li – Ta
48) Li – W
49) Mg – Pt
50) Mn – Sb
51) Mo – Pt
52) Ni – Pt
53) P – Sn
54) Pb – Pt
55) Pt – Si
56) Pt – Sn
57) Pt – Ta
58) Pt – Ti
59) Pt – V
60) Sn – Ta

Many existing solutions were modified to introduce the new systems (*i.e.* Liquid metal, FCC-A1, BCC-A2, HCP-A3, etc.). Those are not necessarily listed below. Also, many existing solutions were modified to introduce new end-members:

- A3' addition of Au(Sn)
- Diamond-A4 addition of In and V
- CBCC-A12 addition of Sb
- CUB-A13 addition of Sb
- A15 addition of Ga, Ge, Pt
- BCC-B2!BCC-A2 addition of Pt (AlPt, MnNi, CoTi, CoHf, CoPt)
- BCC-B2a addition of Ag (AgY, AgSc);
  improved Gibbs energy of metastable end-members
- BCC-B2b addition of Au and Pt (PtTi, NiPt, AuTi)
- B8x (B81/B82) addition of Ge (Ni-Ge), improved Al-Ti-Zr, new Ga-Ni-Ti,
  improved Cu-Ti-Sn, Fe-Mn-Sn, Cu-Fe-Sn, Mn-Bi
- B11 addition of Au for AuTi
- B20 addition of Ni, Pt, Ga, Mg for NiSi, PtAl, PtGa, PtMg
- B27 addition of Cr, Mo, Ni for CrB, MoB, NiB
- B31 addition of Ga, Ge, Pt
- B32 addition of Ga for GaLi
- B33 addition of Fe, Mo, Ge for FeB, MoB, CaGe
- Bg addition of Zr, Ga, Cr, Fe, Ti for borides and ZrGa
- C1a addition of Pt, Mn, Ga for GaPt, AlAu, AlPt;
  improved Gibbs energy of metastable end-members
- C2 addition of As, Ag and Pt for $PtAs_2$, $PtSb_2$ and Ag solubility;
  improved Gibbs energy of metastable end-members
- C11 addition of Y for Ag_2Y
- C11b improved Gibbs energy of metastable end-members
- C12 addition of Ge and Sn for $CaGe_2$ and $CaSn_2$
- C14 improved Gibbs energy of metastable end-members
- C15 improved Gibbs energy of metastable end-members
- C15a addition of Au and Bi for Au_2Bi
- C15b addition of Hf
- C16 addition of Ga, Mg, Cr, Mo for Zr_2Ga and
  many ternary boride solutions (M_2B)
- C23a addition of Ge and Pt
- C32 addition of Ca, Sr, Ba, Ga, Ta, Mo for $BaGa_2$, $SrGa_2$ and
  many ternary borides (MB_2)
- C36 addition of Mn for Mg-Mn-Ni; improved Al_2Ta

- C38 addition of Mn and Bi for Mn_2Sb with Bi solubility
- C40 addition of Ge for VGe_2
- Ca addition of Mn for Mg-Mn-Ni
- Cb addition of Fe and Mo for solubility in Cr_2B
- D0e addition of boron for Co_3B borides and its solutes
- D03 improved Li_3Sb; improved Gibbs energy of metastable end-members
- D011 addition of Ge and Mo for Ni_3Ge; improved solubility in Ni_3B of M_3B borides and borides in Fe_3C
- D018 improved Gibbs energy of metastable end-members
- D019 addition of Pt for Mo_3Pt; improved Gibbs energy of metastable end-members
- D022 improved Gibbs energy of metastable end-members
- D023 addition of Ga for Ga_3Zr
- D024 addition of Au and Ga for Au_3Ga
- D0a addition of Pt
- D13 addition of Ga for Ga_4Sr and Ga_4Ba; improved Gibbs energy of metastable end-members
- D1g addition of Si for solubility in B_4C
- D59 modification to the sublattice structure for Zn_3As_2
- D510 addition of Ni
- D513 addition of Ga and Pt
- D5a addition of Ga, B, Cr, Mo, Fe, V, Nb for borides (i.e. Zr_3B_2, …) and Ga_2Hf_3
- D7b addition of Ta, Fe, Mo for M_3B_4 borides
- D85 improvement in many ternary alloy systems;
- D8l addition of Ga, Ge, Cr, Fe, B, Mo for M_5B_3 borides and germanides;
- L10 addition of Mn, Pt, Zr, Co, Ni for CoPt and NiPt; improved MnNi; improved Gibbs energy of metastable end-members
- L12 addition of Ga and Pt for Ga_3Sc and several Pt_3M end-members; improved Gibbs energy of metastable end-members
- L12c addition of Ge and Pt for several Pt_3M end-members; $AlPt_3$, Ni_3Ge;
- L21 improved Gibbs energy of metastable end-members
- L’2b addition of Pt for $SiPt_2$
- cF96 addition of Pt
- cP60 addition of Ga for Ga_7Sr_8, Ga_7Ba_8
- hP18 addition of Zr and Al for Zr_5Ga_4 and Zr_5Al_4;
- mC18 addition of Hf for Ni_7Hf_2
- mC22 addition of Ga for Ga_8Mo_3

- mP24 restructruration of sublattices for $ZnAs_2$ and ZnP_2
- mS20 addition of Pt for InPt
- mS44 addition of Pt and Ga for $Ni_{13}Ga_9$ and $Pt_{13}In_9$
- oC20 addition of Fe for solubility in M_2B_3 borides;
  improved Gibbs energy of metastable end-members
- oF40 addition of Ga for Ga_3Zr
- oI6 addition of Pt, Fe, Mo for $MoPt_2$, VPt_2 and solubility
- o20P addition of Au
- oP56 addition of W
- oS12 addition of Ga and Zr for $ZrGa_2$
- tP20 addition of Ti for solubility of Al_2Ti_3
- tP32 improved Nb_3P
- R-phase several improvements in ternary systems involving Mo, W for steels

Moreover, the following new solid solution phases were created :

1)	BCC-B2e	Prototype CsCl
		CoGa with vacancies
2)	B19	Prototype Beta' AuCd
		Au-Ti, (Mo,V,Ti)Pt
3)	D0c	Prototype SiU3
		$SiPt_3$ is stable with Zr solubility
4)	D82a	Prototype Cu5Zn8
		$V_6Ga_{7(ht)}$
5)	D8i	Prototype-Mo2B5
		Mo_2B_5, V_2B_5
6)	L11	Prototype-CuPt
		CuPt
7)	L12e	Prototype-AuCu3
		Pt_3Ga, Pt_3Ge, Ni_3Ga
8)	C432	Prototype Ta39Al69
		$Ta_{39}Al_{69}$
9)	cP64	Prototype-KGe
		KGe, KSi
10)	h22P	Prototype Ti6Sn5
		β-Ti_6Sn_5 and V_6Ga_5
11)	h15R	Prototype Al2Li3
		Al_2Li_3, Ga_2Li_3, In_2Li_3
12)	mP86	Prototype Ta22Al21
		$Ta_{22}Al_{21}$
13)	mS16	Prototype Pt_3Ge
		Pt_3Ge, Pt_3Si
14)	o12I	Prototype KHg2
		Al_2Sr, Ga_2Sc, Cu_2Pr, Cu_2Sm
15)	oP4	Prototype AuCd
		α-PtTi
16)	oP4a	Prototype Ag3Sb
		Ag_3Sb with Au solubility
17)	C2Y3	Prototype Co2Y3
		Co_2Y_3 with REE solubility
18)	oP24	Prototype GeAs2
		$GeAs_2$, SiP_2, $SiAs_2$
19)	o24P	Prototype BaSi2
		$(Ba,Sr)(Ge,Si)_2$

20)	oP28	Prototype CeCu6 $CeCu_6$, $SmCu_6$
21)	oP52	Prototype Ca7Sn6 Ca_7Ge_6, Ca_7Sn_6
22)	oS8	Prototype TlI CoY, GaCa, GaSc, GeSr, NiLa, NiZr, PbSr
23)	o16S	Prototype Pt5Ga3 Pt_5Ga_3, Ni_5Ga_3
24)	i160	Prototype Cs3As2 Zn_3As_2
25)	tP16	Prototype Pt3Ga $Pt_3Ga_{(ht)}$, Pt_3Al
26)	P-phase	ternary CrMoNi Frank-Kasper solution with Fe-solubility
27)	P1-phase	M3Ca2 $(Cu,Mg)_3Ca_2$
28)	P2-phase	MCu3 $(Ca,Mg)Cu_3$

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Volumetric and thermal conductivity parameters were introduced for 102 pure solid phases.

Following the 8.2 version where the volumetric properties (density at 298.15K, volumetric thermal expansivity, compressibility and derivative of the Bulk Modulus) and thermal conductivity parameters (based on the Debye Temperature, Gruneisen, and atoms per crystallographic cell) were introduced for 102 pure solid phases, the volumetric and conductivity models have been extended for more compounds.

Carbides (25 phases) – red = new in 8.3

WC	ZrC	Fe3C_S1	Ti_2C	Ta_2C	Nb_2C	Mn_7C_3	Mn_5C_2
Fe_5C_2_(S2)	Fe_7C_3	$Cr_{23}C_6$	Cr_7C_3	Cr_3C_2	Cr_3C	BaC_2_(S1)	BaC_2_(S2)
Cr_2C	SrC_2	$AlTi_2C$	$AlTi_3C$	Fe_6W_6C	Mn_3AlC	Mn_5SiC	SiC
Al_4C_3							

Nitrides (24 phases)

h-BN	BN_(S2)	h-AlN	AlN_(S2)	AlN_(S3)	TiN	ZrN	InN
GaN	WN_(S1)	WN_(S2)	VN	TaN_(S1)	TaN_(S2)	Si_3N_4	NbN
Mn_2N	Mn_4N	Fe_2N	Cr_2N	CrN	CoN	CoN_3	Nb_2N

Borides (55 phases)

ZrB_2	TiB_2	HfB_2	NbB_2	NiB	Ni_3B	ZrB_{12}	ZrB
WB_(S1)	WB_(S2)	V_3B_4	VB	VB_2	V_2B_3	V_3B_2	Ti_3B_4
TiB	NbB	Nb_5B_6	Ni_2B	Ni_4B_3	Nb_3B_4	Nb_2B_3	Nb_3B_2
NbB_2	Mn_2B	MnB_4	Mn_3B_4	MnB	MnB_2	Fe_2B	FeB
Fe_3B	CrB	Cr_3B_4	CrB_2	CoB	Co_2B	Co_3B	AlB_2
BaB_6	CaB_6	Cr_2B	Cr_5B_3	CrB_4	KB_6	LiB_3	MgB_2
MgB_4	MgB_7	NaB_{15}	SrB_6	W_2B	$AlCr_2B_2$	$AlCr_3B_4$	

Phosphides (12 phases) – red = new in 8.3

AlP	Ca_3P_2	Fe_2P	Fe_3P	FeP	FeP_2	Mg_3P_2	Mn_2P
MnP	$Ni_{12}P_5$	Ni_2P	Ni_3P				

Oxides (9 phases) – red = new in 8.3

Al_2O_3	MgO	CuO	PbO	PbO_2	Pb_3O_4		

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Table 1a: Important phases in Al alloys present in the FTlite 8.3 Database

Common names	FTlite		Struktur-bericht	Pearson	Space Group (index)
	Soln-Nickname or CMPD*	Solution Full name or compound stoichiometry			
Liquid metal	Liqu	Liquid	-	-	
Al, α, FCC, (Al), Pb	A1	FCC-A1	A1	cF4	Fm-3m (225)
Si also Ge, α-Sn	A4	Diamond-A4	A4	cF8	Fd-3m (227)
θ-Al_2Cu	C16	C16 Prototype-Al2Cu	C16	tI12	I4/mcm (140)
β-Al_3Mg_2	Beta	Beta Prototype-Mg28Al45	-	cF1832	Fd-3m (227)
Mg_2Si also Mg_2Sn, Mg_2Ge and Mg_2Pb	C1a	aC1 Prototype-CaF2	C1	cF12	Fm-3m (225)
Al_3Sc,Al_3*RE* (Er,Tm,Yb,Lu), $Al_3(Cu,Li,Mg)_{metastable}$	L12	L12 Prototype-AuCu3	$L1_2$	cP4	Pm-3m (221)
Al_3Ti(ht) also α-Al_3Hf, Al_3Nb, Al_3Ta, Al_3V	D022	D022 Prototype-TiAl3	$D0_{22}$	tI8	I4/mmm (139)
Al_3Zr also β-Al_3Hf	D023	D023 Prototype-ZrAl3	$D0_{23}$	tI16	I4/mmm (139)
T-phase $Mg_{32}(Al,Zn)_{49}$ τ-AlMgZn, τ-AlMgCu, τ-AlMgAg	D8e	Tau Prototype-Mg32(Al,Zn)49	$D8_e$	cI162	Im-3 (204)
V-phase Mg_2Zn_{11} also $Mg_2Cu_6Al_5$	D22	V Prototype-Mg2Zn11	$D2_2$	cP39	Pm-3 (200)
Al_6Mn, $Al_6(Fe,Mn)$	D2h	D2h Prototype-Al6Mn	$D2_h$	oC28	Cmcm (63)
ε-Al_3Ti(lt)	tI32	tI32 Prototype-TiAl3	-	tI32	I4/mmm (139)
S-Al_2CuMg	S	S Prototype-Al2CuMg	-	oC16?	Cmcm (63)
Q-Phase	-	$Al_7Cu_3Mg_{6(S)}$			
Q-Phase	Q	Q Prototype-Th7S12 ($Al_5Cu_2Mg_7Si_7$)			P63/m (176)
π-Phase	-	$Al_8FeMg_3Si_{6(s)}$			
α-AlFeSi or τ_5 chinese script / rods	Tau5	AlFeSi_alpha	~Al_7Fe_2Si	hP245	P63/mmc (194)
β-AlFeSi or τ_6 plates / acicular	Tau6	AlFeSi_beta	~Al_5FeSi		
γ-AlFeSi or τ_2	Tau2	AlFeSi_gamma	~Al_3FeSi	m?	
δ-AlFeSi	-	$Al_{11}Fe_3Si_{6(S)}$			
α-AlMnSi	AlM1	AlMnSi_alpha	~Al_9Mn_2Si		
β-AlMnSi	AlM2	AlMnSi_alpha	~Al_9Mn_3Si		

α-AlFeMnSi	AFMS	AlFeMnSi_alpha	~$Al_{18}(Fe,Mn)_4Si_3$		
Al_7Cu_2Fe, Al_7CuMn_2	E9a	E9a Prototype-Al7Cu2Fe	$E9_a$	tP40	P4/mnc (128)
E-phase $Al_{18}Cr_2Mg_3$ also $Al_{18}Mn_2Mg_3$, $Al_{18}Ta_2Mg_3$, $Al_{18}Ti_2Mg_3$, $Al_{18}V_2Mg_3$, $Al_{20}(Cr,Ti,V)_2RE$	E	E Prototype-CeCr2Al20		cF184	Fd-3m (227)
$Al_{13}Cr_4Si_4$	-	$Al_{13}Cr_4Si_{4(S)}$	-	cF84	F-43m
τ_3-$Al_{11}Mn_3Zn_2$	-	$Al_{11}Mn_3Zn_{2(S)}$		o?	
Al_7Cr or $Al_{45}Cr_7$ or $Al_{13}Cr_2$	-	$Al_7Cr_{(S)}$		mC104	C2/m (12)
'Al_7V' or $Al_{45}V_7$	-	$Al_{45}V_{7(S)}$		mC104	C2/m (12)
$Al_{10}V$	-	$Al_{10}V_{(S)}$		cF176	Fd-3m (227)
Al_9Co_2	D8d	D8d Prototype-Al9Co2	$D8_d$	mP22	$P2_1/c$ (14)
Al_4Mn, $Al_4(Mn,Fe)$ also Al_4Cr	Al4M	Al4Mn	-	hP574	$P6_3/mmc$
$Al_{12}Mn$ also $Al_{12}Mo$, $Al_{12}W$	cI26	cI26 Prototype-Al12W	-	cI26	Im-3 (204)
'Al_3Fe' or $Al_{13}Fe_4$	m102	mC102 Prototype-Al13Fe4	-	mC102	C2/m (12)
Al_4Sr also Al_4Ca, Al_4Ba, Al_4Eu	D13	D13 Prototype-Al4Ba	$D1_3$	tI10	I4/mmm (139)
Al_2CaZn_2, Al_2REZn_2	D13a	Al2CaZn2	$D1_3$	tI10	I4/mmm (139)
Al_3CuRE	D13c	D13c Prototype-BaNiSn3	$D1_3$	tI10	I4/mmm (139)
TiB_2 also AlB_2, CrB_2, HfB_2, MgB_2, MnB_2, MoB_2, NbB_2, VB_2, ZrB_2	C32	C32 Prototype-AlB2	C32	hP3	P6/mmm (191)
AlP also AlAs, AlIn, AlSb	B3	B3 Prototype-ZnS	B3	cF8	F-43m (216)
AlLi	B32	B32 Prototype-NaTl	B32	cF16	Fd-3m (227)
Al_4C_3	D71	D71 Prototype-Al4C3	$D7_1$	hR7	R-3m (166)
$Al_{11}RE_3$ (La,Ce,Pr,Nd)	oI28	oI28 Prototype-Al11La3	-	oI28	Immm
Al_3Gd, Al_3Sm	D019	D019 Prototype-Ni3Sn	$D0_{19}$	hP8	$P6_3/mmc$ (194)
Al_3Ni, Fe_3C-cementite, Ni_3B	D011	D011 Prototype-Fe3C	$D0_{11}$	oP16	Pnma (62)
Al_3Dy, Ni_3Ti	D024	D024 Prototype-Ni3Ti	$D0_{24}$	hP16	$P6_3/mmc$ (194)
Al_3Ho	hR60	hR60 Prototype_HoAl3		hR60	R-3m (166)
Be	A3	HCP-A3	A3	hP2	$P6_3/mmc$ (194)
Zn or (Zn)	A3"	HCP-ZN Prototype-Mg	A3	hP2	$P6_3/mmc$ (194)
β-Sn	A5	BCT-A5 Prototype-Sn	A5	tI4	$I4_1/amd$ (141)
Bi	A7	RHOM-A7 Prototype-As	A7	hR2	R-3m (166)
$Al_9(Co,Fe,Ni)_2(Sr,Ba)$	hP12	hP12 Prototype-Al9Co2Sr		hP12	P6/mmm (191)

REFe_2Al_{10}	oC52	oC52 Prototype-YbFe2Al10		oC52	Cmcm (63)
Al_3Tb	A3RE	hR12 Prototype-$BaPb_3$		hR12	R-3m (166)
AlMgAg	-	$AlMgAg_{(s)}$	C14	hP12	$P6_3/mmc$ (191)
AlNaSi	-	$AlNaSi_{(S)}$	-		P4/nmm
$Al_{21}Pt_5$	-		-	cF416	F-43m (216)
Al_2Si_2Sr	hP5	hP5 Prototype-Ce2SO2	-	hP5	P-3m1 (164)
Al_2Si_2Ba	-	$BaAl_2Si_{2(s)}$	-	o?	Pnma
Al_2Si_2Sc	-	$ScSi_2Al_{2(s)}$	-		
Al_2Si_2La	-	$LaSi_2Al_{2(s)}$	-		
Al_2Si_2Pr	-	$PrSi_2Al_{2(s)}$	-		
Al_2Si_2Nd	-	$NdSi_2Al_{2(s)}$	-		
Al_2Si_2Sm	-	$SmSi_2Al_{2(s)}$	-		
Al_2Si_2Eu	-	$EuSi_2Al_{2(s)}$	-		
Al_2Si_2Gd	-	$GdSi_2Al_{2(s)}$	-		
Al_2Si_2Tb	-	$TbSi_2Al_{2(s)}$	-		
Al_2Si_2Dy	-	$DySi_2Al_{2(s)}$	-		
Al_2Si_2Ho	-	$HoSi_2Al_{2(s)}$	-		
Al_2Si_2Yb	-	$YbSi_2Al_{2(s)}$	-		
Al_3Si_2Er	-	$ErSi_2Al_{3(s)}$	-	mS14	C2/m
$AlCeSi_2$	-	$AlCeSi_{2(S)}$		h?	
$ScCu_4Al_8$	-	$ScCu_4Al_{8(s)}$		tI26	I4/mmm (139)
YCu_4Al_8	-	$YCu_4Al_{8(s)}$		tI26	I4/mmm (139)
$LaCu_4Al_8$	-	$LaCu_4Al_{8(s)}$		tI26	I4/mmm (139)
$CeCu_4Al_8$	-	$CeCu_4Al_{8(s)}$		tI26	I4/mmm (139)
$PrCu_4Al_8$	-	$PrCu_4Al_{8(s)}$		tI26	I4/mmm (139)
$NdCu_4Al_8$	-	$NdCu_4Al_{8(s)}$		tI26	I4/mmm (139)
$SmCu_4Al_8$	-	$SmCu_4Al_{8(s)}$		tI26	I4/mmm (139)
$EuCu_4Al_8$	-	$EuCu_4Al_{8(s)}$		tI26	I4/mmm (139)
$GdCu_4Al_8$	-	$GdCu_4Al_{8(s)}$		tI26	I4/mmm (139)
$TbCu_4Al_8$	-	$TbCu_4Al_{8(s)}$		tI26	I4/mmm (139)
$DyCu_4Al_8$	-	$DyCu_4Al_{8(s)}$		tI26	I4/mmm (139)
$HoCu_4Al_8$	-	$HoCu_4Al_{8(s)}$		tI26	I4/mmm (139)
$ErCu_4Al_8$	-	$ErCu_4Al_{8(s)}$		tI26	I4/mmm (139)

$TmCu_4Al_8$	-	$TmCu_4Al_{8(s)}$		tI26	I4/mmm (139)
$YbCu_4Al_8$	-	$YbCu_4Al_{8(s)}$		tI26	I4/mmm (139)
$LuCu_4Al_8$	-	$LuCu_4Al_{8(s)}$		tI26	I4/mmm (139)
Al_8EuFe_2	-	$Al_8EuFe_{2(s)}$		oP44	Pbam (55)
Al_8CrY	-	$Al_8CrY_{(s)}$	-		
Al_2O_3 α-corundum	-	$Al_2O_{3(s4)}$	D51	hR30	R-3c (167)
MgO magnesia	-	$MgO_{(s)}$	B1	cF8	Fm-3m (225)
$MgAl_2O_4$ spinel	-	$MgAl_2O_{4(s)}$	H11	cF56	Fd-3m (227)

Table 1b: Important phases in Mg alloys present in the FTlite 8.3 Database

Common names	FTlite		Struktur-bericht	Pearson	Space Group (index)
	Soln-Nickname or CMPD*	Solution Full name or compound stoichiometry			
Liquid metal	Liqu	Liquid	-	-	
Mg, α, HCP, (Mg), α-Ti, α-Zr, α-Be	A3	HCP-A3	A3	hP2	$P6_3/mmc$ (194)
γ-$Fe_{(austenite)}$, InMg, γ-Mn	A1	FCC-A1	A1	cF4	Fm-3m (225)
α-$Fe_{(ferrite)}$, Cr, Li, K, Na, β-Be, δ-Mn, β-Sc, V	A2	BCC-A2	A2	cI2	Im-3m (229)
$C_{(graphite)}$	A9	A9 Prototype-C	A9	hP4	$P6_3/mmc$ (194)
α-Mn, β-$Al_{12}Mg_{17}$, $Mg_{24}RE_5$ (*RE* = Y,Tb,Dy,Ho,Er,Tm,Lu)	A12	CBCC-A12 Prototype-Mn	A12	cI58	I-43m (217)
β-Mn	A13	CUB-A13 Prototype-Mn	A13	cP20	$P4_132$ (213)
MgSc, AlSc	B2_a	BCC-B2 Prototype-CsCl	B2	cP2	Pm-3m (221)
AlNi	B2_c	BCC-B2c Prototype-CsCl	B2	cP2	Pm-3m (221)
Mg_2Si also Mg_2Sn, Mg_2Ge and Mg_2Pb	C1a	aC1 Prototype-CaF2 (anti-fluorite)	C1	cF12	Fm-3m (225)
$AlCr_2$	C11b	C11b Prototype-MoSi2	$C11_b$	tI6	I4/mmm (139)
Mg_2Ca, Mg_2Yb, Li_2Ca, $(Al,Mg)_2Lu$	C14	C14 Prototype-MgZn2	C14	hP12	$P6_3/mmc$ (194)
Na_2K	-	$Na_2K_{(S)}$	C14	hP12	$P6_3/mmc$ (194)
Al_2Ca, Al_2Ba, $(Al,Cu)_2Mg$, Al_2RE (*RE* = Sc,Y,La,Ce,Pr, Nd,Sm,Eu,Gd,Tb,Dy,Ho, Tm,Er,Yb,Lu)	C15	C15 Prototype-MgCu2	C15	cF24	Fd-3m (227)
Al_4MgY	-	$Al_4MgY_{(S)}$	C15	cF24	Fd-3m (227)
$(Al,Mg)_2Ca$	C36	C36 Prototype-MgNi2	C36	hP24	$P6_3/mmc$ (194)
Mg_2Cu	Cb	Cb Prototype-$CuMg_2$	C_b	oF48	Fddd (70)
AlTi	L10	L10 Prototype-AuCu	$L1_0$	tP2	P4/mmm (123)
Al_3Sc, Al_3RE (Er,Tm,Yb,Lu)	L12	L12 Prototype-AuCu3	$L1_2$	cP4	Pm-3m (221)
Mg_7Zn_3 or $Mg_{51}Zn_{20}$	-	$Mg_{51}Zn_{20(S)}$	-	oI142	Immm
MgZn or $Mg_{12}Zn_{13}$	MgZn	Mg12Zn13	-	-	-
$Mg_{17}Ba_2$	-	$Mg_{17}Ba_{2(S)}$	-	hP57	R3m
$AgMg_4$	hP_G	AgMg4 gamma_hp	-	h?	?

$Ag_{17}Mg_{54}$	A17M	oP142 Prototype-Hf54Os17		oP142	Immm (71)
$AgMg_3$	D018	D018 Prototype-Na3As	$D0_{18}$	hP24	$P6_3cm$ (185)
Al_3RE (*RE* = Y,La,Ce,Pr, Nd,Sm), Ti_3Al	D019	D019 Prototype-Ni3Sn	$D0_{19}$	hP8	$P6_3/mmc$ (194)
Al_3Ti also α-Al_3Hf, Al_3Nb, Al_3Ta, Al_3V	D022	D022 Prototype-TiAl3	$D0_{22}$	tI8	I4/mmm (139)
Al_3Zr also β-Al_3Hf	D023	D023 Prototype-ZrAl3	$D0_{23}$	tI16	I4/mmm (139)
σ-FeCr, σ-AlNb, σ-AlTa	D8b	Sigma Prototype-FeCr	$D8_b$	tP30	$P4_2/mnm$ (136)
T-phase $Mg_{32}(Al,Zn)_{49}$ or τ-AlMgZn	D8e	Tau Prototype-Mg32(Al,Zn)49	$D8_e$	cI162	Im-3 (204)
$Mg_{12}RE$ (*RE* = La,Ce,Pr)	D2b	D2b Prototype-Mn12Th	$D2_b$	tI26	I4/mmm (139)
Al_6Mn, $Al_6(Fe,Mn)$	D2h	D2h Prototype-Al6Mn	$D2_h$	oC28	Cmcm (63)
S-phase Al_2CuMg	S	S Prototype-Al2CuMg	-	oS16	Cmcm (63)
ϕ-Phase or $(Al,Zn)_5Mg_6$	Phi	Phi AlMgZn	-	o?	Pbcm (57)
Q-Phase	-	$Al_7Cu_3Mg_{6(S)}$			
Q-Phase	Q	Q Prototype-Th7S12 $Al_5Cu_2Mg_7Si_7$			P63/m (176)
π-Phase	-	$Al_8FeMg_3Si_{6(s)}$			
$Sr_4Al_{38}Mg_{58}$	-	$Sr_4Al_{38}Mg_{58(S)}$			
α-AlFeSi or τ_5 chinese script / rods	Tau5	AlFeSi_alpha	~Al_7Fe_2Si	hP245	P63/mmc (194)
β-AlFeSi or τ_6 plates / acicular	mC52	AlFeSi_beta	~Al_5FeSi	mC52	C2/c (15)
γ-AlFeSi or τ_2	Tau2	AlFeSi_gamma	~Al_3FeSi	m?	
δ-AlFeSi	-	$Al_{11}Fe_3Si_{6(S)}$			
α-AlMnSi or τ_9	AlM1	AlMnSi_alpha	~Al_9Mn_2Si	cP138	Pm-3 (200)
β-AlMnSi	hP26	AlMnSi_beta	~Al_9Mn_3Si	hP26	P63/mmc (194)
α-AlFeMnSi	AFMS	AlFeMnSi_alpha	~$Al_{18}(Fe,Mn)_4Si_3$		
Al_7Cu_2Fe, Al_7CuMn_2	E9a	E9a Prototype-Al7Cu2Fe	$E9_a$	tP40	P4/mnc (128)
E-phase $Al_{18}Cr_2Mg_3$ also $Al_{18}Mn_2Mg_3$, $Al_{18}Ta_2Mg_3$, $Al_{18}Ti_2Mg_3$, $Al_{18}V_2Mg_3$	E	E Prototype-CeCr2Al20	-	cF184	Fd-3m (227)
Mg_2Ni	Ca	Ca Prototype-NiMg2	C_a	hP18	$P6_222$
Mg_5RE (*RE* = Gd,Sm)	Mg5X	cF448 Prototype-Mg5Gd	-	cF448	F-43m (216)
$Mg_{41}RE_5$ (*RE* = Nd,Sm)	tI92	tI92 Prototype-Mg41Ce5	-	tI92	I4/m (87)
$Mg_{17}Sr_2$, $Mg_{17}Sc_2$, $Mg_{17}Eu_2$, $Mg_{17}Pm_2$, $Mg_{17}Tm_2$	hP38	hP38 Prototype-Ni17Th2	-	hP38	$P6_3/mmc$ (194)

α-Mg_3Bi_2, α-Mg_3Sb_2	P3m1	alpha_Mg3X2(low-T)	-	-	P-3m1
Al_3Ni_2	D513	D513 Prototype-Al3Ni2	$D5_{13}$	hP5	P-3m1 (164)
Al_8V_5	-	$Al_8V_{5(S)}$	$D8_2$	cI52	I-43m (217)
Al_8Mn_5	D810	D810 Prototype-Al8Cr5	$D8_{10}$	hR26	R3m (160)
$Al_{13}Cr_4Si_4$	-	$Al_{13}Cr_4Si_{4(S)}$	-	cF84	F-43m
τ_3-$Al_{11}Mn_3Zn_2$	-	$Al_{11}Mn_3Zn_{2(S)}$		o?	
β-Al_8Cr_5 (HT)	-	$Al_8Cr_{5(S1)}$			
α-Al_8Cr_5 (LT)	-	$Al_8Cr_{5(S2)}$	$D8_{10}$	hR26	R3m (160)
α-Al_9Cr_4	-	$Al_9Cr_{4(S)}$	-		
β-Al_9Cr_4	-	$Al_9Cr_{4(S2)}$	-	cI52	I-43m
'Al$_7$Cr' or $Al_{45}Cr_7$ or $Al_{13}Cr_2$	-	$Al_{13}Cr_{2(S)}$		mC104	C2/m
'Al$_7$V' or $Al_{45}V_7$	-	$Al_7V_{(S)}$		mC104	C2/m
$Al_{10}V$	-	$Al_{10}V_{(S)}$		cF?	Fd-3m
α-Al_3Ta_2 (lt)	-	$Al_3Ta_{2(S2)}$			
Al_9Co_2	D8d	D8d Prototype-Al9Co2	$D8_d$	mP22	$P2_1/c$ (14)
Al_4Mn, Al_4(Mn,Fe) also Al_4Cr	Al4M	Al4Mn	-	hP574	$P6_3/mmc$
$Al_{11}Mn_4$	aP15	aP15 Prototype-Al11Mn4		aP15	P-1 (2)
$Al_{12}Mn$ also $Al_{12}Mo$, $Al_{12}W$	cI26	cI26 Prototype-Al12W	-	cI26	Im-3 (204)
'Al$_2$Fe' or $Al_{61}Fe_{31}$	-	$Al_{61}Fe_{31(S)}$		aP18	P1-1
η-Al_5Fe_2	Eta	Eta Prototype-Al5Fe2	-	oS24	Cmcm (63)
'Al$_3$Fe' or $Al_{13}Fe_4$	m102	mC102 Prototype-Al13Fe4	-	mC102	C2/m (12)
Al_4Sr, Al_4Ba, Al_4Eu	D13	D13 Prototype-Al4Ba	$D1_3$	tI10	I4/mmm (139)
TiB_2 also AlB_2, CrB_2, HfB_2, MgB_2, ZrB_2	C32	C32 Prototype-AlB2	C32	hP3	P6/mmm (191)
AlLi, InLi, ZnLi, InNa	B32	B32 Prototype-NaTl	B32	cF16	Fd-3m (227)
Al_4C_3	D71	D71 Prototype-Al4C3	$D7_1$	hR7	R-3m (166)
$Al_{11}RE_3$ (La,Ce,Pr,Nd)	oI28	oI28 Prototype-Al11La3	-	oI28	Immm (71)
Al_3Ni, Fe_3C-cementite	D011	D011 Prototype-Fe3C	$D0_{11}$	oP16	Pnma (62)
Al_3Dy	D024	D024 Prototype-Ni3Ti	$D0_{24}$	hP16	$P6_3/mmc$ (194)
Al_3Ho	hR60	hR60 Prototype-HoAl3		hR60	R-3m (166)
$MgBe_{13}$	-	$MgBe_{13(S)}$	$D2_3$	cF112	Fm-3c
Al_2Ti	-	$Al_2Ti_{(S)}$		tI24	$I4_1/amd$ (141)

Mg_3P_2	-	$Mg_3P_{2(S)}$			
MgO magnesia	-	$MgO_{(s)}$	B1	cF8	Fm-3m (225)
$MgAl_2O_4$ spinel	-	$MgAl_2O_{4(s)}$	H11	cF56	Fd-3m (227)
Mg_5Ga_2	D8g	D8g Prototype-Ga2Mg5	$D8_g$	oI28	Ibam (72)

Table 1c: Important phases in Ti alloys present in the FTlite 8.3 Database

Common names	FTlite		Struktur-bericht	Pearson	Space Group (index)
	Soln-Nickname or CMPD*	Solution Full name or compound stoichiometry			
Liquid metal	**Liqu**	Liquid	-	-	
Ti, α, HCP, (Ti), Dy, Er, Gd, Hf, Ho, Lu, Mg, Sc, Tb, Tm, Y, **α-Zr**	**A3**	HCP-A3	A3	hP2	$P6_3/mmc$ (194)
Ti, β, BCC, (Ti), Ba, Ca, Ce, Dy, Eu, Hf, K, Li, **Mo**, Na, **Nb**, Sr, Ta, **V**, W, Yb	**A2**	BCC-A2	A2	cI2	Im-3m (229)
TiC, TiN, β-TiO, Ca, Ce, La, Sr, Yb	**A1**	FCC-A1	A1/**B1**	cF4	Fm-3m (225)
La, Nd, Pr, Au	A3'	DHCP-A3	A3'	hP4	$P6_3/mmc$ (194)
$C_{(graphite)}$	A9	A9 Prototype-C	A9	hP4	$P6_3/mmc$ (194)
$Mg_{24}RE_5$ (*RE* = Y,Tb,Dy, Ho,Er,Tm,Lu)	A12	CBCC-A12 Prototype-Mn	A12	cI58	I-43m (217)
Ti_3Au, Ti_3Pt	A15	CUB-A15 Prototype-Cr3Si	A15	cP8	Pm-3n (223)
FeTi, AgMg, AlFe, AlMn	**B2**	BCC-B2 Prototype-CsCl	B2	cP2	Pm-3m (221)
MgSc	B2_a	BCC-B2 Prototype-CsCl	B2	cP2	Pm-3m (221)
ZnTi	-	$ZnTi_{(s)}$	B2	cP2	Pm-3m (221)
(Ag,Cu)Ti	B11	B11 Prototype-CuTi	B11	tP4	P4/nmm (129)
TiSi, **TiB**	**B27**	B27 Prototype-FeB	B27	oP8	Pnma (62)
Ti_2Ga, Zr_2Al, Ti_2Sn	**B8x**	B81/B82 NiAs/InNi2	$B8_1$/**$B8_2$**	hP6	$P6_3/mmc$ (194)
δ-TiH_2	**C1**	C1 Prototype-CaF2	C1	cF12	Fm-3m (225)
Rutile TiO_2	-	**$TiO_{2(s)}$**	C4	tP6	$P4_2/mnm$ (136)
Ti_2N	-	**$Ti_2N_{(s)}$**	C4	tP6	$P4_2/mnm$ (136)
Anatase TiO_2	-	$TiO_{2(s2)}$	C5	tI12	$I4_1/amd$ (141)
(Ag,**Cu**,Zn)**Ti_2**	**C11b**	C11b Prototype-MoSi2	$C11_b$	tI6	I4/mmm (139)
Cr_2Ti, Mn_2Ti, Mg_2Ca, Mg_2Yb, Li_2Ca	C14	C14 Prototype-MgZn2	C14	hP12	$P6_3/mmc$ (194)
Na_2K	-	$Na_2K_{(s)}$	C14	hP12	$P6_3/mmc$ (194)
Cr_2Ti	C15	C15 Prototype-MgCu2	C15	cF24	Fd-3m (227)
Al_4MgY	-	$Al_4MgY_{(s)}$	C15	cF24	Fd-3m (227)
TiB_2, MB_2 (*M* = Al,Cr,Hf, Mg,Mn,Nb,Ti,V,Zr)	**C32**	C32 Prototype-AlB2	C32	hP3	P6/mmm (191)

Cr_2Ti	C36	C36 Prototype-MgNi2	C36	hP24	$P6_3/mmc$ (194)
$TiSi_2$, $ZrSn_2$	**C54**	C54 Prototype-TiSi2	C54	oF24	Fddd (70)
γ-TiAl	**L10**	L10 Prototype-AuCu	$L1_0$	tP2	P4/mmm (123)
$Mg_{17}Ba_2$	-	$Mg_{17}Ba_{2(s)}$	-	hP57	R3m
$AgMg_4$	hP_G	AgMg4 gamma_hp	-	h?	?
$Ag_{17}Mg_{54}$	A17M	oP142 Prototype-Hf54Os17		oP142	Immm (71)
$AgMg_3$	D018	D018 Prototype-Na3As	$D0_{18}$	hP24	$P6_3cm$ (185)
α_2-Ti_3Al, Ti_3Ga, **Ti_3Sn**	**D019**	D019 Prototype-Ni3Sn	$D0_{19}$	hP8	$P6_3/mmc$ (194)
Al_3Ti also α-Al_3Hf, Al_3Nb, Al_3Ta, Al_3V	D022	D022 Prototype-TiAl3	$D0_{22}$	tI8	I4/mmm (139)
$Mg_{12}RE$ (*RE* = La,Ce,Pr)	D2b	D2b Prototype-Mn12Th	$D2_b$	tI26	I4/mmm (139)
Ti_3B_4, M_3B_4 (*M* = Cr, Hf, Mn, Nb, Ti, V)	**D7b**	D7b Prototype-Ta3B4	$D7_b$	oI14	Immm (71)
Ti_5Si_3	**D88**	D88 Prototype-Mn5Si3	$D8_8$	hP16	$P6_3/mcm$ (193)
Ti_2O_3	-	$Ti_2O_{3(s)}$	$D5_1$	hR30	R-3c (167)
Ti_3O_2	-	$Ti_3O_{2(s)}$	-	hR30	R-3c (167)
Al_7Cu_2Fe, Al_7CuMn_2	E9a	E9a Prototype-Al7Cu2Fe	$E9_a$	tP40	P4/mnc (128)
$(Co,Ni)Ti_2$	cF96	cF96 Prototype-Ti2Ni	-	cF96	Fd-3m (227)
Mg_5RE (*RE* = Gd,Sm)	Mg5X	cF448 Prototype-Mg5Gd	-	cF448	F-43m (216)
$Mg_{41}RE_5$ (*RE* = Nd,Sm)	tI92	tI92 Prototype-Mg41Ce5	-	tI92	I4/m (87)
$Mg_{17}Sr_2$, $Mg_{17}Sc_2$, $Mg_{17}Eu_2$, $Mg_{17}Pm_2$, $Mg_{17}Tm_2$	hP38	hP38 Prototype-Ni17Th2	-	hP38	$P6_3/mmc$ (194)
α-Mg_3Bi_2, α-Mg_3Sb_2	P3m1	alpha_Mg3X2(low-T)	-	-	P-3m1
β-MnTi	-	"$MnTi_{(s)}$"	-	tP30	(136)
Ti_3Si, M_3Si (*M* = Hf,Nb, Ta,Ti,Zr)	**tP32**	tP32 Prototype-Ti3P	-	tP32	$P4_2/n$ (86)
Sm	-	$Sm_{(s)}$	-	hR9	R-3m (166)
α-TiO	-	$TiO_{(s)}$	-	mS20	C2/m (12)
Al_2O_3 α-corundum	-	**$Al_2O_{3(s4)}$**	D51	hR30	R-3c (167)
MgO magnesia	-	$MgO_{(s)}$	B1	cF8	Fm-3m (225)
$MgAl_2O_4$ spinel	-	$MgAl_2O_{4(s)}$	H11	cF56	Fd-3m (227)
Mg_5Ga_2	D8g	D8g Prototype-Ga2Mg5	$D8_g$	oI28	Ibam (72)

Table 2: Solution names with their major components (<u>not</u> including minor solutes)

- **Important solutions in Al alloys**
- **Important solutions in Mg alloys**
- **Important solutions in Ti alloys**
- **Important solutions in Al and Mg alloys**

Common names	FTlite		Major phase components
	Nickname	Full name	
Liquid metal	Liqu	Liquid	most elements
Al, FCC, TiC, TiN, TiO	A1	FCC-A1	Ag, Al, Cu, γ-$Fe_{austenite}$, Ni, Pb, Pt, ... with C, H, N, O interstitials (→B1)
BCC, β-Ti	A2	BCC-A2	α-$Fe_{ferrite}$, Cr, K, Li, Na, β-Ti, β-Zr, Mo, Nb, Ta, V… ... with C, H, N, O interstitials
Mg, HCP, α-Ti	A3	HCP-A3	Mg, α-Ti, α-Zr, Co, Rare-earth elements... ... with C, H, N, O interstitials
DHCP	A3'	DHCP-A3'	Rare-earth elements, Au(Sn)
Zn	A3"	HCP-Zn	Zn with 17 solutes
Si	A4	Diamond-A4	$C_{diamond}$, Ge, Si, α-Sn with 13 solutes
Sn	A5	BCT-A5	β-Sn with 16 solutes
In	A6	TET-A6	α-In, with 12 solutes
InSn	A6o	TET-A6o	β-InSn with 5 solutes
As, Bi, Sb	A7	RHOM-A7	α-As, Bi, Sb with 7 solutes
C, graphite	A9	A9	$C_{graphite}$ with boron
Ga	A11	ORTH-A11	α-Ga with 2 solutes
α-Mn, $Mg_{24}RE_5$, (γ- or β-) $Al_{12}Mg_{17}$	A12	CBCC-A12	α-Mn, β/γ-$Al_{12}Mg_{17}$, χ-FeCr(Mo,W) $Mg_{24}RE_5$ (with *RE* = Y,Tb,Dy,Ho,Er,Tm,Lu)
β-Mn	A13	CUB-A13	β-Mn, Ag_3Al with 25 solutes
Cr_3Si	A15	CUB-A15	Cr_3Si, Cr_3Ga, Cr_3Pt, Mo_3Al, Nb_3Al, Nb_3Sn, Ta_3Sn, V_3Al, V_3Co, V_3Ga, V_3Ni, V_3Si, V_3Sn
γ-InSn	Af	HEX-Af	γ-InSn with Ag solubility
β-B, boron, A_g	Ag	Ag	β-B-tetragonal with carbon solubility
α-B	aRho	aRHOM	α-B with carbon solubility
β-B	bRho	bRHOM	β-B-rhombohedral with 4 solutes
P(red)	RedP	Red-Phosphorus	P(red) with As solubility
RESb	B1	FCC-B1	CeSb, NdSb, PrSb, SmSb, *M*S (*M*=Ca,Mg,Mn,Pb)
ordered BCC	B2_a	BCC-B2a	AlSc, Zn*RE* and Mg*RE* (with *RE* = Y,Sc,La,Ce, Pr,Nd,Sm,Eu, Gd,Tb,Dy,Ho,Tm,Er,Yb,Lu), CoSc
AlFe, AlMn, FeSi, AgLi, AgMg, CaIn, β-NiZn, β'-CuZn	**B2**	BCC_B2!BCC_A2	AgLi, AgMg, CaIn, β-NiZn, β'-CuZn with order/disorder transf.

TiNi	B2_b	BCC-B2b	non-stoichiometric TiNi with Au, Pt
AlNi	B2_c	BCC-B2c	non-stoichiometric AlNi with vacancies
AlMo	B2_d	BCC-B2d	non-stoichiometric AlMo
CoGa	B2_e	BDD-B2e	non-stoichiometric CoGa
AlP, β-BN, β-SiC-3C	B3	B3 (sphalerite)	AlAs, AlP, AlSb, β-BN, GaAs, GaP, GaSb, InAs, InP, InSb, β-SiC-3C
AlN, γ-BN, α-SiC-2H	B4	B4 (wurtzite)	AlN, γ-BN, GaN, InN, α-SiC-2H
ε-AlCu, L'3, $B8_1$	B8x	B81/B82 NiAs/InNi2	$B8_1$: ε-AlCu, ε-FeSb, NiBi, NiAs, α-MnBi, AuSn, η-CuSn
			$B8_2$: β-BiMn, $InNi_2$, θ-$SiNi_2$, $Sn(Fe,Ti)_2$
γ-CuTi	B11	B11 Prototype-CuTi	γ-CuTi, α-AuTi, Ag(Ti,Zr), β1-NiZn
TiPt, MoPt, VPt, TiAu	B19	B19 Prototype-beta'AuCd	(Mo,V,Ti)Pt, β-TiAu
FeSi, PtGa, PtMg	B20	B20 Prototype-FeSi	(Fe,Co,Cr,Mn)Si, PtGa, PtMg
FeB, **TiB**, **TiSi**	B27	B27 Prototype-FeB	CoB, FeB, HfB, TiB, ZrB, HfSi, TiSi, ZrSi, *RE*Si (with *RE* = La,Ce,Pr,Nd,Pm,Sm,Eu,Gd, Tb,Dy,Ho,Er,Tm,Yb,Lu)
FeP, MnP, CoP, NiSi	B31	B31 Prototype-FeAs	(Co,Fe,Mn)P, NiSi, PtGe, NiGe, PtSi
AlLi	B32	B32 Prototype-NaTl	AlLi, InLi, InNa, ZnLi
CrB	B33	B33 Prototype-CrB	CrB, NiB, VB, β-WB, NbB, CaSi, SrSi, BaSi, CaSn, LaSn, SrSn, AlY, YSi, ScSi, AlHf
CoSn	B35	B35 Prototype-CoSn	CoSn, FeSn, NiIn
η-AgZn	Bb	Bb Prototype-AgZn	η-AgZn (also called β')
α-WB	Bg	Bg Prototype-MoB	α-WB, α-MoB, ZrGa
δ-WC	Bh	Bh Prototype-WC	γ-MoC, δ-WC, MoP, WP, WN
α-BN	Bk	Bk Prototype-BN	α-BN with AlN solubility
TiH_2	C1	C1 Prototype-CaF2	TiH_2, δ-ZrH_2, δ-HfH_2
Mg_2Si	C1a	aC1 Prototype -C1	Mg_2Si, Mg_2Sn, Mg_2Ge, Mg_2Pb, Al_2Au, Si_2Co, Si_2Ni, Ga_2Au, Ga_2Pt
FeS_2, NiS_2, $AuSb_2$	C2	C2 Prototype-FeS2	$AuSb_2$
Cu_2O	C3	C3 Prototype-Cu2O	$(Cu,Ag)_2O$
$CuTi_2$	C11b	C11b Prototype-MoSi2	$MoSi_2$, WSi_2, $AgTi_2$, $AgZr_2$, $AlCr_2$, $CuTi_2$, $CuZr_2$, $ZnTi_2$, $ZnZr_2$, $TaNi_2$, $ScAg_2$, $ScCu_2$, $TiAu_2$, YAg_2
$CaSi_2$	C12	C12 Prototype-CaSi2	$CaSi_2$, $CaGe_2$
$MgZn_2$, Laves-C14, Hexagonal Laves	C14	C14 Prototype-$MgZn_2$ (Laves)	Al_2Zr, Co_2Mg, Co_2Ta, Cr_2Nb, Cr_2Ti, Cr_2Ta, Cr_2Hf, Cr_2Zr, Cu_2Mg, Fe_2Hf, Fe_2Mo, Fe_2Nb, Fe_2Sc, Fe_2Ta, Fe_2Ti, Fe_2W, Li_2Ca, Mg_2Ba, Mg_2Ca, Mg_2Dy, Mg_2Er, Mg_2Eu, Mg_2Ho, Mg_2Lu, Mg_2Sr, Mg_2Tb, Mg_2Tm, Mg_2Y, Mg_2Yb, Mn_2Er, Mn_2Ho, Mn_2Lu, Mn_2Nb, Mn_2Nd, Mn_2Sm, Mn_2Tm, Mn_2Sc, Mn_2Ta, Mn_2Ti, Mn_2Zr, V_2Ta, Zn_2Mg, Zn_2Ti, Zr_2Ag

$MgCu_2$, Laves-C15, Cubic Laves	C15	C15 Prototype-$MgCu_2$ (Laves)	Al_2Ba, Al_2Ca, Al_2Ce, Al_2Dy, Al_2Er, Al_2Eu, Al_2Gd, Al_2Ho, Al_2La, Al_2Lu, Al_2Nd, Al_2Pr, Al_2Sc, Al_2Sm, Al_2Tb, Al_2Tm, Al_2Y, Al_2Yb, Co_2Ce, Co_2Dy, Co_2Er, Co_2Gd, Co_2Ho, Co_2Nd, Co_2Pr, Co_2Sc, Co_2Sm, Co_2Ti, Co_2Y, Co_2Zr, Co_2Nb, Co_2Ta, Co_2Hf, Cr_2Ti, Cr_2Zr, Cr_2Nb, Cr_2Ta, Cr_2Hf, Cu_2Mg, Cu_2Zr, Fe_2Ce, Fe_2Dy, Fe_2Er, Fe_2Gd, Fe_2Ho, Fe_2Lu, Fe_2Sc, Fe_2Sm, Fe_2Tb, Fe_2Tm, Fe_2Y, Fe_2Yb, Fe_2Hf, Fe_2Ti, Fe_2Zr, Mg_2Ce, Mg_2Gd, Mg_2La, Mg_2Nd, Mg_2Pr, Mg_2Sm, Mn_2Dy, Mn_2Gd, Mn_2Tb, Mn_2Y, Ni_2Ca, Ni_2Sc, V_2Zr, V_2Ta, V_2Hf, Zn_2Zr
Laves-Ag_2Na	C15a	C15a Prototype-$MgCu_2$ (Laves)	Ag_2Na, Au_2Bi
Laves-Ni_5Zr	C15b	C15b Prototype-$MgSnCu_4$ (Laves)	Ni_5Zr, Ni_5Hf
θ-Al_2Cu	C16	C16 Prototype-Al2Cu	θ-Al_2Cu, $(Co,Cr,Fe,Mn,Mo,Ni,Ta,W)_2B$, Hf_2Al, Hf_2Si, Pb_2Au, $Sn_2(Co,Fe,Mn)$, $Ta_2(Co,Ni)$, $(Ta,Zr)_2Si$, $(Hf,Ti,Zr)_2Ni$, $Zr_2(Co,Fe,Ni,Si)$, Zr_2Ga, $CoSc_2$, Mg_2Pt
$Fe(As,Sb)_2$	C18	C18 Prototype-FeS_2	$(Co,Fe,Ni)(As,Sb)_2$
α-Sm	C19	C19 Prototype-Sm	α-Sm with 17 solutes
Fe_2P	C22	C22 Prototype-Fe2P	Cu_2P, Fe_2P, Mn_2P, Ni_2P, FeNiP
CaH_2, α-SrH_2	C23	C23 Prototype-PbCl2	CaH_2, α-SrH_2, α-BaH_2
Al*RE*$_2$, Co_2Si, $AlPt_2$(ht)	C23a	C23 Prototype-Co2Si	$AlPt_2$(ht), $AlPr_2$, $AlNd_2$, $AlSm_2$, $AlGd_2$, $AlTb_2$, $AlDy_2$, $AlHo_2$, $AlEr_2$, Ca_2Sn, Sr_2Sn, Ca_2Si, Sr_2Si, θ-Ni_2Si, Ni_2Ge, Ca_2Cu, Co_2Si, $Pb(Ca,Sr)_2$
TiB_2	C32	C32 Prototype-AlB2	AlB_2, CrB_2, HfB_2, MgB_2, MnB_2, NbB_2, TiB_2, VB_2, ZrB_2
RESi_2, *RE*$_2Si_3$, *RE*$_3Si_5$	C32o	C32o Prototype-AlB2	*RE*Si_2 (with RE = Y) *RE*$_2Si_3$ (with RE = Sc, Nd) *RE*$_3Si_5$ (with RE = Sm, Gd, Tb, Dy, Ho, Er)
Laves-$MgNi_2$	C36	C36 Prototype-MgNi2 (Laves)	$MgNi_2$, Cr_2(Ti,Zr), Cu_2Mg, ternary phases in Mg-Al-Ca-Sr-Ba, Co_2Ta, Co_2Ti
η-Cu_2Sb	C38	C38 Prototype-Cu2Sb	η-Cu_2Sb, Cu_2As, Mn_2Sb
$CrSi_2$	C40	C40 Prototype-CrSi2	$CrSi_2$, $NbSi_2$, $TaSi_2$, VSi_2, $HfSn_2$, WAl_2, WSi_2
REZn_2, Al_2Sr	C42	C42 Prototype-CeCu2	Al_2Sr, *RE*Zn_2 (with all *RE*), $BaZn_2$, $SrZn_2$, *RE*Cu_2 (with *RE* = Ce, Nd, Pr, Sm), Ag_2Ba
Si_2Zr	C49	C49 Prototype-Si2Zr	Si_2Zr, Si_2Hf, Sn_2RE (RE = Y, Gd, Tb, Dy, Ho, Er, Tm, Lu)
$TiSi_2$	C54	C54 Prototype-TiSi2	$TiSi_2$, $ZrSn_2$
$NiMg_2$ C_a	Ca	Ca Prototype-NiMg2	$NiMg_2$ with Cu solubility
$CuMg_2$, Mn_2B	Cb	Cb Prototype-$CuMg_2$	$CuMg_2$, Cr_2B, Mn_2B, $NbSn_2$, VSn_2

RESi_2, *RE*$_3Si_5$ *RE*$_6Si_{11}$ C_c	Cc	Cc Prototype-ThSi2	*RE*Si_2 (with RE = Y, La, Ce, Sm, Gd, Dy) *RE*$_3Si_5$ (with RE = Y) *RE*$_6Si_{11}$ (with RE = Pr, Nd, Ho)
$SiPt_3$	D0c	D0c Prototype-SiU3	$SiPt_3$
M$_3$P (*M*=Co,Cr,Fe, Mn,Ni,V), Fe_3B	D0e	D0e Prototype-Ni3P	Co_3P, Cr_3P, Fe_3P, Mn_3P, Ni_3P, V_3P(ht), Fe_3B
Kieftite Sb_3Co	D02	D02 Prototype-As3Co	Sb_3Co
Mg_3*RE,* Zn_3*RE*, β-Ni_3Sn, γ-Cu_3Sn, Cu_3Sb	D03	D03 Prototype-BiF3	Mg_3*RE* (with *RE* = Ce,La,Pr,Nd,Sm,Gd,Tb, Dy,Tm,Lu) Zn_3*RE* (with *RE* = Y,Ce,Nd,Sm,Pr,Gd,Tb,Dy, Er,Ho,Lu,Tm) γ-Cu_3Sn, Sn_3Cu, β-Ni_3Sn, Ni_3Sb, Cu_3Sb, Mn_3Si, Li_3Bi, K_3Bi
Fe_3Si	D03a	D03a Prototype-BiF3	Fe_3Si with Al solubility
Li_2MgSn	D03b	D03b Prototype-BiF3	Li_2MgSn
θ-Fe_3C, **Al_3Ni**	D011	D011 Prototype-Fe3C	Co_3B, Ni_3B, θ-Fe_3C, Mn_3C, Al_3Ni, Y_3Ni, La_3Ni, Ni_3Si, Ni_3Ge
CoY_3	CoY3	D011 Prototype-Fe3C	Co*RE*$_3$ (with RE = Y,La,Pr,Nd,Sm,Gd.Dy, Ho,Er)
Na_3As, Na_3P	D018	D018 Prototype-Na3As	Na_3As, Na_3Bi, Na_3P
α$_2$-Ti_3Al, **Al_3X, X_3Al $D0_{19}$**	D019	D019 Prototype-Ni3Sn	Al_3*RE* (with *RE* = Y,La,Ce,Pr,Nd,Sm,Gd), *RE*$_3$Al (with *RE* = La,Ce,Pr,Nd), Nb_3Al, Ta_3Al, α$_2$-Ti_3Al, Ti_3Ga, Zr_3Al, Ti_3Sn, Ni_3Zr, Ni_3In, Ni_3Sn(lt), Co_3W, Mo_3Al, Mo_3Pt, Mn_3Sn
Cu_3P	D021	D021 Prototype-Cu3P	Cu_3P, Na_3P, K_3Bi
Al_3X $D0_{22}$	D022	D022 Prototype-TiAl3	α-Al_3Hf, Al_3Cr, Al_3Mo, Al_3Nb, Al_3Ta, ε-Al_3Ti, Al_3V, Al_3Zr, Ga_3Ti, Ni_3V, Pt_3V
Al_3Zr $D0_{23}$	D023	D023 Prototype-ZrAl3	Al_3Zr, β-Al_3Hf, Ga_3Zr
Ni_3Ti $D0_{24}$	D024	D024 Prototype-Ni3Ti	Ni_3Ti, Al_3Dy, Au_3Ga
Ag_3Sn $D0_a$	D0a	D0a Prototype-Cu3Ti	Ag_3Sn, Cu_3Sb, γ-Ni_3Mo, Ni_3Nb, Ni_3Sb, Ni_3Ta
$Cr_7C_{3(hT)}$, Mn_7C_3 $D10_1$	D101	D101 Prototype-Mn7C3	Cr_7C_3, Mn_7C_3 with boride solubility
$Cr_7C_{3(lT)}$	D102	D102 Prototype-Th7Fe3	Cr_7C_3
Al_4(Ca,Sr,Ba)	D13	D13 Prototype-Al4Ba	Al_4Ca, Al_4Sr, Al_4Ba, Al_4Eu, Ga_4Sr, Ga_4Ba
Al_2CaZn_2	D13a	D13a Al2CaZn2	Al_2CaZn_2, Al_2*RE*Zn_2 (with *RE* = La,Ce,Pr,Nd)
Al_{11}*RE*$_3$	D13b	D13b Prototype-Al4Ba	Al_{11}*RE*$_3$ (with *RE* = La,Ce,Pr,Nd,Sm)
Al_3Cu*RE*	D13c	D13c Prototype-BaNiSn3	Al_3Cu*RE* (with *RE* = Y,La,Ce)
Sc(Ag,Cu)$_4$	D1a	D1a Prototype-MoNi4	$ScAg_4$, $ScCu_4$, $TiAu_4$, $MoNi_4$, WNi_4
B_4C	D1g	D1g Prototype-B4C	B_4C with Si solubility

$(Ca,Sr,Ba)B_6$	D21	D21 Prototype-CaB6	CaB_6, KB_6, NaB_6, NdB_6, SrB_6, BaB_6
V-phase Mg_2Zn_{11}, $Mg_2Cu_6Al_5$	D22	D22 Prototype-Mg2Zn11	Mg_2Zn_{11}, $Mg_2Cu_6Al_5$
$NaZn_{13}$	D23	D23 Prototype-NaZn13	$NaZn_{13}$, $CaZn_{13}$, $SrZn_{13}$, $BaZn_{13}$, $LaZn_{13}$, $EuZn_{13}$
$Co_{13}La$	D23a	D23 Prototype-NaZn13	$Co_{13}La$
$Mg_{12}RE$, $Zn_{12}RE$ $Al_8(Fe,Cr)_4RE$	D2b	D2b Prototype-Mn12Th	$Mg_{12}RE$ (with *RE* = La,Ce,Pr) $Mn_{12}RE$ (with *RE* = Y,Gd,Tb,Dy,Ho,Er,Tm) $Zn_{12}RE$ (with *RE* = Sc,Y,La,Ce,Pr,Nd,Sm, Pm,Eu,Gd,Tb,Dy,Ho,Er,Tm,Yb,Lu) Al_8Cr_4RE (with *RE* = Y,La,Pr,Nd,Sm, Gd,Ho,Er,Yb) Al_8Fe_4RE (with *RE* = Sc,Y,La,Ce,Pr,Nd,Sm, Gd,Tb,Ho,Tm,Yb,Lu)
$REZn_5$, $(Ca,Sr)Zn_5$, $(Ca,Sr)Cu_5$, $(Sr,Ba)Ag_5$	D2d	D2d Prototype-CaCu5	$REZn_5$ (with *RE* = La,Ce,Eu), $CaZn_5$, $SrZn_5$, $CaCu_5$, $CaNi_5$, $SrCu_5$, $SrAg_5$, $BaAg_5$, $ScNi_5$, $LaNi_5$, $RECo_5$(with *RE* = Sc,Y,Ce,Pr,Nd,Sm, Gd,Dy, Ho,Er)
Al_6Mn, $Al_6(Fe,Mn)$	D2h	D2h Prototype-Al6Mn	Al_6Mn $(Al_6Fe)_{metastable}$
α-$Mg_3(Bi,Sb)_2$	D52	D52 Prototype-La2O3	$Mg_3(Bi,Sb)_2$
β-$Mg_3(Bi,Sb)_2$	D53	D53 Prototype-Mn2O3	$Mg_3(Bi,Sb)_2$
Zn_3P_2	D59	D59 Prototype-Zn3P2	Zn_3As_2, Zn_3P_2
Cr_3C_2	D510	D510 Prototype-Cr3C2	$(Cr,Fe,Ni)_3C_2$ with boron solubility
Al_3Ni_2	D513	D513 Prototype-Al3Ni2	Al_3Ni_2, Al_3Pt_2, Ga_3Pt_2, In_3Ni_2
RE_3Si_2	D5a	D5a Prototype-Si2U3	RE_3Si_2 (with *RE* = La,Ce), Si_2Sc_2Al, Si_2Hf_3, Si_2Zr_3, Ga_2Zr_3, $(Nb,V)_3B_2$, $MoCr_2B_2$
Al_4C_3	D71	D71 Prototype-Al4C3	Al_4C_3 with Si and V solubility
Sb_3RE_4	D73a	D73a Prototype-Th3P4	Sb_3RE_4 (with *RE* = Ce,Nd,Pr,Sm)
Ti_3B_4	D7b	D7b Prototype-Ta3B4	$(Cr,Hf,Mn,Nb,Ta,Ti,V)_3B_4$ with Fe & Mo
Ag_5Zn_8, γ-AlCu	D82	D82 Prototype-Cu5Zn8	$(Ag,Cu,Fe)_5Zn_8$, γ-AlCu, γ-NiZn, ε-$Al_8(Cr,Fe,V)_5$
Ga_6V_7	D82a	D82 Prototype-Cu5Zn8	Ga_6V_7
Cu_9Al_4, '$InAg_2$'	D83	D83 Prototype-Cu9Al4	γ-Cu_9Al_4, γ-Co_9Zn_4, In_5Ag_8
$Cr_{23}C_6$, τ-$Ni_{20}Al_3B_6$	D84	D84 Prototype-Cr23C6	τ-$Ni_{20}Al_3B_6$, $Cr_{23}C_6$, $Mn_{23}C_6$ with boron solubility
Fe_7W_6	D85	D85 Prototype-Fe7W6 (Frank-Kasper)	$(Co,Fe)_7(Mo,Nb,Ta,W)_6$ with Mn, Ni and Ti solubility
ε-$Cu_{15}Si_4$	D86	D86 Prototype-Cu15Si4	ε-$Cu_{15}Si_4$
Mn_5Si_3, **Ti_5Si_3**, Ti_5Sn_3	D88	D88 Prototype-Mn5Si3	RE_5Si_3 and RE_5Sn_3 (with *RE* = Dy,Er,Gd,Ho,Sc,Sm,Tm,Y) Cr_5Si_3, Fe_5Si_3, Mn_5Si_3, Nb_5Si_3, Ta_5Si_3, Ti_5Si_3, V_5Si_3, W_5Si_3, Zr_5Si_3, Ti_5Sn_3, Zr_5Sn_3
Sb_3RE_5	D88b	D88b Prototype-Mn5Si3	Sb_3RE_5 (with RE = Sc,Y,La,Ce,Pr,Nd,Sm,Eu, Gd,Tb,Dy,Ho,Er,Tm,Yb,Lu)

Al_8Mn_5 Al_8Cr_5	D810	D810 Prototype-Al8Cr5	Al_8Mn_5, Al_8Cr_5 with Si, Cu, Fe solubility
$Mn_{23}RE_6$, $Fe_{23}RE_6$, $Mg_{23}Sr_6$, $Li_{23}Sr_6$	D8a	D8a Prototype-Mn23Th6	$Mn_{23}RE_6$ (with RE = Y,Gd,Sc,Pr,Nd,Sm,Tb, Dy,Ho,Er,Tm,Lu) $Fe_{23}RE_6$ (with RE = Y,Gd,Tb,Dy,Ho,Er,Tm) $Mg_{23}Sr_6$, $Li_{23}Sr_6$, $Co_{23}(Hf,Zr)_6$
σ-FeCr, σ-AlNb, σ-AlTa, σ-MnV, σ-NiV, σ-FeMo	D8b	D8b Prototype-FeCr	σ-FeCr, intermetallic phases in Al-Mo-Nb-Ta and Mn-Ni-V-W
Al_9Co_2	D8d	D8d Prototype-Al9Co2	Al_9Co_2 with Cr, Fe, Ni solubility
T-phase, Tau $Mg_{32}(Al,Zn)_{49}$	D8e	Tau Prototype-Mg32(Al,Zn)49	Ternary phases in Mg-Al-Cu-Zn-(Ag)
$Mg_5(Ga,In)_2$	D8g	D8g Prototype-Ga2Mg5	$Mg_5(Ga,In)_2$
B_2W or W_2B_5	D8h	D8h Prototype-B2W	$W_2(B,Va)_5$
$(Mo,V)_2B_5$	D8i	D8i Prototype-Mo2B5	$(Mo,V)_2B_5$
RE_5Si_3 D8$_l$ Cr_5B_3	D8l	D8l Prototype-Cr5B3	RE_5Si_3 (with *RE* = La,Ce,Pr,Nd) Ca_5Si_3, Sr_5Si_3, Ca_5Sn_3, Sr_5Sn_3, Ca_5Zn_3, Sr_5Pb_3, Ca_5Ag_3, Cr_5B_3 (with Fe and Mo substitution)
Cr_5Si_3, La_5Sn_3	D8m	D8m Prototype-W5Si3	$(Cr,Mo,Nb,V,W)_5Si_3$ RE_5Sn_3 (with *RE* = La,Ce,Pr)
$FeZr_3$, $CoZr_3$	E1a	E1a Prototype-FeZr3	$(Co,Fe)Zr_3$
$(Fe,Mn,Ti)_3AlC$	E21	E21 Prototype-CaTiO3	$(Fe,Mn,Ti)_3AlC$
Al_7Cu_2Fe, Al_7CuMn_2	E9a	E9a Prototype-Al7Cu2Fe	Al_7Cu_2Fe, Al_7CuMn_2, τ_9-Al_7Cu_2Zr
$(Co,Fe,Mo,Ni)_3W_3C$	E93	E93 Prototype-Fe3W3C	$(Co,Fe,Mo,Ni)_3W_3C$
Al_4SiC_4, Al_5C_3N	E94	E94 Prototype-Al5C3N	Al_4SiC_4, Al_5C_3N
γ-AlTi, MgIn, $L1_0$	L10	L10 Prototype-AuCu	AlTi, MgIn, GaTi, CoPt, α-MnNi, NiPt
CuPt $L1_1$	L11	L11 Prototype-CuPt	CuPt
Al_3M, Al_3RE $L1_2$	L12	L12 Prototype-AuCu3	Al_3RE with (*RE* = Sc,Er,Tm,Yb,Lu) metastable Al_3M (with *M* = Cr,Cu,Li,Mg,Ti, V,Zr), Pb_3RE (*RE* = Dy,Nd,Pr,Tb), Sn_3RE (*RE* = Ce,Dy,Er,Gd,Ho,Nd,Pr,Sm,Y,Yb), Pt_3Ti
$AlRE_3$ $L1_2$	L12b	L12b Prototype-AuCu3	$AlRE_3$ with (*RE* = Sc,Ce,Pr), $SnRE_3$ (*RE* = Ce,Pr)
$Ni_3(Al,Fe,Si)$ $L1_2$	L12c	L12-FCC!FCC-A1	Ag_3Mg, Ni_3Al, Ni_3Fe, Ni_3Si, Si_3Ni, Ni_3Ge
$MgIn_3$, $InMg_3$ $L1_2$	L12d	L12d Prototype-AuCu3	$MgIn_3$, $InMg_3$, $InAg_3$
Pt_3Ga, Pt_3Ge, Ni_3Ga	L12e	L12e Prototype-AuCu3	Pt_3Ga, Pt_3Ge, Ni_3Ga
$AlCu_2Mn$, $AlNi_2(Hf,Ti)$	L21	Heusler Prototype-AlCu2Mn	$AlCu_2Mn$, $AlNi_2(Hf,Ti)$
TiH_2(low-T), ZrH_2	L'2	L'2 Prototype-TiH2	TiH_2(low-T), ZrH_2, $SiPt_2$
$AgMg_3$	AMg3	cF264 Prototype-AgMg3	$AgMg_3$ with Al, In, Sn solubility
$Al_{11}Mn_4$(low-T)	aP15	aP15 Prototype-Al11Mn4	$Al_{11}Mn_4$(low-T), $Al_{11}Cr_4$ with Fe solub.
ξ-Al_2Fe	aP18	aP18 Prototype-Al2Fe	ξ-Al_2Fe
La_2Sn_3	aP20	aP20 Prototype-Nd2Sn3	RE_2Sn_3 (with *RE* = La,Pr,Sm)

$(Al,In)_3Ca_8$	aP22	aP22 Prototype-Ca8In3	$(Al,In)_3Ca_8$
Cu_7In_3	aP40	aP40 Prototype-Cu7In3	Cu_7In_3
τ_3-*RE*$MgZn_2$	cF16	Tao3 Prototype-MnCu2Al	*RE*$MgZn_2$ (with *RE* = La,Ce,Nd,Sm, Pr,Gd,Ho,Tb,Er,Tm,LuY,Dy)
Ti_2Co, Ti_2Ni, Hf_2Co	cF96	cF96 Prototype-Ti2Ni	Ti_2Co, Ti_2Ni, Hf_2Co, Sc_2Ni, Hf_2Fe
$Al_{69}Ta_{39}$	C432	cF432 Prototype-Ta39Al69	$Al_{69}Ta_{39}$
$Al_{12}Mn$, $Al_{12}W$	cI26	cI26 Prototype-Al12W	$Al_{12}(Mn,Mo,W)$ ($Al_{12}Fe$-metastable)
$(Co,Fe,Mn)_4N$	cP5	cP5 Prototype-Fe4N	$(Co,Fe,Mn)_4N$ with Cr, Ni, C substitution
Al_7Sr_8	cP60	cP60 Prototype-Ba8Ga7	Al_7Sr_8, $Ga_7(Sr,Ba)_8$
K(Ge,Si)	cP64	cP64 Prototype-KGe	KGe, KSi
CaAlSi, SrAlSi	hP3_	hP3 Prototype-AlB2	CaAlSi, SrAlSi
δ-CuZn	hP3	CuZn_delta	δ-CuZn with Ag solubility
$(Ca,Sr,Y)Al_2Si_2$	hP5	hP5 Prototype-Ce2SO2	$(Ca,Sr,Y)Al_2Si_2$
Fe_2Si	hP6	hP6 Prototype-Ni2Al	Ni_2Al, Fe_2Si
BaCu, SrCu	hP8	hP8 Prototype-BaCu	(Sr,Ba)Cu with Ca solubility
Cu_6Y	hP8_	hP8 Prototype-TbCu7	"Cu_6Y"
M_2AlC	hP8c	MAX Prototype-Cr2AlC	M_2AlC (*M* = Cr, Ti, Nb, V)
LiB	hP8*	hP8 Prototype-LiB	LiB
δ-WC, η-MoC	hP12	eta-MoC	δ-WC, η-MoC with Ta and V solub.
Ti_5Ga_4	hP18	hP18 Prototype-Ti5Ga4	Ti_5Ga_4, Zr_5Al_4, Zr_5Ga_4
Co_3RE_4	hP22	hP22 Prototype-Co_3Ho_4	Co_3RE_4 (with *RE* = Y,Gd,Ho)
Ti_6Sn_5, V_6Ga_5	H22P	hP22 Prototype-Ti6Sn5	Ti_6Sn_5, V_6Ga_5
β-AlMnSi	hP26	AlMnSi_beta	β-AlMnSi
Zn_5RE	hP36	hP36 Prototype-ErZn5	Zn_5RE (with *RE* = Er,Ho,Lu,Tm,Y)
$Mg_{17}Sr_2$, $(Mg,Fe,Zn,Co)_{17}RE_2$	hP38	hP38 Prototype-Ni17Th2	$Mg_{17}Sr_2$, $Mg_{17}RE_2$ (with *RE* = La,Ce,Eu, Gd,Tb,Dy,Ho,Er,Tm,Yb,Lu,Sc,Y) $Zn_{17}RE_2$ (with *RE* = La,Ce,Eu,Gd,Tb, Dy,Ho,Er,Tm,Yb,Lu,Sc,Y) $Fe_{17}RE_2$ (with *RE* = La,Ce,Eu,Gd,Tb, Dy,Ho,Er,Tm,Yb,Lu,Sc,Y) $Co_{17}RE_2$ (with *RE* = Er – metastable : Ce,Pr,Nd,Sm,Gd,Dy,Ho)
$Co_{11}Ce_{24}$	hP70	Co11RE24 Prototype-Co11Ce24	$Co_{11}Ce_{24}$ with Nd solubility
$Mg_{38}Sr_9$	hP94	hP94 Prototype-Mg38Sr9	$Mg_{38}Sr_9$ with Al and Ca solubility
SbSn	hR3	hR3 Prototype-"SbSn"	SbSn with Pb and Bi solubility
Fe_3RE, Ni_3Y, Co_3RE	hR12	hR12 Prototype-Ni3Pu	Fe_3RE (with *RE* = Y,Sm,Tb,Dy,Er,Tm,Lu), Co_3RE (with *RE* = Y,Ce,Pr,Nd,Sm,Gd,Dy, Ho,Er), Ni_3Y
$(Al,Ga,In)_2Li_3$	h15R	hR15 Prototype-Al2Li3	$(Al,Ga,In)_2Li_3$
V_4C_3 ($V_4C_{2.65}$, 'V_3C_2')	hR21	hR21 Prototype-Sn4P3	V_4C_3
Fe_3Gd, Fe_3Ho	hR36	hR36 Prototype-Be3Nb	Fe_3RE (with *RE* = Gd,Ho)

Al_5Mo	h36R	h36R Prototype-MoAl5	Al_5Mo with Fe solubility
Mg_3In	hR48	hR48 Prototype-Mg3In	Mg_3In
RE_2Co_7	hR54	hR54 Prototype-Gd_2Co_7	RE_2Co_7 (with *RE* = Y,La,Ce,Pr,Nd,Sm,Gd, Dy,Ho,Er)
$Zn_{17}RE_2$, $Co_{17}RE_2$	hR57	hR57 Prototype-Th2Zn17	$Zn_{17}RE_2$, $Fe_{17}RE_2$ (with *RE* = Gd,Nd,Pr,Sm), $Co_{17}RE_2$ (with *RE* = Y,Ce,Pr,Nd,Sm,Gd,Dy, Ho)
Al_3Ho, Al_3Dy	hR60	hR60 Prototype-HoAl3	Al_3Ho, Al_3Dy
$Co_{19}RE_5$	hR72	hR72 Prototype-Ce_5Co_{19}	$Co_{19}RE_5$ (with *RE* = La,Ce,Pr,Nd,Sm)
Ni_7Zr_2, Co_7Nb_2	mC18	mC18 Prototype-Ni7Zr2	Ni_7Zr_2, Co_7Nb_2
Mo_3Al_8	mC22	mC22 Prototype-Mo3Al8	Mo_3Al_8 with Ga, Si, Ti solubility
ζ-$Zn_{13}Fe$, γ_2-$Zn_{13}Co$	mC28	mC28 Prototype-Zn13Co	ζ-$Zn_{13}Fe$, γ_2-$Zn_{13}Co$
Ni_5Sb_2	m28C	mS28 Prototype-Ni5Sb2	Ni_5Sb_2
Al_4Mo, Al_4W	mC30	mC30 Prototype-Al4W	Al_4Mo, Al_4W with Fe solubility
β-AlFeSi (τ_6)	mC52	AlFeSi_beta	β-AlFeSi (τ_6)
$(Ag,Cu)P_2$	mP12	mP12 Prototype-CuP2	$(Ag,Cu)P_2$
$ZnAs_2$	mP24	mP24 Prototype-ZnAs2	$ZnAs_2$, β-ZnP_2
$RE_{12}Co_7$	mP38	mP38 Prototype-$Ho_{12}Co_7$	$RE_{12}Co_7$ (with *RE* = Dy,Ho,Er)
Co_5Y_8	mP52	mP52 Prototype-Co5Y8	Co_5Y_8
$(Al,Ga,In)_2Li_3$	mP86	mP86 Prototype-Ta22Al21	$Ta_{22}Al_{21}$
'Al_3Fe'	m102	mC102 Prototype-Al13Fe4	$Al_{13}Fe_4$, $Al_{13}Co_4$
Mg_2Zn_3	m110	Mg2Zn3	Mg_2Zn_3 with Al and Cu solubility
Ni_3Sn_4	mC14	mS14 Prototype-Ni3Sn4	Ni_3Sn_4 with Cu solubility
$Pt_3(Ge,Si)$	mS16	mS16 Prototype-Pt3Ge	Pt_3Ge, Pt_3Si(lt) with Ga solubility
η_2-AlCu, θ-InCu	mS20	eta2 Prototype-AlCu	η_2-AlCu, θ-InCu, InPt
GeAs, SiAs	mS24	mS24 Prototype-SiAs	(Ge,Si)(As,P)
Hägg χ-Fe_5C_2	mS28	Haegg Prototype-Mn5C2	χ-Fe_5C_2, Mn_5C_2 with B, Mn, V substitution
Co_2Sm_5	m28S	Co2RE5 Prototype-Mn5C2	Co_2RE_5 (*RE* = Sm,Pr,Nd)
$MoAl_3$	mS32	mS32 Prototype-MoAl3	$MoAl_3$ with Fe solubility
ζ'-$Ni_{13}In_9$	mS44	mS44 Prototype-Ni13Ga9	ζ'-$Ni_{13}In_9$, $Ni_{13}Ga_9$, $Pt_{13}In_9$
$Al_{14}Ca_{13}$	mS54	mS54 Prototype-Al14Ca13	$Al_{14}Ca_{13}$
AlLa, AlCe	oC16	oC16 Prototype-AlCe	AlLa, AlCe
V_2B_3, Nb_2B_3	oC20	oC20 Prototype-V2B3	V_2B_3, Nb_2B_3 with Cr and Fe solubility
***RE*Fe_2Al_{10}**	oC52	oC52 Prototype-YbFe2Al10	$REFe_2Al_{10}$ (with *RE* = Y,La,Ce,Pr,Nd,Sm, Gd,Tb,Dy,Ho,Er,Tm,Yb,Lu)
Al_3Zr_2	oF40	oF40 Prototype-Al3Zr2	$(Al,Ga)_3(Hf,Zr)_2$
$(Cr,Mo,V)Ni_2$	oI6	oI6 Prototype-MoPt2	$(Cr,Mo,V)Ni_2$, $MoPt_2$, VPt_2
$RESi_2$, RE_3Si_5, RE_5Si_9	oI12	oI12 Prototype-GdSi2	$RESi_2$ (with *RE* = Sm,Gd,Tb,Dy) RE_3Si_5 (with *RE* = La,Ce) RE_5Si_9 (with *RE* = Pr,Nd,Ho)

α-Al_2Sr	o12I	oI12 Prototype-KHg2	α-Al_2Sr, Ga_2Sc, Cu_2Pr, Cu_2Sm
α-Ti_6Sn_5	oI44	oI44 Prototype-Ti6Sn5	$(Nb,Ti)_6Sn_5$
$Al_{11}RE_3$, $Zn_{11}RE_3$	oI28	oI28 Prototype-Al11La3	$Al_{11}RE_3$ (with *RE* = La,Ce,Pr,Nd,Sm) $Zn_{11}RE_3$ (with *RE* = Y.Ce,Pr,Nd,Sm,Dy,Gd, Tb,Yb)
α-PtTi	oP4	oP4 Prototype-AuCd	α-PtTi
Ag_3Sb	oP4a	oP4 Prototype-Ag3Sb	Ag_3Sb with Au solubility
CaMgSi	oP12	oP12 Prototype-TiNiSi	CaMgSi
Al*RE*	oP16	oP16 Prototype-AlEr	Al*RE* (with RE = Pr,Nd,Sm,Gd,Tb,Dy,Ho, Er,Tm,Lu)
Cu_4Ti	oP20	oP20 Prototype-ZrAu4	β'-Cu_4Ti
$(Co,Mn,Ni)_3Sn_2$	o20P	oP20 Prototype-Ni3Sn2	$(Co,Mn,Ni)_3Sn_2$ with Au solubility
Co_2Y_3	C2Y3	Co2RE3 Prototype-Co2Y3	Co_2Y_3 with REE solubility
$SiAs_2$, $GeAs_2$, SiP_2	oP24	oP24 Prototype-GeAs2	$(Ge,Si)(As,P)_2$
$BaSi_2$, $SrGe_2$	o24P	oP24 Prototype-BaSi2	$BaSi_2$, $SrGe_2$
$(Ce,Sm)Cu_6$	oP28	oP28 Prototype-CeCu6	$CeCu_6$, $SmCu_6$
RE_5Si_4, RE_5Sn_4	oP36	oP36 Prototype-Sm5Ge4	RE_5Si_4 (with *RE* = Y,Tb,Dy,Ho,Er,Tm,Lu) RE_5Sn_4
Ca_7Sn_6, Ca_7Ge_6	oP52	oP52 Prototype-Ca7Sn6	Ca_7Sn_6, Ca_7Ge_6 with Si solubility
δ-NiMo	oP56	NiMo-delta	δ-NiMo with solubility of Cr, Fe, W
CoY, NiZr	oS8	oS8 Prototype-TlI	CoY, GaCa, GaSc, GeSr, NiLa, NiZr, PbSr
$ZrGa_2$, $(Nd,Pr)Sn_2$	oS12	oS12 Prototype-ZrGa2	$ZrGa_2$, $(Pr,Nd,Sm)Sn_2$
α-$GdSn_3$	oS16	oS16 Prototype-GdSn3	α-$(Y,Gd,Ho,Er,Tm)Sn_3$
Pt_5Ga_3, Ni_3Ga_3	o16S	oS16 Prototype-Pt5Ga3	Pt_5Ga_3, Ni_3Ga_3
$LaZn_4$	oS20	oS20 Prototype-LaZn4	$LaZn_4$ with Mg solubility
Co_3La_2	o20S	Co3RE2 Prototype-La2Ni3	Co_3La_2 with REE solubility
$(Ce,Nd,Pr,Sm)Sb_2$	oS24	oS24 Prototype-SmSb2	$(Ce,Nd,Pr,Sm)Sb_2$
α-Tb_3Sn_7, α-Dy_3Sn_7, Pr_3Sn_7, Sm_3Sn_7,	oS28	oS28 Prototype-Tb3Sn7	$(Pr,Sm,Tb,Dy)_3Sn_7$
RE_3Sn_5	oS32	oS32 Prototype-Pu3Pd5	RE_3Sn_5 (with *RE* = La,Ce,Pr,Nd)
Li_7Sn_2	oS36	oS36 Prototype-Li7Ge2	Li_7Sn_2
β-$FeSi_2$	oS48	Luobusaite Prototype-FeSi2	β-$FeSi_2$ with Al solubility
'$Ni_{10}Zr_7$'	oS68	oS68 Prototype-Zr7Ni10	'$Ni_{10}Zr_7$'
$(Ce,Nd,Pr,Sm)_2Sb$	tI12	tI12 Prototype-La2Sb	$(Ce,Nd,Pr,Sm)_2Sb$
$Ni_8(Nb,Ta)$	tI18	tI18 Prototype-Pt8Ti	$Ni_8(Nb,Ta)$
η-Al_2Ti	tI24	tI24 Prototype-HfGa2	η-Al_2Ti, Ga_2Ti, Pb_2Pr, Pb_2Nd, Al_2Mg-metastable
ε-Al_3Ti(lt)	tI32	tI32 Prototype-$TiAl_3$	ε-Al_3Ti(lt) with Si solubility
$Zn_{11}RE$, $CaZn_{11}$	tI48	tI48 Prototype-BaCd11	$Zn_{11}RE$ (with *RE* = La,Ce,Pr,Nd,Yb), $CaZn_{11}$
$RE_{11}Sn_{10}$	tI84	tI84 Prototype-Ho11Ge10	$RE_{11}Sn_{10}$ (with *RE* = Y,La,Ce,Pr,Nd,Sm, Gd,Tb,Dy,Ho,Er,Tm,Yb,Lu)
$Mg_{41}RE_5$	tI92	tI92 Prototype-Mg41Ce5	$Mg_{41}RE_5$ (with *RE* = La,Ce,Pr,Nd,Sm)
$Zn_3(As,P)_2$	i160	tI160 Prototype Cd3As2	$Zn_3(As,P)_2$

α-$FeSi_2$(high-T)	tP3	Ferdisilicite Prototype-FeSi2	α-$FeSi_2$(high-T) with Al solubility
Pt_3Al	tP16	tP16 Prototype-Pt3Ga	Pt_3Ga(ht), Pt_3Al
Al_2RE_3, Al_2Zr_3	tP20	tP20 Prototype-Al2Zr3	Al_2RE_3 (with *RE* = Y,Gd,Tb,Dy,Ho, Er,Tm,Lu), $Al_2(Hf,Zr)_3$, Li_2Sr_3, Zn_2Zr_3
ζ-Al_5Ti_2	tP28	tP28 Prototype Al_5Ti_2	ζ-Al_5Ti_2 with Nb solubility
Ti_3P, Ti_3Si	tP32	tP32 Prototype-Ti3P	M_3P (with *M* = Hf,Ta,Ti,V,Zr) X_3Si (with *X* = Nb,Ta,Ti,Zr)
RE_5Si_4, $(Hf,Ti,Zr)_5Si_4$	tP36	tP36 Prototype-Zr5Si4	RE_5Si_4 (with *RE* = Sc,La,Ce,Pr,Nd,Pm,Sm, Gd), $(Hf,Ti,Zr)_5Si_4$
β-Al_3Mg_2	Beta	Beta Prototype-Mg28Al45	β-Al_3Mg_2 with Li, Zn solubility
η-Al_5Fe_2	Eta	Eta Prototype-Al5Fe2	η-Al_5Fe_2 with Mn, Zn solubility
ϕ-$Mg_6(Al,Zn)_5$	Phi	Phi AlMgZn	ϕ-$Mg_6(Al,Zn,Cu)_5$
ζ-AlCu or ζ-Al_9Cu_{11}	Zeta	Zeta Prototype-AlCu	ζ-Al_9Cu_{11}
***E*-phase $Al_{18}Cr_2Mg_3$ $Al_{20}(Cr,Ti,V)_2RE$, $Zn_{22}Zr$, $CaCr_2Al_{20}$**	E	E Prototype-CeCr2Al20	$Al_{18}Cr_2Mg_3$, $Al_{18}Mn_2Mg_3$, $Al_{18}Mo_2Mg_3$, $Al_{18}Ta_2Mg_3$, $Al_{18}Ti_2Mg_3$, $Al_{18}V_2Mg_3$, $Al_{18}W_2Mg_3$ $Al_{20}(Cr,Ti,V)_2RE$, $CaCr_2Al_{20}$, $Zn_{22}Zr$
Q-$Al_3Cu_2Mg_9Si_7$	Q	Q Prototype-Th7S12	$Al_3Cu_2Mg_9Si_7$
P phase	P	P phase	CrMoNi with Fe solubility
P1 phase	P1	P1 phase M3Ca2	$(Mg,Cu)_3Ca_2$
P2 phase	P2	P2 phase MCu3	$(Mg,Ca)Cu_3$
R phase	R	R phase	$(Co,Fe,Ni)_{27}W_{14}(Co,Cr,Fe,Ni,W)_{12}$
***S*-Al_2CuMg**	S	S Prototype-Al2CuMg	*S*-Al_2CuMg (ordered E1a)
X-*RE*$ZnMg_{12}$	X	X LPSO-18R	*RE*$ZnMg_{12}$ (with *RE* = Y,Gd,Dy,Tb,Ho,Er, Tm, Lu) Long-Period-Stacking-Order
μ-Al_4Mn, Al_4Cr	Al4M	Al4Mn	Al_4Mn, Al_4Cr (metastable Al_4Fe)
'Al$_3$Mn(ht)'	A3M_	oP156 Prototype-Al11Mn4	$Al_{29}Mn_{10}$(high-T)
$Al_{11}Cr_2$	AlCr	Al11Cr2	$Al_{11}Cr_2$ with Mn solubility
α-AlFeSi, τ_5	Tau5	AlFeSi_alpha	stoichiometry ~Al_7Fe_2Si (chinese script/rods)
γ-AlFeSi, τ_2	Tau2	AlFeSi_gamma	stoichiometry τ_2~Al_3FeSi
α-AlMnSi	AlM1	AlMnSi_alpha	stoichiometry τ_9~Al_9Mn_2Si
α-AlFeMnSi	AFMS	AlFeMnSi_alpha	stoichiometry ~$Al_{18}(Fe,Mn)_4Si_3$
'MgZn' or $Mg_{12}Zn_{13}$	MgZn	Mg12Zn13	$Mg_{12}Zn_{13}$ with Cu and Al solubility
δ-AlCu or δ-Al_2Cu_3	Dlta	AlCu_delta	δ-Al_2Cu_3 with Zn solubility
η_1-AlCu	EtaH	Eta1 Prototype-AlCu	η_1-AlCu with Zn solubility
γ-AlCu(high-T)	Gam5	gamma Prototype-AlCu	γ-Al_4Cu_9(high-T) with Zn solubility
τ-AlCuZn	Tau_	AlCuZn_Tau	τ-$Al_9Cu_9Zn_2$ (approx.)
B_3Si	B3Si	B3Si	~B_3Si
B_6Si	B6Si	B6Si	~B_6Si
$B_{10}Si$	B_nS	B_nSi	~$B_{10}Si$

β-Zn_3Li_2	Li2Z	Zn3Li2	β-Li_2Zn_3
I-phase *RE*Zn_6Mg_3	Fm53	I REZn6Mg3	*RE*Zn_6Mg_3 (with RE = Y,Gd,Tb,Dy,Ho, Er,Tm, Lu)
$Mg_3Ce_2Zn_3$	MgCZ	Mg3Ce2Zn3	~$Mg_3Ce_2Zn_3$
σ-CrMn	HSig	High_Sigma	~Cr_2Mn_7
pre-β'' AlMgSi	prB2	pre-B''	complex AlMgSi FCC monoclinic
β'' AlMgSi	B''	B''	complex AlMgSi non-FCC monoclinic
U2 $Mg_4Si_xAl_y$	Pnma	U2	complex AlMgSi orthorhombic
β' $Mg_9Si_7Al_3$	P_6	B'	complex AlMgSi hexagonal
$Ca(Mg,Zn)_5$	IM1	IM1-CaMgZn	$CaMg_4Zn$, $CaMgZn_4$
Mg_5Gd, Mg_5Sm	Mg5X	cF448 Prototype-Mg5Gd	Mg_5Gd, Mg_5Sm
$(Li,Mg)_{17}Sn_4$	L17X	cF420 Prototype-Li17Pb4	$Li_{17}Sn_4$ with Mg solubility
γ-$AgMg_4$	hP_G	AgMg4 gamma_hp	γ-$AgMg_4$
$Ag_{17}Mg_{54}$	A17M	oP142 Prototype-Hf54Os17	$Ag_{17}Mg_{54}$
Li_2Ag	L2A	Prototype-Li2Ag	~Li_2Ag
Li_3Ag	L3A	Prototype-Li3Ag	~Li_3Ag
Li_6Ag	L6A	Prototype-Li6Ag	~Li_6Ag
REZn_3	Pmna	oP16 Prototype-YZn3	*RE*Zn_3 (with *RE* = Ce,Dy,Er,Gd,Ho,Lu, Nd,Pr, Sm,Tb,Tm,Pm,Y)
Zn_{58}*RE*$_{13}$	hex5	hP142 Prototype-Cd58Gd13	Zn_{58}*RE*$_{13}$ (with *RE* = Y,Sc,Ce,Pr,Nd,Sm,Gd, Tb,Dy,Ho,Er,Tm,Yb,Lu,Pm)
Zn_{22}*RE*$_3$	Z22X	tI100 Prototype-Pu3Zn22	Zn_{22}*RE*$_3$ (with *RE* = La,Ce,Pr,Nd,Sm,Pm, Gd)
Al_3Tb, β-Al_3Y	A3RE	hR12 Prototype-BaPb3	Al_3Tb, β-Al_3Y
τ_1-$Ce_3Zn_9Mg_2$	Tao1	Tau Prototype-Al11La3	τ_1-$Ce_3Zn_9Mg_2$
τ_2-$(Ce,Nd)_2Zn_{45}Mg_{53}$	Tao2	Tao2	τ_2-$(Ce,Nd)_2Zn_{45}Mg_{53}$
τ_4-*RE*$_2Mg_5Zn_9$	Tao4	Tau4 RE2Zn9Mg5	*RE*$_2Mg_5Zn_9$ (with *RE* = Ce,Nd,Pr,Sm,Dy)
τ_5-*RE*$_3Zn_{30}Mg_{13}$	Tao5	Tau5 RE3Zn30Mg13	*RE*$_3Zn_{30}Mg_{13}$ (with *RE* = Y,Ce,Nd,Pr,Sm,Dy)
τ_7-$Ce_{20}Zn_{81}Mg_{19}$	Tao7	Tao7	τ_7-$(Ce,Nd)_{20}Zn_{81}Mg_{19}$
$Al_9(Co,Fe,Ni)_2(Sr,Ba)$	A9ME	hP12 Prototype-Al9Co2Sr	$Al_9(Co,Fe,Ni)_2(Sr,Ba)$
$(Y,Yb)Zn_2$	RZ2L	ReZn2(LT)	$(Y,Yb)Zn_2$ (low-T)
$(Co,Fe)_6W_6C$	M12C	cF104 Prototype-Fe6W6C	$(Co,Fe)_6W_6C$ with Mo solubility
$Mn_{11}Si_{19}$	NCL1	tP20 Prototype-Mn11Si19	$Mn_{11}(Si,Al)_{19}$ Nowotny Chimney Ladder Phase
$Al_{63}Mo_{37}$	AM8	AM8 Al63Mo37	$Al_{63}Mo_{37}$ with Ti solubility
"As_3P_2" or "AsP"	AsP	AsP-orthorhombic	~"As_3P_2"
γ_1-FeZn	Gam1	FeZn-Gamma-1	$Fe_7(Fe,Zn)_6Zn_{38}$
δ_1-FeZn	FeZ2	FeZn-delta-1	$Fe(Al,Fe,Zn)_3Zn_{13}$
$Co_{11}(Hf,Zr)_2$	gam8	gamma-ortho	$Co_{11}(Hf,Zr)_2$
Co*RE*$_3$	CoY3	CoY3 Prototype-Fe3C	Co*RE*$_3$ (*RE* = Y,La,Pr,Nd,Sm,Gd,Tb,Dy,Ho, Er,Tm)
M$_4$$AlC_3$	MAX2	MAX2 Prototype-CsYb3Se4	$(Cr,Nb,Ti,V)AlC_3$

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Table 3: Pure compounds and their phases in the FTlite 8.3 Database

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FTlite database
2145 compounds,  2621 phases

Ag                          FTLITE   S1   S2   S3   S4   S5   L
Ag2Ba                       FTLITE   S
Ag2Ba3                      FTLITE   S
Ag2Ca                       FTLITE   S
Ag2Ga                       FTLITE   S
Ag2O                        FTLITE   S
Ag2Sc                       FTLITE   S
Ag2Sr                       FTLITE   S
Ag2Sr3                      FTLITE   S
Ag2Y                        FTLITE   S
'Ag3Be8'                    FTLITE   S                                   (Ag)2.97(Be)8.03
Ag3Ca5                      FTLITE   S
Ag3Ga2                      FTLITE   S
Ag3P11                      FTLITE   S
Ag3Sb                       FTLITE   S
Ag4Sc                       FTLITE   S
Ag4Sr                       FTLITE   S
Ag51Y14                     FTLITE   S
Ag5Ba                       FTLITE   S
Ag5Sr                       FTLITE   S
Ag5Sr3                      FTLITE   S
Ag7Ca2                      FTLITE   S
Ag9Ca2                      FTLITE   S
AgBa                        FTLITE   S
AgCa                        FTLITE   S
AgCa3                       FTLITE   S
AgCu4Zr                     FTLITE   S
AgMg4                       FTLITE   S
AgP2                        FTLITE   S
AgSc                        FTLITE   S
AgSr                        FTLITE   S
AgTi2                       FTLITE   S
AgY                         FTLITE   S
AgZr                        FTLITE   S
AgZr2                       FTLITE   S
Al                          FTLITE   S1   S2   S3   S4   S5   S6   S7   ...  L1   L
Al10V                       FTLITE   S
Al116Cr63Si21               FTLITE   S
Al11Cr2                     FTLITE   S
Al11Cu5Mn3                  FTLITE   S
Al11Fe3Si6                  FTLITE   S
Al11Mn3Zn2                  FTLITE   S
Al11Mn4                     FTLITE   S
Al12Mn                      FTLITE   S
Al12Mo                      FTLITE   S
Al12W                       FTLITE   S
Al13Co4                     FTLITE   S
Al13Cr4Si4                  FTLITE   S
Al14Ca13                    FTLITE   S
Al14Fe3Si3                  FTLITE   S
Al15Cu8Li2                  FTLITE   S
Al17Mo4                     FTLITE   S
Al18Cr2Mg3                  FTLITE   S
Al18Mg3Mn2                  FTLITE   S
Al18Mg3Mo2                  FTLITE   S
Al18Mg3Ta2                  FTLITE   S
Al18Mg3Ti2                  FTLITE   S
Al18Mg3V2                   FTLITE   S
Al18Mg3W2                   FTLITE   S
Al21Pt5                     FTLITE   S
```

Al21Pt8	FTLITE	S			
Al22Mo5	FTLITE	S			
Al23CuFe4	FTLITE	S			
Al23V4	FTLITE	S			
Al2Au	FTLITE	S			
Al2Ba	FTLITE	S1	S2		
Al2Ca	FTLITE	S1	S2		
Al2CaZn2	FTLITE	S			
Al2Cu	FTLITE	S1	S2	S3	
Al2Cu3	FTLITE	S			
Al2CuLi	FTLITE	S			
Al2CuMg	FTLITE	S			
Al2Fe	FTLITE	S			
Al2Hf	FTLITE	S			
Al2Hf3	FTLITE	S			
Al2Li	FTLITE	S1	S2		
Al2Li18Si6	FTLITE	S			
Al2Li3	FTLITE	S			
Al2Mn2Si3	FTLITE	S			
Al2O3	FTLITE	S1	S2	S3	S4
Al2Pt	FTLITE	S			
Al2Sc	FTLITE	S			
Al2Sr	FTLITE	S1	S2		
Al2Ti	FTLITE	S1	S2		
Al2W	FTLITE	S			
Al2Y3	FTLITE	S			
Al2Zr	FTLITE	S			
Al2Zr3	FTLITE	S			
Al30Mg23	FTLITE	S			
Al39Cu33Zr6	FTLITE	S			
Al3BC	FTLITE	S			
Al3Ca8	FTLITE	S			
Al3Co	FTLITE	S			
Al3Cr	FTLITE	S1	S2		
Al3Cu	FTLITE	S			
Al3Cu2	FTLITE	S			
Al3CuCe	FTLITE	S			
Al3CuLa	FTLITE	S			
Al3Hf	FTLITE	S1	S2		
Al3Hf2	FTLITE	S			
Al3Hf4	FTLITE	S			
Al3Li	FTLITE	S1	S2	S3	
Al3Li15Si6	FTLITE	S			
Al3Li7Si4	FTLITE	S			
Al3Mg	FTLITE	S			
Al3MnSi2	FTLITE	S			
Al3Mo	FTLITE	S			
Al3Nb	FTLITE	S			
Al3Ni	FTLITE	S			
Al3Ni5	FTLITE	S			
Al3Pt2	FTLITE	S			
Al3Pt5	FTLITE	S			
Al3Sc	FTLITE	S			
Al3Ta	FTLITE	S			
Al3Ti	FTLITE	S1	S2	S3	S4
Al3V	FTLITE	S1	S2	S3	
Al3Y	FTLITE	S1	S2		
Al3Zr	FTLITE	S1	S2	S3	
Al3Zr2	FTLITE	S			
Al3Zr5	FTLITE	S			
Al4Ba	FTLITE	S			
Al4C3	FTLITE	S			
Al4C4Si	FTLITE	S			
Al4Ca	FTLITE	S			
Al4Ce	FTLITE	S			

Al4Cr	FTLITE	S		
Al4Fe	FTLITE	S		
Al4Li9	FTLITE	S		
Al4MgY	FTLITE	S		
Al4Mn	FTLITE	S		
Al4Mo	FTLITE	S		
Al4Sr	FTLITE	S		
Al4W	FTLITE	S		
Al4Zr5	FTLITE	S		
Al53Mg14Li33	FTLITE	S		
Al57Cu11Li32	FTLITE	S		
Al5Ba4	FTLITE	S		
Al5C3N	FTLITE	S		
Al5Co2	FTLITE	S		
Al5Cu2Mg8Si6	FTLITE	S		
Al5Cu6Mg2	FTLITE	S		
'Al5CuLi3'	FTLITE	S		(Al)4.95(Cu)1.053(Li)2.997
Al5Li	FTLITE	S		
Al5Mo	FTLITE	S		
Al5W	FTLITE	S		
Al63Mo37	FTLITE	S		
Al6Fe	FTLITE	S		
Al6Mn	FTLITE	S		
Al6Ni3Si	FTLITE	S		
Al77W23	FTLITE	S		
Al7Cr	FTLITE	S		
Al7Cu2Fe	FTLITE	S		
Al7Cu2Zr	FTLITE	S		
Al7Cu3Mg6	FTLITE	S		
Al7CuFe2	FTLITE	S		
Al7CuMn2	FTLITE	S		
Al7CuZr2	FTLITE	S		
Al7Sr8	FTLITE	S		
Al7W3	FTLITE	S		
Al8C7B4	FTLITE	S		
Al8C7Si	FTLITE	S		
Al8Cr5	FTLITE	S1	S2	
Al8CrTi3	FTLITE	S		
Al8CrY	FTLITE	S		
Al8EuFe2	FTLITE	S		
Al8FeMg3Si6	FTLITE	S		
Al8Mn4Y	FTLITE	S		
Al8Mo3	FTLITE	S		
Al8V5	FTLITE	S		
Al99Mn23	FTLITE	S		
Al9Co2	FTLITE	S		
Al9Co2Ba	FTLITE	S		
Al9Co2Sr	FTLITE	S		
Al9Cr3Si	FTLITE	S		
Al9Cr4	FTLITE	S1	S2	
Al9Cu11	FTLITE	S		
Al9Fe2Ba	FTLITE	S		
Al9Fe2Sr	FTLITE	S		
Al9Ni2Ba	FTLITE	S		
Al9Ni2Sr	FTLITE	S		
AlAs	FTLITE	S		
AlAu	FTLITE	S		
AlAu2	FTLITE	S		
AlAu4	FTLITE	S		
AlB12	FTLITE	S		
AlB2	FTLITE	S		
AlCa5Zn2	FTLITE	S		
AlCeSi2	FTLITE	S		
AlCo	FTLITE	S		
AlCr2	FTLITE	S		

AlCr2B2	FTLITE	S							
AlCr3B4	FTLITE	S							
AlCu	FTLITE	S1	S2						
AlCu2	FTLITE	S							
AlCu3Mn2	FTLITE	S							
AlH3	FTLITE	S							
AlHf	FTLITE	S							
AlHf2	FTLITE	S							
AlLi	FTLITE	S1	S2						
AlLiSi	FTLITE	S							
AlMg	FTLITE	S							
AlMgAg	FTLITE	S							
AlMgB14	FTLITE	S							
AlMo3	FTLITE	S							
AlN	FTLITE	S1	S2	S3					
AlNaSi	FTLITE	S							
AlP	FTLITE	S							
AlPt	FTLITE	S							
AlPt2	FTLITE	S1	S2						
AlPt3	FTLITE	S							
AlSb	FTLITE	S							
AlSc	FTLITE	S							
AlSc2	FTLITE	S							
AlSc2Si2	FTLITE	S							
AlSn2Zr5	FTLITE	S							
AlTi	FTLITE	S							
AlY	FTLITE	S							
AlY2	FTLITE	S							
AlZr	FTLITE	S1	S2						
AlZr2	FTLITE	S							
AlZr3	FTLITE	S1	S2						
As	FTLITE	S1	S2	S3	S4	S5	L		
'As2Cu5'	FTLITE	S						(As)2.058(Cu)4.942	
AsCu8	FTLITE	S							
AsIn	FTLITE	S							
Au	FTLITE	S1	S2	S3	L				
Au2Bi	FTLITE	S							
Au2Pb	FTLITE	S							
Au2Ti	FTLITE	S							
Au3In	FTLITE	S							
Au3Sn12Co5	FTLITE	S							
'Au4Zn5'	FTLITE	S						(Au)3.96(Zn)5.04	
Au5Zn3	FTLITE	S							
Au7Ga2	FTLITE	S							
Au7Ga3	FTLITE	S							
Au7In3	FTLITE	S							
Au8Al3	FTLITE	S							
'Au8Ga2'	FTLITE	S						(Au)7.89476(Ga)2.10526	
AuGa	FTLITE	S							
AuGa2	FTLITE	S							
AuIn	FTLITE	S							
AuIn2	FTLITE	S							
AuSb2	FTLITE	S							
AuSn	FTLITE	S							
AuSn2	FTLITE	S							
AuSn4	FTLITE	S							
AuTi	FTLITE	S1	S2						
AuTi3	FTLITE	S							
AuZn3	FTLITE	S							
B	FTLITE	S1	S2	S3	S4	S5	S6	S7	L
B2Mo2Ni	FTLITE	S							
B4Nd	FTLITE	S							
B5Nd2	FTLITE	S							
B66Nd	FTLITE	S							
BN	FTLITE	S1	S2						

Ba	FTLITE	S1	S2	S3	L	
Ba10Ga	FTLITE	S				
Ba2Si	FTLITE	S				
Ba2Zn	FTLITE	S				
Ba3Si4	FTLITE	S				
Ba5Ga6	FTLITE	S				
Ba5Si3	FTLITE	S				
Ba8Ga7	FTLITE	S				
BaAl2Si2	FTLITE	S				
BaB6	FTLITE	S				
BaBe13	FTLITE	S				
BaC2	FTLITE	S1	S2			
BaCu	FTLITE	S				
BaCu13	FTLITE	S				
BaGa2	FTLITE	S				
BaGa4	FTLITE	S				
BaGe2	FTLITE	S				
BaH2	FTLITE	S1	S2			
BaSi	FTLITE	S				
BaSi2	FTLITE	S				
BaZn	FTLITE	S				
BaZn13	FTLITE	S				
BaZn2	FTLITE	S				
BaZn5	FTLITE	S				
Be	FTLITE	S1	S2	S3	L	
Bi	FTLITE	S1	S2	S3	S4	L
Bi2K	FTLITE	S				
Bi2K3	FTLITE	S				
Bi3In5	FTLITE	S				
Bi3Ni	FTLITE	S				
Bi4K5	FTLITE	S				
BiIn	FTLITE	S				
BiIn2	FTLITE	S				
BiLi	FTLITE	S				
BiNa	FTLITE	S				
C	FTLITE	S1	S2	L		
Ca	FTLITE	S1	S2	S3	L	
Ca11Ga7	FTLITE	S				
Ca14Si19	FTLITE	S				
Ca25Ga59	FTLITE	S				
Ca28Ga11	FTLITE	S				
Ca2Cu	FTLITE	S				
Ca2Ge	FTLITE	S				
Ca2Mg55Zn43	FTLITE	S				
Ca2Mg5Zn13	FTLITE	S				
Ca2Ni7	FTLITE	S				
Ca2Pb	FTLITE	S				
Ca2Si	FTLITE	S				
Ca2Sn	FTLITE	S				
Ca3Ga5	FTLITE	S				
Ca3Ga8	FTLITE	S				
Ca3Mg3Zn14	FTLITE	S				
Ca3P2	FTLITE	S				
Ca3Si4	FTLITE	S				
Ca3Zn	FTLITE	S				
Ca4Al3Mg	FTLITE	S				
Ca5Ga3	FTLITE	S				
Ca5Ge3	FTLITE	S				
Ca5Pb3	FTLITE	S				
Ca5Si3	FTLITE	S				
Ca5Zn3	FTLITE	S				
Ca7Ge6	FTLITE	S				
Ca7Mg6Si14	FTLITE	S				
Ca7Sn6	FTLITE	S				
CaAl2Si2	FTLITE	S				

CaAlH5	FTLITE	S				
CaB6	FTLITE	S				
CaBe13	FTLITE	S				
CaC2	FTLITE	S1	S2	S3	S4	L
CaCr2Al20	FTLITE	S				
CaCu	FTLITE	S				
CaCu5	FTLITE	S				
CaGa	FTLITE	S				
CaGa2	FTLITE	S1	S2			
CaGa4	FTLITE	S1	S2			
CaGe2	FTLITE	S				
CaH2	FTLITE	S				
CaLi2	FTLITE	S				
CaMgSi	FTLITE	S				
CaNi2	FTLITE	S				
CaNi3	FTLITE	S				
CaNi5	FTLITE	S				
CaO	FTLITE	S				
CaPb	FTLITE	S				
CaPb3	FTLITE	S				
CaSi	FTLITE	S				
CaSi2	FTLITE	S				
CaTi2Al20	FTLITE	S				
CaZn	FTLITE	S				
CaZn11	FTLITE	S				
CaZn13	FTLITE	S				
CaZn2	FTLITE	S				
CaZn3	FTLITE	S				
CaZn5	FTLITE	S				
Ce	FTLITE	S1	S2	S3	S4	L
Ce11Sn10	FTLITE	S				
Ce12Y21Mg67	FTLITE	S				
Ce13Zn58	FTLITE	S				
Ce20Zn81Mg19	FTLITE	S				
Ce2Al	FTLITE	S				
Ce2Fe17	FTLITE	S				
Ce2In	FTLITE	S				
Ce2Mg17	FTLITE	S				
Ce2Mn3Al	FTLITE	S				
Ce2Mn7Al10	FTLITE	S				
Ce2Sb	FTLITE	S				
Ce2Sn5	FTLITE	S				
Ce2Zn17	FTLITE	S1	S2			
Ce2Zn45Mg53	FTLITE	S				
Ce2Zn9Mg5	FTLITE	S				
Ce3Al	FTLITE	S1	S2			
Ce3Al11	FTLITE	S1	S2			
Ce3Ga2	FTLITE	S				
Ce3In	FTLITE	S				
Ce3In5	FTLITE	S				
Ce3Si2	FTLITE	S				
Ce3Si5	FTLITE	S				
Ce3Sn	FTLITE	S				
Ce3Sn5	FTLITE	S				
Ce3Sn7	FTLITE	S				
Ce3Zn11	FTLITE	S				
Ce3Zn22	FTLITE	S				
Ce3Zn30Mg13	FTLITE	S				
Ce3Zn9Mg2	FTLITE	S				
Ce4Sb3	FTLITE	S				
Ce5In4	FTLITE	S				
Ce5Mg41	FTLITE	S				
Ce5Si3	FTLITE	S1	S2			
Ce5Si4	FTLITE	S1	S2			
Ce5Sn3	FTLITE	S1	S2			

Ce5Sn4	FTLITE	S					
Ce6Zn83Mg11	FTLITE	S					
Ce9In11	FTLITE	S					
CeAl	FTLITE	S					
CeAl13Mg6	FTLITE	S					
CeAl2	FTLITE	S					
CeAl3	FTLITE	S1	S2				
CeCr2Al20	FTLITE	S					
CeCr4Al5	FTLITE	S					
CeCu	FTLITE	S					
CeCu2	FTLITE	S					
CeCu4	FTLITE	S					
CeCu4Al8	FTLITE	S					
CeCu5	FTLITE	S					
CeCu6	FTLITE	S					
CeFe2	FTLITE	S					
CeFe2Al10	FTLITE	S					
CeIn2	FTLITE	S					
CeIn3	FTLITE	S					
CeMg	FTLITE	S					
CeMg12	FTLITE	S					
CeMg2	FTLITE	S					
CeMg3	FTLITE	S					
CeMn4Al8	FTLITE	S					
CeSb	FTLITE	S					
CeSb2	FTLITE	S					
CeSi	FTLITE	S					
CeSi2	FTLITE	S					
CeSn3	FTLITE	S					
CeTi2Al20	FTLITE	S					
CeV2Al20	FTLITE	S					
CeZn	FTLITE	S					
CeZn11	FTLITE	S					
CeZn12	FTLITE	S					
CeZn2	FTLITE	S					
CeZn2Al2	FTLITE	S					
CeZn2Mg	FTLITE	S					
CeZn3	FTLITE	S					
CeZn5	FTLITE	S					
Co	FTLITE	S1	S2	S3	S4	S5	L
Co11Ce24	FTLITE	S					
Co11Hf2	FTLITE	S					
Co11Zr2	FTLITE	S					
Co13La	FTLITE	S					
Co16Nb9	FTLITE	S					
Co17Ce2	FTLITE	S					
Co17Dy2	FTLITE	S					
Co17Er2	FTLITE	S					
Co17Gd2	FTLITE	S					
Co17Ho2	FTLITE	S					
Co17La20	FTLITE	S					
Co17Lu2	FTLITE	S					
Co17Nd2	FTLITE	S					
Co17Pr2	FTLITE	S					
Co17Pr20	FTLITE	S					
Co17Sm2	FTLITE	S					
Co17Tb2	FTLITE	S					
Co17Tm2	FTLITE	S					
Co17Y2	FTLITE	S					
Co17Yb2	FTLITE	S					
Co19Ce5	FTLITE	S					
Co19La5	FTLITE	S					
Co19Nd5	FTLITE	S					
Co19Pr5	FTLITE	S					
Co19Sm5	FTLITE	S					

Co23C6	FTLITE	S		
Co23Hf6	FTLITE	S		
Co23Zr6	FTLITE	S		
Co2B	FTLITE	S		
Co2Ce	FTLITE	S		
Co2Dy	FTLITE	S		
Co2Er	FTLITE	S		
Co2Gd	FTLITE	S		
Co2Hf	FTLITE	S		
Co2Ho	FTLITE	S		
Co2Lu	FTLITE	S		
Co2N	FTLITE	S		
Co2Nb	FTLITE	S		
Co2Nd	FTLITE	S		
Co2Nd5	FTLITE	S		
Co2P	FTLITE	S		
Co2Pr	FTLITE	S		
Co2Pr5	FTLITE	S		
Co2Sc	FTLITE	S		
Co2Si	FTLITE	S		
Co2Sm	FTLITE	S		
Co2Sm5	FTLITE	S		
Co2Ta	FTLITE	S1	S2	S3
Co2Tb	FTLITE	S		
Co2Ti	FTLITE	S1	S2	S3
Co2Tm	FTLITE	S		
Co2Y	FTLITE	S		
Co2Yb	FTLITE	S		
Co2Zr	FTLITE	S		
Co3B	FTLITE	S		
Co3C2	FTLITE	S		
Co3Ce	FTLITE	S		
Co3Dy	FTLITE	S		
Co3Dy4	FTLITE	S		
Co3Er	FTLITE	S		
Co3Er4	FTLITE	S		
Co3Gd	FTLITE	S		
Co3Gd4	FTLITE	S		
Co3Ho	FTLITE	S		
Co3Ho4	FTLITE	S		
Co3La2	FTLITE	S		
Co3Lu	FTLITE	S		
Co3Lu4	FTLITE	S		
Co3Mo	FTLITE	S		
Co3Nb	FTLITE	S		
Co3Nd	FTLITE	S		
Co3Nd2	FTLITE	S		
Co3Nd4	FTLITE	S		
Co3Pr	FTLITE	S		
Co3Pr4	FTLITE	S		
Co3Si	FTLITE	S		
Co3Sm	FTLITE	S		
Co3Sn2	FTLITE	S1	S2	
Co3Tb	FTLITE	S		
Co3Tb4	FTLITE	S		
Co3Tm	FTLITE	S		
Co3Tm4	FTLITE	S		
Co3V	FTLITE	S		
Co3W	FTLITE	S		
Co3Y	FTLITE	S		
Co3Y2	FTLITE	S		
Co3Y4	FTLITE	S		
Co3Yb	FTLITE	S		
Co4Zn9	FTLITE	S		
Co5Ce	FTLITE	S		

Co5Dy	FTLITE	S
Co5Er	FTLITE	S
Co5Gd	FTLITE	S
Co5Ho	FTLITE	S
Co5La	FTLITE	S
Co5Nd	FTLITE	S
Co5Pr	FTLITE	S
Co5Sm	FTLITE	S
Co5Tb	FTLITE	S
Co5Tm	FTLITE	S
Co5Y	FTLITE	S
Co5Y8	FTLITE	S
Co6W6C	FTLITE	S
Co7C3	FTLITE	S
Co7Ce2	FTLITE	S
Co7Dy12	FTLITE	S
Co7Dy2	FTLITE	S
Co7Er12	FTLITE	S
Co7Er2	FTLITE	S
Co7Gd2	FTLITE	S
Co7Ho12	FTLITE	S
Co7Ho2	FTLITE	S
Co7La2	FTLITE	S
Co7Nb2	FTLITE	S
Co7Nd2	FTLITE	S
Co7Pr2	FTLITE	S
Co7Sm2	FTLITE	S
Co7Ta2	FTLITE	S
Co7Tb12	FTLITE	S
Co7Tb2	FTLITE	S
Co7Tm2	FTLITE	S
Co7Y2	FTLITE	S
Co7Y6	FTLITE	S
CoB	FTLITE	S
CoDy3	FTLITE	S
CoEr3	FTLITE	S
CoGa3	FTLITE	S
CoGd3	FTLITE	S
CoHf	FTLITE	S
CoHf2	FTLITE	S
CoHo3	FTLITE	S
CoIn2	FTLITE	S
CoIn3	FTLITE	S
CoLa3	FTLITE	S
CoLu3	FTLITE	S
CoMo2B2	FTLITE	S
CoN	FTLITE	S
CoN3	FTLITE	S
CoNd3	FTLITE	S
CoO	FTLITE	S
CoP	FTLITE	S
CoPr3	FTLITE	S
CoSb	FTLITE	S
CoSb2	FTLITE	S
CoSb3	FTLITE	S
CoSc	FTLITE	S
CoSc2	FTLITE	S
CoSc3	FTLITE	S
CoSi	FTLITE	S
CoSi2	FTLITE	S
CoSm3	FTLITE	S
CoSn	FTLITE	S
CoSn2	FTLITE	S
CoTb3	FTLITE	S
CoTi2	FTLITE	S

CoV3	FTLITE	S							
CoY	FTLITE	S							
CoY3	FTLITE	S							
CoZn7	FTLITE	S							
CoZr2	FTLITE	S							
CoZr3	FTLITE	S							
Cr	FTLITE	S1	S2	S3	S4	S5	S6	L	
Cr23B6	FTLITE	S							
Cr23C6	FTLITE	S							
Cr2AlC	FTLITE	S							
Cr2B	FTLITE	S1	S2						
Cr2C	FTLITE	S							
Cr2Hf	FTLITE	S1	S2						
Cr2N	FTLITE	S							
Cr2O3	FTLITE	S							
Cr2P	FTLITE	S							
Cr2Ta	FTLITE	S1	S2						
Cr2Ti	FTLITE	S1	S2						
Cr2Zr	FTLITE	S1	S2	S3					
Cr3B2	FTLITE	S							
Cr3B4	FTLITE	S							
Cr3C	FTLITE	S							
Cr3C2	FTLITE	S							
Cr3Ga	FTLITE	S1	S2						
Cr3Mn5	FTLITE	S							
Cr3P	FTLITE	S							
Cr3Si	FTLITE	S							
Cr5B3	FTLITE	S							
Cr5Si3	FTLITE	S1	S2	S3					
Cr7C3	FTLITE	S							
CrB	FTLITE	S							
CrB2	FTLITE	S							
CrB4	FTLITE	S							
CrGa4	FTLITE	S							
CrN	FTLITE	S							
CrSi	FTLITE	S							
CrSi2	FTLITE	S							
CrZn13	FTLITE	S							
CrZn17	FTLITE	S							
Cu	FTLITE	S1	S2	S3	S4	L			
'Cu10Sn3'	FTLITE	S							(Cu)9.997(Sn)3.003
Cu10Zr7	FTLITE	S							
Cu15Si4	FTLITE	S							
Cu16Mg6Si7	FTLITE	S							
Cu19Si6	FTLITE	S							
Cu2Eu	FTLITE	S							
Cu2Ho	FTLITE	S							
Cu2La	FTLITE	S							
Cu2Mg	FTLITE	S1	S2	S3					
Cu2Nd	FTLITE	S							
Cu2O	FTLITE	S							
Cu2P	FTLITE	S							
Cu2Pr	FTLITE	S							
Cu2Sb	FTLITE	S							
Cu2Sc	FTLITE	S							
Cu2Sm	FTLITE	S							
Cu2Ti	FTLITE	S							
Cu2TiZr	FTLITE	S							
Cu2Y	FTLITE	S1	S2						
Cu2Zr	FTLITE	S							
Cu33Si7	FTLITE	S							
Cu37La3	FTLITE	S							
'Cu3As'	FTLITE	S							(Cu)2.94(As)1.06
Cu3Ge	FTLITE	S							
Cu3Mg2Si	FTLITE	S							

Cu3P	FTLITE	S1	S2				
Cu3Sb	FTLITE	S1	S2				
Cu3Sn	FTLITE	S1	S2				
Cu3Ti2	FTLITE	S					
Cu4In	FTLITE	S					
Cu4La	FTLITE	S					
Cu4Nd	FTLITE	S					
Cu4Pr	FTLITE	S					
Cu4Sb	FTLITE	S					
Cu4Sc	FTLITE	S					
Cu4Sm	FTLITE	S					
'Cu4Sn'	FTLITE	S				(Cu)3.94(Sn)1.06	
Cu4Ti3	FTLITE	S					
Cu4Y	FTLITE	S					
Cu51Zr14	FTLITE	S					
Cu5Eu	FTLITE	S					
Cu5Ho	FTLITE	S1	S2				
Cu5La	FTLITE	S					
Cu5Nd	FTLITE	S					
Cu5Pr	FTLITE	S					
Cu5Sm	FTLITE	S					
Cu5Sr	FTLITE	S					
Cu5Zr8	FTLITE	S					
Cu6La	FTLITE	S1	S2				
Cu6Nd	FTLITE	S					
Cu6Pr	FTLITE	S					
'Cu6Sb'	FTLITE	S				(Cu)5.95(Sb)1.05	
Cu6Sm	FTLITE	S					
'Cu6Sn5'	FTLITE	S				(Cu)5.995(Sn)5.005	
Cu7Ga2	FTLITE	S					
Cu7Ho2	FTLITE	S					
Cu7In3	FTLITE	S					
'Cu7In4'	FTLITE	S				(Cu)7.04(In)3.96	
'Cu7Sb2'	FTLITE	S				(Cu)6.93(Sb)2.07	
Cu7Y2	FTLITE	S					
Cu8Zr3	FTLITE	S					
Cu9Ho2	FTLITE	S					
Cu9Si2	FTLITE	S					
Cu9Zr2	FTLITE	S					
CuBe2	FTLITE	S					
CuEu	FTLITE	S					
CuEu2	FTLITE	S					
CuH	FTLITE	S					
CuHo	FTLITE	S					
CuLa	FTLITE	S					
CuNd	FTLITE	S					
CuO	FTLITE	S					
CuP2	FTLITE	S					
CuPr	FTLITE	S					
CuSc	FTLITE	S					
CuSm	FTLITE	S1	S2				
CuSr	FTLITE	S					
CuTi2	FTLITE	S					
CuY	FTLITE	S					
CuZr	FTLITE	S					
CuZr2	FTLITE	S					
Dy	FTLITE	S1	S2	S3	S4	L	
Dy11Sn10	FTLITE	S					
Dy13Zn58	FTLITE	S					
Dy2Al	FTLITE	S					
Dy2Al10Mg3	FTLITE	S					
Dy2Fe17	FTLITE	S					
Dy2Zn17	FTLITE	S1	S2				
Dy3Al2	FTLITE	S					
Dy3Si4	FTLITE	S					

Dy3Si5	FTLITE	S1	S2			
Dy3Sn7	FTLITE	S1	S2			
Dy3Zn11	FTLITE	S				
Dy3Zn22	FTLITE	S				
Dy5Mg24	FTLITE	S				
Dy5Si3	FTLITE	S				
Dy5Si4	FTLITE	S				
Dy5Sn3	FTLITE	S1	S2			
Dy5Sn4	FTLITE	S				
Dy6Fe23	FTLITE	S				
Dy6Mn23	FTLITE	S				
DyAl	FTLITE	S				
DyAl2	FTLITE	S				
DyAl3	FTLITE	S1	S2			
DyCr2Al20	FTLITE	S				
DyCu4Al8	FTLITE	S				
DyFe2	FTLITE	S				
DyFe2Al10	FTLITE	S				
DyFe3	FTLITE	S				
DyMg	FTLITE	S				
DyMg2	FTLITE	S				
DyMg3	FTLITE	S				
DyMn12	FTLITE	S				
DyMn2	FTLITE	S				
DySi	FTLITE	S				
DySi2	FTLITE	S1	S2			
DySi2Al2	FTLITE	S				
DySn2	FTLITE	S				
DySn3	FTLITE	S1	S2			
DyTi2Al20	FTLITE	S				
DyV2Al20	FTLITE	S				
DyZn	FTLITE	S				
DyZn11	FTLITE	S				
DyZn12	FTLITE	S				
DyZn2	FTLITE	S				
DyZn2Mg	FTLITE	S				
DyZn3	FTLITE	S				
DyZn5	FTLITE	S				
DyZn6Mg3	FTLITE	S				
DyZnMg12	FTLITE	S				
Er	FTLITE	S1	S2	S3	S4	L
Er11Sn10	FTLITE	S				
Er13Zn58	FTLITE	S				
Er2Al	FTLITE	S				
Er2Fe17	FTLITE	S				
Er2Si2Al3	FTLITE	S				
Er2Sn5	FTLITE	S				
Er2Zn17	FTLITE	S1	S2			
Er3Al2	FTLITE	S				
Er3Al20Mg7	FTLITE	S				
Er3Si5	FTLITE	S1	S2			
Er3Zn11	FTLITE	S				
Er3Zn22	FTLITE	S				
Er5Mg24	FTLITE	S				
Er5Si3	FTLITE	S				
Er5Si4	FTLITE	S				
Er5Sn3	FTLITE	S				
Er5Sn4	FTLITE	S				
Er6Fe23	FTLITE	S				
Er6Mn23	FTLITE	S				
ErAl	FTLITE	S				
ErAl2	FTLITE	S				
ErAl3	FTLITE	S				
ErCr2Al20	FTLITE	S				
ErCu4Al8	FTLITE	S				

ErFe2	FTLITE	S							
ErFe2Al10	FTLITE	S							
ErFe3	FTLITE	S							
ErMg	FTLITE	S							
ErMg2	FTLITE	S							
ErMn12	FTLITE	S							
ErMn2	FTLITE	S							
ErSi	FTLITE	S							
ErSn2	FTLITE	S							
ErSn3	FTLITE	S1	S2						
ErTi2Al20	FTLITE	S							
ErV2Al20	FTLITE	S							
ErZn	FTLITE	S							
ErZn11	FTLITE	S							
ErZn12	FTLITE	S							
ErZn2	FTLITE	S							
ErZn2Mg	FTLITE	S							
ErZn3	FTLITE	S							
ErZn5	FTLITE	S							
ErZn6Mg3	FTLITE	S							
ErZnMg12	FTLITE	S							
Eu	FTLITE	S1	S2	S3	L				
Eu13Zn58	FTLITE	S							
Eu2Mg17	FTLITE	S							
Eu2Zn17	FTLITE	S1	S2						
Eu3Si5	FTLITE	S							
Eu3Zn11	FTLITE	S							
Eu3Zn22	FTLITE	S							
Eu50Si87	FTLITE	S							
Eu5Si3	FTLITE	S							
Eu5Si4	FTLITE	S							
Eu8Si11	FTLITE	S							
EuAl	FTLITE	S							
EuAl2	FTLITE	S							
EuAl4	FTLITE	S							
EuCu4Al8	FTLITE	S							
EuMg	FTLITE	S							
EuMg2	FTLITE	S							
EuMg4	FTLITE	S							
EuMg5	FTLITE	S							
EuSi	FTLITE	S							
EuSi2Al2	FTLITE	S							
EuSn3	FTLITE	S							
EuTi2Al20	FTLITE	S							
EuV2Al20	FTLITE	S							
EuZn	FTLITE	S							
EuZn11	FTLITE	S							
EuZn12	FTLITE	S							
EuZn13	FTLITE	S							
EuZn2	FTLITE	S							
EuZn3	FTLITE	S							
EuZn5	FTLITE	S							
Fe	FTLITE	S1	S2	S3	S4	S5	S6	S7	L
Fe13Mo2B5	FTLITE	S							
Fe18Sc10	FTLITE	S							
Fe23B6	FTLITE	S							
Fe2B	FTLITE	S							
Fe2Mo	FTLITE	S							
Fe2MoC	FTLITE	S							
Fe2N	FTLITE	S							
Fe2Nb	FTLITE	S							
Fe2O3	FTLITE	S							
Fe2P	FTLITE	S							
Fe2Sc	FTLITE	S1	S2						
Fe2Si	FTLITE	S							

Fe2Ti	FTLITE	S					
Fe2W	FTLITE	S					
Fe3B	FTLITE	S					
Fe3B2	FTLITE	S					
Fe3C	FTLITE	S1	S2				
Fe3C2	FTLITE	S					
Fe3N	FTLITE	S					
Fe3O4	FTLITE	S1	S2	S3	S4		
Fe3P	FTLITE	S					
Fe3Si	FTLITE	S					
Fe3Sn2	FTLITE	S					
Fe5C2	FTLITE	S1	S2				
Fe5Si3	FTLITE	S1	S2				
Fe5Sn3	FTLITE	S1	S2	S3			
Fe6Sc29	FTLITE	S					
Fe6W6C	FTLITE	S					
Fe7C3	FTLITE	S					
Fe7W6	FTLITE	S					
Fe9Sc5	FTLITE	S					
FeB	FTLITE	S					
FeBe12	FTLITE	S					
FeBe2	FTLITE	S					
FeBe5	FTLITE	S					
FeP	FTLITE	S					
FeP2	FTLITE	S					
FeP4	FTLITE	S					
FeSb	FTLITE	S					
FeSb2	FTLITE	S					
FeSi	FTLITE	S1	S2	S3			
FeSi2	FTLITE	S1	S2	S3			
FeSn	FTLITE	S1	S2				
FeSn2	FTLITE	S					
FeSn2Zr6	FTLITE	S					
FeTi	FTLITE	S					
Ga	FTLITE	S1	S2	S3	S4	S5	L
Ga2Cu	FTLITE	S					
Ga2Pt	FTLITE	S1	S2				
Ga2Sc	FTLITE	S					
Ga2Ti	FTLITE	S					
Ga2Zr	FTLITE	S					
Ga2Zr3	FTLITE	S					
Ga39Na22	FTLITE	S					
Ga3Pt2	FTLITE	S					
Ga3Pt5	FTLITE	S					
Ga3Sc	FTLITE	S					
Ga3Sc5	FTLITE	S					
Ga3Ti	FTLITE	S					
Ga3Ti2	FTLITE	S					
Ga3Ti5	FTLITE	S					
Ga3Zr	FTLITE	S					
Ga3Zr2	FTLITE	S					
Ga3Zr5	FTLITE	S					
Ga4Cr3	FTLITE	S					
Ga4Cu9	FTLITE	S					
Ga4Na	FTLITE	S					
Ga4Sc5	FTLITE	S					
Ga4Zr5	FTLITE	S					
Ga5Zr3	FTLITE	S					
Ga6Pt	FTLITE	S					
Ga7Pt3	FTLITE	S					
Ga8Mo3	FTLITE	S					
GaAs	FTLITE	S					
GaCr	FTLITE	S					
GaN	FTLITE	S					
GaP	FTLITE	S					

GaPt	FTLITE	S				
GaPt2	FTLITE	S				
GaPt3	FTLITE	S1	S2	S3		
GaSb	FTLITE	S				
GaSc	FTLITE	S				
GaZr	FTLITE	S1	S2			
GaZr2	FTLITE	S				
Gd	FTLITE	S1	S2	S3	S4	L
Gd11Sn10	FTLITE	S				
Gd12Co7	FTLITE	S				
Gd13Zn58	FTLITE	S				
Gd2Al	FTLITE	S				
Gd2Fe17	FTLITE	S				
Gd2Zn17	FTLITE	S1	S2			
Gd3Al2	FTLITE	S				
Gd3Si5	FTLITE	S1	S2			
Gd3Sn7	FTLITE	S				
Gd3Zn11	FTLITE	S				
Gd3Zn22	FTLITE	S				
Gd4Sn11	FTLITE	S				
Gd5Si3	FTLITE	S				
Gd5Si4	FTLITE	S1	S2			
Gd5Sn3	FTLITE	S				
Gd5Sn4	FTLITE	S				
Gd6Fe23	FTLITE	S				
Gd6Mn23	FTLITE	S				
GdAl	FTLITE	S				
GdAl2	FTLITE	S				
GdAl3	FTLITE	S				
GdAl4Mg	FTLITE	S				
GdCr2Al20	FTLITE	S				
GdCu4Al8	FTLITE	S				
GdFe2	FTLITE	S				
GdFe2Al10	FTLITE	S				
GdFe3	FTLITE	S				
GdMg	FTLITE	S				
GdMg2	FTLITE	S				
GdMg3	FTLITE	S				
GdMg5	FTLITE	S				
GdMn12	FTLITE	S				
GdMn2	FTLITE	S				
GdSi	FTLITE	S				
GdSi2	FTLITE	S1	S2			
GdSi2Al2	FTLITE	S				
GdSn2	FTLITE	S				
GdSn3	FTLITE	S1	S2			
GdTi2Al20	FTLITE	S				
GdV2Al20	FTLITE	S				
GdZn	FTLITE	S				
GdZn11	FTLITE	S				
GdZn12	FTLITE	S				
GdZn2	FTLITE	S				
GdZn2Mg	FTLITE	S				
GdZn3	FTLITE	S				
GdZn5	FTLITE	S				
GdZn6Mg3	FTLITE	S				
GdZnMg12	FTLITE	S				
Ge	FTLITE	S1	S2	S3	L	
GeAs	FTLITE	S				
GeAs2	FTLITE	S				
GeCa	FTLITE	S				
GeP	FTLITE	S				
H	FTLITE	S	L			
Hf	FTLITE	S1	S2	S3	L	
Hf2Cr	FTLITE	S				

Hf2Ni	FTLITE	S			
Hf2Ni7	FTLITE	S			
Hf2Si	FTLITE	S			
Hf3Ga2	FTLITE	S			
Hf3N2	FTLITE	S			
Hf3N4	FTLITE	S			
Hf3P	FTLITE	S			
Hf3Si2	FTLITE	S			
Hf5Si3	FTLITE	S1	S2		
Hf5Si4	FTLITE	S			
Hf5Sn3	FTLITE	S1	S2		
Hf5Sn4	FTLITE	S			
Hf7Ni10	FTLITE	S			
HfB	FTLITE	S			
HfB2	FTLITE	S			
HfH2	FTLITE	S			
HfN	FTLITE	S			
HfNi	FTLITE	S			
HfNi3	FTLITE	S			
HfNi5	FTLITE	S			
HfSi	FTLITE	S			
HfSi2	FTLITE	S			
HfSn2	FTLITE	S			
Ho	FTLITE	S1	S2	S3	L
Ho11Sn10	FTLITE	S			
Ho13Zn58	FTLITE	S			
Ho2Al	FTLITE	S			
Ho2Al10Mg3	FTLITE	S			
Ho2Fe17	FTLITE	S			
Ho2Sn5	FTLITE	S			
Ho2Zn17	FTLITE	S1	S2		
Ho3Al2	FTLITE	S			
Ho3Si4	FTLITE	S			
Ho3Si5	FTLITE	S1	S2		
Ho3Zn11	FTLITE	S			
Ho3Zn22	FTLITE	S			
Ho5Mg24	FTLITE	S			
Ho5Si3	FTLITE	S			
Ho5Si4	FTLITE	S			
Ho5Si9	FTLITE	S1	S2		
Ho5Sn3	FTLITE	S			
Ho5Sn4	FTLITE	S			
Ho6Fe23	FTLITE	S			
Ho6Mn23	FTLITE	S			
HoAl	FTLITE	S			
HoAl2	FTLITE	S			
HoAl3	FTLITE	S			
HoCr2Al20	FTLITE	S			
HoCu4Al8	FTLITE	S			
HoFe2	FTLITE	S			
HoFe2Al10	FTLITE	S			
HoFe3	FTLITE	S			
HoMg	FTLITE	S			
HoMg2	FTLITE	S			
HoMn12	FTLITE	S			
HoMn2	FTLITE	S			
HoSi	FTLITE	S			
HoSi2Al2	FTLITE	S			
HoSiAl2	FTLITE	S			
HoSn2	FTLITE	S			
HoSn3	FTLITE	S1	S2		
HoTi2Al20	FTLITE	S			
HoZn	FTLITE	S			
HoZn11	FTLITE	S			
HoZn12	FTLITE	S			

HoZn2	FTLITE	S				
HoZn2Mg	FTLITE	S				
HoZn3	FTLITE	S				
HoZn5	FTLITE	S				
HoZn6Mg3	FTLITE	S				
HoZnMg12	FTLITE	S				
In	FTLITE	S1	S2	S3	L	
In2Ag	FTLITE	S				
In2Ca	FTLITE	S				
In2Li3	FTLITE	S				
In2Pt	FTLITE	S				
In2Pt3	FTLITE	S1	S2			
In3Li13	FTLITE	S				
In3Pt2	FTLITE	S				
In5Na3	FTLITE	S				
In5Pt6	FTLITE	S				
In7Pt3	FTLITE	S				
In9Na5	FTLITE	S				
In9Pt13	FTLITE	S				
InAg3	FTLITE	S				
InCa3	FTLITE	S				
InLi2	FTLITE	S				
InLi6	FTLITE	S				
InMg2	FTLITE	S				
InN	FTLITE	S				
InNa	FTLITE	S				
InNa2	FTLITE	S				
InP	FTLITE	S				
InPt	FTLITE	S				
InPt2	FTLITE	S				
InSb	FTLITE	S				
InSiNC	FTLITE	S				
K	FTLITE	S1	S2	S3	L	
K2O	FTLITE	S				
K3Bi	FTLITE	S1	S2			
K3Ge	FTLITE	S				
KB6	FTLITE	S				
KGe	FTLITE	S				
KGe4	FTLITE	S				
KH	FTLITE	S				
KSi	FTLITE	S				
KZn13	FTLITE	S				
La	FTLITE	S1	S2	S3	S4	L
La11Sn10	FTLITE	S				
La13Zn58	FTLITE	S				
La22Al53	FTLITE	S				
La2Mg17	FTLITE	S				
La2Ni3	FTLITE	S				
La2Ni7	FTLITE	S1	S2			
La2Sn3	FTLITE	S				
La2Zn17	FTLITE	S1	S2			
La3Al	FTLITE	S				
La3Al11	FTLITE	S1	S2			
La3Al40Mg17	FTLITE	S				
La3Ga2	FTLITE	S				
La3Ni	FTLITE	S				
La3Si2	FTLITE	S				
La3Si5	FTLITE	S				
La3Sn5	FTLITE	S				
La3Zn11	FTLITE	S				
La3Zn22	FTLITE	S				
La5Mg41	FTLITE	S				
La5Si3	FTLITE	S1	S2			
La5Si4	FTLITE	S1	S2			
La5Sn3	FTLITE	S1	S2			

La5Sn4	FTLITE	S			
La5Zn53Mg42	FTLITE	S			
La7Ni16	FTLITE	S			
La7Ni3	FTLITE	S			
LaAl	FTLITE	S			
LaAl2	FTLITE	S			
LaAl3	FTLITE	S			
LaCr2Al20	FTLITE	S			
LaCu2Al10	FTLITE	S			
LaCu4Al8	FTLITE	S			
LaFe2Al10	FTLITE	S			
LaMg	FTLITE	S			
LaMg12	FTLITE	S			
LaMg2	FTLITE	S			
LaMg3	FTLITE	S			
LaNi	FTLITE	S			
LaNi3	FTLITE	S			
LaNi5	FTLITE	S			
LaSi	FTLITE	S			
LaSi2	FTLITE	S			
LaSi2Al2	FTLITE	S			
LaSn	FTLITE	S			
LaSn3	FTLITE	S			
LaTi2Al20	FTLITE	S			
LaV2Al20	FTLITE	S			
LaZn	FTLITE	S			
LaZn11	FTLITE	S			
LaZn12	FTLITE	S			
LaZn13	FTLITE	S			
LaZn2	FTLITE	S			
LaZn2Al2	FTLITE	S			
LaZn2Mg	FTLITE	S			
LaZn3	FTLITE	S			
LaZn4	FTLITE	S			
LaZn5	FTLITE	S			
Li	FTLITE	S1	S2	S3	L
Li12Si7	FTLITE	S			
Li13Si4	FTLITE	S			
Li22Si5	FTLITE	S			
Li23Sr6	FTLITE	S			
Li2Ga	FTLITE	S			
Li2Ga7	FTLITE	S			
Li2LaH4	FTLITE	S			
Li2O	FTLITE	S			
Li2Sb	FTLITE	S			
Li2Sr3	FTLITE	S			
Li3AlH6	FTLITE	S			
Li3Bi	FTLITE	S			
Li3Ga14	FTLITE	S			
Li3Ga2	FTLITE	S			
Li3Ga8	FTLITE	S			
Li3Sb	FTLITE	S1	S2		
Li4Ba	FTLITE	S			
Li5Ga4	FTLITE	S			
Li5Ga9	FTLITE	S			
Li7Si3	FTLITE	S			
LiAlH4	FTLITE	S			
LiB3	FTLITE	S			
LiGa	FTLITE	S			
LiH	FTLITE	S			
LiPb	FTLITE	S1	S2		
LiZn	FTLITE	S			
LiZn4	FTLITE	S			
Lu	FTLITE	S1	S2	S3	L
Lu11Sn10	FTLITE	S			

Lu13Zn58	FTLITE	S							
Lu2Al	FTLITE	S							
Lu2Fe17	FTLITE	S							
Lu2Sn5	FTLITE	S							
Lu2Zn17	FTLITE	S1	S2						
Lu3Al2	FTLITE	S							
Lu3Si5	FTLITE	S							
Lu3Zn11	FTLITE	S							
Lu3Zn22	FTLITE	S							
Lu5Mg24	FTLITE	S							
Lu5Si3	FTLITE	S							
Lu5Si4	FTLITE	S							
Lu5Sn3	FTLITE	S							
Lu6Fe23	FTLITE	S							
Lu6Mn23	FTLITE	S							
LuAl	FTLITE	S							
LuAl2	FTLITE	S							
LuAl3	FTLITE	S							
LuCu4Al8	FTLITE	S							
LuFe2	FTLITE	S							
LuFe2Al10	FTLITE	S							
LuFe3	FTLITE	S							
LuMg	FTLITE	S							
LuMg2	FTLITE	S							
LuMn2	FTLITE	S							
LuMn5	FTLITE	S							
LuSi	FTLITE	S							
LuSn2	FTLITE	S							
LuV2Al20	FTLITE	S							
LuZn	FTLITE	S							
LuZn11	FTLITE	S							
LuZn12	FTLITE	S							
LuZn2	FTLITE	S							
LuZn2Mg	FTLITE	S							
LuZn3	FTLITE	S							
LuZn5	FTLITE	S							
LuZn6Mg3	FTLITE	S							
LuZnMg12	FTLITE	S							
Mg	FTLITE	S1	S2	S3	S4	S5	S6	S7	L
Mg11Si7Al3	FTLITE	S							
Mg12Zn13	FTLITE	S							
Mg17Ba2	FTLITE	S							
Mg23Ba6	FTLITE	S							
Mg2Ba	FTLITE	S1	S2						
Mg2Ca	FTLITE	S1	S2						
Mg2Cu	FTLITE	S1	S2						
Mg2Ga	FTLITE	S							
Mg2Ga5	FTLITE	S							
Mg2Ge	FTLITE	S							
Mg2Ni	FTLITE	S							
Mg2Pb	FTLITE	S							
Mg2Pt	FTLITE	S							
Mg2Si	FTLITE	S							
Mg2Si6Al3	FTLITE	S1	S2						
Mg2Sn	FTLITE	S							
Mg2Zn	FTLITE	S							
Mg2Zn11	FTLITE	S							
Mg2Zn3	FTLITE	S							
Mg3Bi2	FTLITE	S1	S2						
Mg3N2	FTLITE	S1	S2	S3					
Mg3P2	FTLITE	S							
Mg3Pt	FTLITE	S							
Mg3Sb2	FTLITE	S1	S2						
Mg3Si6Al2	FTLITE	S1	S2						
Mg4Si4Al4	FTLITE	S							

Mg4Si6Al	FTLITE	S1	S2					
Mg4Si6Al2	FTLITE	S						
Mg4Si7	FTLITE	S						
Mg4Si8	FTLITE	S						
Mg51Zn20	FTLITE	S						
Mg5Ga2	FTLITE	S						
Mg5In2	FTLITE	S						
Mg5Si6	FTLITE	S1	S2					
Mg6Pt	FTLITE	S						
Mg6Si3	FTLITE	S						
Mg6Si4	FTLITE	S						
Mg9Si5	FTLITE	S						
Mg9Si7Al3	FTLITE	S						
Mg9Si7Al5	FTLITE	S						
Mg9Si9Al3	FTLITE	S						
MgAl2O4	FTLITE	S						
MgB2	FTLITE	S						
MgB20	FTLITE	S						
MgB4	FTLITE	S						
MgB7	FTLITE	S						
MgBe13	FTLITE	S						
MgCo2	FTLITE	S						
MgGa	FTLITE	S						
MgGa2	FTLITE	S						
MgH2	FTLITE	S						
MgNi2	FTLITE	S						
MgO	FTLITE	S						
MgPt	FTLITE	S						
MgPt3	FTLITE	S						
MgPt7	FTLITE	S						
MgSi	FTLITE	S						
MgSi2Al2	FTLITE	S						
MgSi6Al4	FTLITE	S1	S2					
MgZn2	FTLITE	S1	S2					
Mn	FTLITE	S1	S2	S3	S4	S5	S6	L
Mn11Si19	FTLITE	S						
Mn19Sn6	FTLITE	S						
Mn23C6	FTLITE	S						
Mn23Sc6	FTLITE	S						
Mn2B	FTLITE	S						
Mn2Bi	FTLITE	S						
Mn2CaAl10	FTLITE	S						
Mn2N	FTLITE	S						
Mn2P	FTLITE	S						
Mn2Sb	FTLITE	S1	S2					
Mn2Sc	FTLITE	S						
Mn2Sn	FTLITE	S						
Mn2Ti	FTLITE	S						
Mn2Ti2	FTLITE	S						
Mn2Zr	FTLITE	S						
Mn3AlC	FTLITE	S						
Mn3B4	FTLITE	S						
Mn3C	FTLITE	S						
Mn3C2	FTLITE	S						
Mn3N	FTLITE	S						
Mn3Ni	FTLITE	S						
Mn3P	FTLITE	S						
Mn3Si	FTLITE	S						
Mn3Ti	FTLITE	S						
Mn5C2	FTLITE	S						
Mn5Si3	FTLITE	S1	S2					
Mn5SiC	FTLITE	S						
Mn5Sn3	FTLITE	S						
Mn6N4	FTLITE	S						
Mn6N5	FTLITE	S						

Mn6Si	FTLITE	S					
Mn7C3	FTLITE	S					
Mn7Mo6	FTLITE	S					
Mn8Si2C	FTLITE	S					
Mn9Si2	FTLITE	S					
'Mn9Ti2'	FTLITE	S					(Mn)8.965(Ti)2.035
MnB	FTLITE	S					
MnB2	FTLITE	S					
MnB4	FTLITE	S					
MnBe12	FTLITE	S					
MnBe2	FTLITE	S					
MnBe5	FTLITE	S					
MnBi	FTLITE	S					
MnCa4Al7	FTLITE	S					
MnN	FTLITE	S					
MnNi2	FTLITE	S					
MnNi3	FTLITE	S					
MnO	FTLITE	S					
MnP	FTLITE	S					
MnSc4	FTLITE	S					
MnSi	FTLITE	S					
MnSn2	FTLITE	S					
'MnTi'	FTLITE	S					(Mn)1.03(Ti)0.97
Mo	FTLITE	S1	S2	S3	L		
Mo23C6	FTLITE	S					
Mo2B	FTLITE	S					
Mo2B5	FTLITE	S					
Mo2BC	FTLITE	S					
Mo2C	FTLITE	S					
Mo2Hf	FTLITE	S1	S2				
Mo2Zr	FTLITE	S					
Mo3B2	FTLITE	S					
Mo3Ga	FTLITE	S					
Mo3Ni10B11	FTLITE	S					
Mo3Ni11	FTLITE	S					
Mo3P	FTLITE	S1	S2				
Mo3Si	FTLITE	S					
Mo4Ni3	FTLITE	S					
Mo5Si3	FTLITE	S					
Mo5Sn3	FTLITE	S					
MoB	FTLITE	S1	S2				
MoB12	FTLITE	S					
MoB2	FTLITE	S1	S2				
MoB4	FTLITE	S					
MoC	FTLITE	S					
MoCo2B4	FTLITE	S					
MoCoB	FTLITE	S					
MoGa4	FTLITE	S					
MoN	FTLITE	S1	S2				
MoNi4	FTLITE	S					
MoP	FTLITE	S					
MoPt	FTLITE	S					
MoPt2	FTLITE	S					
MoSi2	FTLITE	S1	S2				
MoZn22	FTLITE	S					
MoZn7	FTLITE	S					
N	FTLITE	L					
Na	FTLITE	S1	S2	S3	L		
Na2C2	FTLITE	S1	S2				
Na2K	FTLITE	S					
Na2LiAlH6	FTLITE	S					
Na2O	FTLITE	S1	S2	S3			
Na3AlH6	FTLITE	S1	S2				
Na3As	FTLITE	S					
Na3Bi	FTLITE	S					

Na3Ge	FTLITE	S				
Na3P	FTLITE	S				
Na3Sb	FTLITE	S				
Na4Ba	FTLITE	S				
NaAlH4	FTLITE	S				
NaB15	FTLITE	S				
NaB6	FTLITE	S				
NaBa	FTLITE	S				
NaGe	FTLITE	S				
NaH	FTLITE	S				
NaMgH3	FTLITE	S				
NaSi	FTLITE	S				
NaZn13	FTLITE	S				
Nb	FTLITE	S	L			
Nb2AlC	FTLITE	S				
Nb2B3	FTLITE	S				
Nb2C	FTLITE	S				
Nb2N	FTLITE	S				
Nb2Zn3	FTLITE	S				
Nb3B2	FTLITE	S				
Nb3B4	FTLITE	S				
Nb3C2	FTLITE	S				
Nb3P	FTLITE	S				
Nb4FeSi	FTLITE	S				
Nb5B6	FTLITE	S				
Nb5Si3	FTLITE	S1	S2			
Nb5Sn3	FTLITE	S				
Nb6Fe7	FTLITE	S				
NbB	FTLITE	S				
NbB2	FTLITE	S				
NbN	FTLITE	S				
NbNi8	FTLITE	S				
NbSn2	FTLITE	S				
NbZn	FTLITE	S				
NbZn12Fe	FTLITE	S				
NbZn15	FTLITE	S				
NbZn2	FTLITE	S				
NbZn3	FTLITE	S				
NbZn7	FTLITE	S				
Nd	FTLITE	S1	S2	S3	S4	L
Nd11Sn10	FTLITE	S				
Nd13Zn58	FTLITE	S				
Nd20Mg19Zn81	FTLITE	S				
Nd2Al	FTLITE	S				
Nd2Fe17	FTLITE	S				
Nd2Sb	FTLITE	S				
Nd2Si3	FTLITE	S1	S2			
Nd2Sn5	FTLITE	S				
Nd2Zn17	FTLITE	S1	S2			
Nd2Zn9Mg5	FTLITE	S				
Nd3Al	FTLITE	S				
Nd3Al11	FTLITE	S1	S2			
Nd3Al50Mg22	FTLITE	S				
Nd3Si4	FTLITE	S				
Nd3Sn5	FTLITE	S				
Nd3Sn7	FTLITE	S				
Nd3Zn11	FTLITE	S				
Nd3Zn22	FTLITE	S				
Nd3Zn30Mg13	FTLITE	S				
Nd4Sb3	FTLITE	S				
Nd5Fe17	FTLITE	S				
Nd5Mg41	FTLITE	S				
Nd5Sb3	FTLITE	S				
Nd5Si3	FTLITE	S1	S2			
Nd5Si4	FTLITE	S1	S2			

Nd5Si9	FTLITE	S					
Nd5Sn3	FTLITE	S					
Nd5Sn4	FTLITE	S					
Nd6Mn23	FTLITE	S					
NdAl	FTLITE	S					
NdAl2	FTLITE	S					
NdAl3	FTLITE	S					
NdB6	FTLITE	S					
NdCr2Al20	FTLITE	S					
NdCu4Al8	FTLITE	S					
NdFe2Al10	FTLITE	S					
NdMg	FTLITE	S					
NdMg2	FTLITE	S					
NdMg3	FTLITE	S					
NdMn2	FTLITE	S					
NdSb	FTLITE	S					
NdSb2	FTLITE	S					
NdSi	FTLITE	S					
NdSi2Al2	FTLITE	S					
NdSn	FTLITE	S					
NdSn2	FTLITE	S					
NdSn3	FTLITE	S					
NdTi2Al20	FTLITE	S					
NdV2Al20	FTLITE	S					
NdZn	FTLITE	S					
NdZn11	FTLITE	S					
NdZn12	FTLITE	S					
NdZn2	FTLITE	S					
NdZn2Al2	FTLITE	S					
NdZn2Mg	FTLITE	S					
NdZn3	FTLITE	S					
NdZn5	FTLITE	S					
Ni	FTLITE	S1	S2	S3	S4	S5	L
Ni10Mn3Si7	FTLITE	S					
Ni11As8	FTLITE	S					
Ni12P5	FTLITE	S					
Ni13Ga9	FTLITE	S					
Ni16Mn6Si7	FTLITE	S					
Ni16Si7Ti6	FTLITE	S					
Ni23C6	FTLITE	S					
Ni2B	FTLITE	S					
Ni2Cr	FTLITE	S					
Ni2Ga	FTLITE	S					
Ni2Ga3	FTLITE	S					
Ni2Ge	FTLITE	S1	S2				
Ni2In	FTLITE	S					
Ni2In3	FTLITE	S					
Ni2Mg3Al	FTLITE	S					
Ni2Mn3Si	FTLITE	S					
Ni2MnMg3	FTLITE	S					
Ni2Mo	FTLITE	S					
Ni2P	FTLITE	S					
Ni2Si	FTLITE	S1	S2				
Ni2Ta	FTLITE	S					
Ni2V	FTLITE	S					
Ni2Y	FTLITE	S					
Ni2Y3	FTLITE	S					
Ni3B	FTLITE	S					
Ni3Ga	FTLITE	S					
Ni3Ga4	FTLITE	S					
Ni3Ga7	FTLITE	S					
Ni3Ge	FTLITE	S					
Ni3In	FTLITE	S					
Ni3In7	FTLITE	S					
Ni3Mo	FTLITE	S					

Ni3P	FTLITE	S							
Ni3Sb	FTLITE	S1	S2						
Ni3Si	FTLITE	S1	S2						
Ni3Si2	FTLITE	S							
Ni3SiTi2	FTLITE	S							
Ni3Sn	FTLITE	S1	S2						
Ni3Sn2	FTLITE	S							
Ni3Ta	FTLITE	S							
Ni3Ti	FTLITE	S							
Ni3V	FTLITE	S							
Ni3Y	FTLITE	S							
Ni49Si37Ti14	FTLITE	S							
Ni4B3	FTLITE	S							
Ni4Si7Ti4	FTLITE	S							
Ni4W	FTLITE	S							
Ni4Y	FTLITE	S							
Ni5AlB4	FTLITE	S							
Ni5As2	FTLITE	S							
Ni5Ga3	FTLITE	S							
Ni5Ge2	FTLITE	S							
Ni5Ge3	FTLITE	S							
Ni5P2	FTLITE	S							
Ni5Sb2	FTLITE	S							
Ni5Si2	FTLITE	S							
'Ni5Si2B'	FTLITE	S							(Ni)4.6(Si)2(B)1
'Ni5Zr4'	FTLITE	S							(Ni)4.95(Zr)4.05
Ni6P5	FTLITE	S							
Ni6Si2B	FTLITE	S							
Ni7Sc2	FTLITE	S							
Ni7Y2	FTLITE	S							
'Ni7Zr2'	FTLITE	S							(Ni)7.02(Zr)1.98
Ni8AlB11	FTLITE	S							
Ni8Ta	FTLITE	S							
'Ni8Y'	FTLITE	S							(Ni)8.0523(Y)0.9477
'Ni8Zr3'	FTLITE	S							(Ni)7.975(Zr)3.025
Ni9Mn3Si8	FTLITE	S							
NiAs	FTLITE	S							
NiAs2	FTLITE	S1	S2						
NiB	FTLITE	S							
NiGa	FTLITE	S1	S2						
NiGe	FTLITE	S1	S2						
NiIn	FTLITE	S							
NiMnSi	FTLITE	S							
NiO	FTLITE	S							
NiP2	FTLITE	S							
NiSb	FTLITE	S							
NiSb2	FTLITE	S							
NiSc	FTLITE	S							
NiSi	FTLITE	S1	S2						
NiSi2	FTLITE	S							
NiSi4Ti4	FTLITE	S							
NiSiTi	FTLITE	S							
NiSn	FTLITE	S1	S2						
NiSr	FTLITE	S							
NiTi2	FTLITE	S1	S2						
NiV3	FTLITE	S							
NiW	FTLITE	S							
NiW2	FTLITE	S							
NiY	FTLITE	S							
NiY3	FTLITE	S							
NiZn8	FTLITE	S							
NiZr	FTLITE	S							
NiZr2	FTLITE	S							
P	FTLITE	S1	S2	S3	S4	L			
Pb	FTLITE	S1	S2	S3	S4	S5	S6	S7	L

Pb10Nd11	FTLITE	S				
Pb10Pr11	FTLITE	S				
Pb2Au	FTLITE	S				
Pb2Dy	FTLITE	S				
Pb2Nd	FTLITE	S				
Pb2Pr	FTLITE	S				
Pb2Tb	FTLITE	S				
Pb2Zr	FTLITE	S				
Pb3Au	FTLITE	S				
Pb3Dy	FTLITE	S				
Pb3Dy5	FTLITE	S				
Pb3Nd	FTLITE	S				
Pb3Nd5	FTLITE	S				
Pb3O4	FTLITE	S				
Pb3Pr	FTLITE	S				
Pb3Pr5	FTLITE	S				
Pb3Sr	FTLITE	S				
Pb3Sr2	FTLITE	S				
Pb3Sr5	FTLITE	S				
Pb3Tb	FTLITE	S				
Pb3Tb5	FTLITE	S				
Pb3Zr5	FTLITE	S				
Pb4Dy5	FTLITE	S				
Pb4Nd3	FTLITE	S				
Pb4Nd5	FTLITE	S				
Pb4Pr3	FTLITE	S				
Pb4Pr5	FTLITE	S				
Pb4Sr5	FTLITE	S				
Pb4Tb5	FTLITE	S				
Pb5Li22	FTLITE	S				
Pb5Sr3	FTLITE	S				
PbDy	FTLITE	S				
PbNd3	FTLITE	S				
PbO	FTLITE	S1	S2			
PbO2	FTLITE	S				
PbPr3	FTLITE	S				
PbSr	FTLITE	S				
PbSr2	FTLITE	S				
PbTb	FTLITE	S				
PbZr4	FTLITE	S				
Pr	FTLITE	S1	S2	S3	S4	L
Pr11Sn10	FTLITE	S				
Pr13Zn58	FTLITE	S				
Pr2Al	FTLITE	S				
Pr2Fe17	FTLITE	S				
Pr2Sb	FTLITE	S				
Pr2Sn3	FTLITE	S				
Pr2Sn5	FTLITE	S				
Pr2Zn17	FTLITE	S1	S2			
Pr2Zn9Mg5	FTLITE	S				
Pr3Al	FTLITE	S1	S2			
Pr3Al11	FTLITE	S1	S2			
Pr3Al50Mg22	FTLITE	S				
Pr3Si4	FTLITE	S				
Pr3Sn	FTLITE	S				
Pr3Sn5	FTLITE	S1	S2			
Pr3Sn7	FTLITE	S				
Pr3Zn11	FTLITE	S				
Pr3Zn22	FTLITE	S				
Pr3Zn30Mg13	FTLITE	S				
Pr4Sb3	FTLITE	S				
Pr5Mg41	FTLITE	S				
Pr5Sb3	FTLITE	S				
Pr5Si3	FTLITE	S1	S2			
Pr5Si4	FTLITE	S1	S2			

Pr5Si9	FTLITE	S1	S2		
Pr5Sn3	FTLITE	S1	S2		
Pr5Sn4	FTLITE	S1	S2		
Pr6Mn23	FTLITE	S			
PrAl	FTLITE	S			
PrAl2	FTLITE	S			
PrAl3	FTLITE	S			
PrCr2Al20	FTLITE	S			
PrCu4Al8	FTLITE	S			
PrFe2Al10	FTLITE	S			
PrMg	FTLITE	S			
PrMg12	FTLITE	S			
PrMg2	FTLITE	S			
PrMg3	FTLITE	S			
PrSb	FTLITE	S			
PrSb2	FTLITE	S			
PrSi	FTLITE	S			
PrSi2Al2	FTLITE	S			
PrSn	FTLITE	S			
PrSn2	FTLITE	S			
PrSn3	FTLITE	S			
PrTi2Al20	FTLITE	S			
PrV2Al20	FTLITE	S			
PrZn	FTLITE	S			
PrZn11	FTLITE	S			
PrZn12	FTLITE	S			
PrZn2	FTLITE	S			
PrZn2Al2	FTLITE	S			
PrZn2Mg	FTLITE	S			
PrZn3	FTLITE	S			
PrZn5	FTLITE	S			
Pt	FTLITE	S1	S2	L	
Pt17Si8	FTLITE	S1	S2		
Pt25Si7	FTLITE	S			
Pt2Ge	FTLITE	S			
Pt2Ge3	FTLITE	S			
Pt2Si	FTLITE	S1	S2		
Pt2Sn3	FTLITE	S			
'Pt2Ta'	FTLITE	S			(Pt)2.001(Ta)0.999
Pt2V	FTLITE	S			
Pt3Ge	FTLITE	S			
Pt3Ge2	FTLITE	S			
Pt3Pb	FTLITE	S			
Pt3Si	FTLITE	S1	S2		
Pt3Sn	FTLITE	S			
Pt3Ta	FTLITE	S			
Pt3Ti	FTLITE	S			
Pt3Ti4	FTLITE	S			
Pt5Si2	FTLITE	S			
Pt6Si5	FTLITE	S			
Pt8Ti	FTLITE	S			
PtAs2	FTLITE	S			
PtGe	FTLITE	S			
PtGe2	FTLITE	S			
PtPb	FTLITE	S			
PtPb4	FTLITE	S			
PtSb2	FTLITE	S			
PtSi	FTLITE	S			
PtSn	FTLITE	S			
PtSn2	FTLITE	S			
PtSn4	FTLITE	S			
PtTa	FTLITE	S			
'PtTa6'	FTLITE	S			(Pt)1.001(Ta)5.999
PtTi	FTLITE	S1	S2		
PtTi3	FTLITE	S			

Sb	FTLITE	S1	S2	S3	L				
Sb2Sn3	FTLITE	S							
Sb2SnZn	FTLITE	S							
SbFe2	FTLITE	S							
SbNi2	FTLITE	S							
Sc	FTLITE	S1	S2	S3	S4	L			
Sc2Si3	FTLITE	S							
Sc5Si3	FTLITE	S							
Sc5Si4	FTLITE	S1	S2						
ScCu4Al8	FTLITE	S							
ScSi	FTLITE	S							
ScV2Al20	FTLITE	S							
Si	FTLITE	S1	S2	S3	S4	S5	S6	S7	L
Si2V	FTLITE	S							
Si2W	FTLITE	S							
Si2Zr3	FTLITE	S							
Si3N4	FTLITE	S							
Si3Ti	FTLITE	S							
Si3Zr5	FTLITE	S1	S2						
Si4Zr5	FTLITE	S							
Si5V6	FTLITE	S							
Si6Al5	FTLITE	S1	S2						
SiAs	FTLITE	S							
SiAs2	FTLITE	S							
SiC	FTLITE	S1	S2	S3	S4	S5	S6		
SiO2	FTLITE	S1	S2	S3	S4	S5	S6	S7	S8
SiP	FTLITE	S1	S2						
SiP2	FTLITE	S							
SiTa3	FTLITE	S							
SiZr	FTLITE	S							
SiZr2	FTLITE	S							
Sm	FTLITE	S1	S2	S3	S4	L			
Sm11Sn10	FTLITE	S							
Sm13Zn58	FTLITE	S							
Sm2Al	FTLITE	S							
Sm2Fe17	FTLITE	S							
Sm2Sb	FTLITE	S							
Sm2Sn3	FTLITE	S							
Sm2Sn5	FTLITE	S							
Sm2Zn17	FTLITE	S1	S2						
Sm2Zn9Mg5	FTLITE	S							
Sm3Al11	FTLITE	S							
Sm3Si5	FTLITE	S							
Sm3Sn7	FTLITE	S							
Sm3Zn11	FTLITE	S							
Sm3Zn22	FTLITE	S							
Sm3Zn30Mg13	FTLITE	S							
Sm4Sb3	FTLITE	S							
Sm4Sn3	FTLITE	S							
Sm5Mg41	FTLITE	S							
Sm5Sb3	FTLITE	S							
Sm5Si3	FTLITE	S							
Sm5Si4	FTLITE	S1	S2						
Sm5Sn3	FTLITE	S							
Sm5Sn4	FTLITE	S							
Sm6Mn23	FTLITE	S							
SmAl	FTLITE	S							
SmAl2	FTLITE	S							
SmAl3	FTLITE	S							
SmCr2Al20	FTLITE	S							
SmCu4Al8	FTLITE	S							
SmFe2	FTLITE	S							
SmFe2Al10	FTLITE	S							
SmFe3	FTLITE	S							
SmMg	FTLITE	S							

SmMg2	FTLITE	S					
SmMg3	FTLITE	S					
SmMg5	FTLITE	S					
SmMn2	FTLITE	S					
SmSb	FTLITE	S					
SmSb2	FTLITE	S					
SmSi	FTLITE	S					
SmSi2	FTLITE	S1	S2				
SmSi2Al2	FTLITE	S					
SmSn2	FTLITE	S					
SmSn3	FTLITE	S					
SmTi2Al20	FTLITE	S					
SmV2Al20	FTLITE	S					
SmZn	FTLITE	S					
SmZn11	FTLITE	S					
SmZn12	FTLITE	S					
SmZn2	FTLITE	S					
SmZn2Mg	FTLITE	S					
SmZn3	FTLITE	S					
SmZn5	FTLITE	S					
Sn	FTLITE	S1	S2	S3	S4	S5	L
Sn14Ca12Mg7	FTLITE	S					
Sn20Ca31	FTLITE	S					
Sn23Ca36	FTLITE	S					
Sn24Sr14Mg25	FTLITE	S					
Sn2Li5	FTLITE	S					
Sn2Na	FTLITE	S					
Sn2Zr	FTLITE	S					
Sn3Ca	FTLITE	S					
Sn3Ca5	FTLITE	S					
Sn3Li7	FTLITE	S					
Sn3Li8	FTLITE	S					
Sn3Na	FTLITE	S					
Sn3Na4	FTLITE	S					
Sn3Sr	FTLITE	S					
Sn3Sr5	FTLITE	S					
Sn3SrMg5	FTLITE	S					
Sn4As3	FTLITE	S					
Sn4Li17	FTLITE	S					
Sn4Na	FTLITE	S					
Sn4Na15	FTLITE	S					
Sn4Na9	FTLITE	S					
Sn4P3	FTLITE	S					
Sn4Sr	FTLITE	S					
Sn5Li13	FTLITE	S					
Sn5Li2	FTLITE	S					
Sn5Sr3	FTLITE	S					
Sn6Na	FTLITE	S					
SnAg3	FTLITE	S					
SnAs	FTLITE	S					
SnCa	FTLITE	S					
SnFe2	FTLITE	S					
SnLi	FTLITE	S					
SnMgLi4	FTLITE	S					
SnNa	FTLITE	S1	S2				
SnNa3	FTLITE	S					
SnNi2	FTLITE	S					
SnSr	FTLITE	S					
SnSr2	FTLITE	S					
SnSrMg	FTLITE	S					
SnTi2	FTLITE	S					
SnZr4	FTLITE	S					
Sr	FTLITE	S1	S2	S3	L		
Sr18Zn62Mg20	FTLITE	S					
Sr2AlH7	FTLITE	S					

Sr2Ge	FTLITE	S				
Sr2Mg17	FTLITE	S				
Sr2Si	FTLITE	S				
Sr2Zn43Mg55	FTLITE	S				
Sr35Zn21Mg44	FTLITE	S				
Sr4Al38Mg58	FTLITE	S				
Sr5Ge3	FTLITE	S				
Sr5Si3	FTLITE	S				
Sr6Mg23	FTLITE	S				
Sr8Ga7	FTLITE	S				
Sr9Mg38	FTLITE	S				
SrAlH5	FTLITE	S				
SrB6	FTLITE	S				
SrBe13	FTLITE	S				
SrC2	FTLITE	S1	S2			
SrGa2	FTLITE	S				
SrGa4	FTLITE	S				
SrGe	FTLITE	S				
SrGe2	FTLITE	S				
SrH2	FTLITE	S1	S2			
SrMg2	FTLITE	S				
SrSi	FTLITE	S				
SrSi2	FTLITE	S1	S2			
SrSi2Al2	FTLITE	S				
SrZn	FTLITE	S				
SrZn13	FTLITE	S				
SrZn2	FTLITE	S				
SrZn5	FTLITE	S1	S2			
Ta	FTLITE	S1	S2	L		
Ta2B	FTLITE	S				
Ta2C	FTLITE	S				
Ta2Co	FTLITE	S				
Ta2N	FTLITE	S				
Ta2Si	FTLITE	S				
Ta2Sn3	FTLITE	S				
Ta3B2	FTLITE	S				
Ta3B4	FTLITE	S				
Ta3P	FTLITE	S				
Ta3Sn	FTLITE	S				
'Ta4C3'	FTLITE	S				(Ta)4(C)2.66666666666667
Ta5B6	FTLITE	S				
Ta5Si3	FTLITE	S1	S2	S3		
Ta5Sn3	FTLITE	S				
TaB	FTLITE	S1	S2			
TaB2	FTLITE	S				
TaN	FTLITE	S1	S2			
TaN3	FTLITE	S				
Tb	FTLITE	S1	S2	S3	L	
Tb11Sn10	FTLITE	S				
Tb13Zn58	FTLITE	S				
Tb2Al	FTLITE	S				
Tb2Fe17	FTLITE	S				
Tb2Zn17	FTLITE	S1	S2			
Tb3Al2	FTLITE	S				
Tb3Si5	FTLITE	S				
Tb3Sn7	FTLITE	S1	S2			
Tb3Zn11	FTLITE	S				
Tb3Zn22	FTLITE	S				
Tb5Mg24	FTLITE	S				
Tb5Si3	FTLITE	S				
Tb5Si4	FTLITE	S				
Tb5Sn3	FTLITE	S				
Tb5Sn4	FTLITE	S				
Tb6Fe23	FTLITE	S				
Tb6Mn23	FTLITE	S				

TbAl	FTLITE	S							
TbAl2	FTLITE	S							
TbAl3	FTLITE	S							
TbAl4Mg	FTLITE	S							
TbCr2Al20	FTLITE	S							
TbCu4Al8	FTLITE	S							
TbFe2	FTLITE	S							
TbFe2Al10	FTLITE	S							
TbFe3	FTLITE	S							
TbMg	FTLITE	S							
TbMg2	FTLITE	S							
TbMg3	FTLITE	S							
TbMn12	FTLITE	S							
TbMn2	FTLITE	S							
TbSi	FTLITE	S							
TbSi2	FTLITE	S							
TbSi2Al2	FTLITE	S							
TbSn2	FTLITE	S							
TbSn3	FTLITE	S							
TbTi2Al20	FTLITE	S							
TbV2Al20	FTLITE	S							
TbZn	FTLITE	S							
TbZn11	FTLITE	S							
TbZn12	FTLITE	S							
TbZn2	FTLITE	S							
TbZn2Mg	FTLITE	S							
TbZn3	FTLITE	S							
TbZn5	FTLITE	S							
TbZn6Mg3	FTLITE	S							
TbZnMg12	FTLITE	S							
Ti	FTLITE	S1	S2	S3	S4	S5	S6	S7	L
Ti2Al	FTLITE	S							
Ti2AlC	FTLITE	S							
Ti2C	FTLITE	S							
Ti2Cr	FTLITE	S							
Ti2H	FTLITE	S							
Ti2Mn	FTLITE	S							
Ti2N	FTLITE	S1	S2						
Ti2O	FTLITE	S							
Ti2O3	FTLITE	S1	S2						
Ti2Zn	FTLITE	S							
Ti3Al	FTLITE	S							
Ti3AlC	FTLITE	S							
Ti3AlC2	FTLITE	S							
Ti3AlSi5	FTLITE	S							
Ti3B4	FTLITE	S							
Ti3O2	FTLITE	S							
Ti3P	FTLITE	S							
Ti3Si	FTLITE	S							
Ti3Sn	FTLITE	S							
Ti4AlSi7	FTLITE	S							
Ti5Si3	FTLITE	S1	S2						
Ti5Si4	FTLITE	S							
Ti5Sn3	FTLITE	S1	S2						
Ti6Sn5	FTLITE	S1	S2						
TiB	FTLITE	S							
TiB2	FTLITE	S							
TiC	FTLITE	S							
TiH2	FTLITE	S							
TiN	FTLITE	S							
TiN3	FTLITE	S							
TiO	FTLITE	S							
TiO2	FTLITE	S1	S2						
TiSi	FTLITE	S							
TiSi2	FTLITE	S							

TiZn	FTLITE	S					
TiZn10	FTLITE	S					
TiZn15	FTLITE	S					
TiZn2	FTLITE	S					
TiZn3	FTLITE	S					
TiZn5	FTLITE	S					
Tm	FTLITE	S1	S2	S3	L		
Tm11Sn10	FTLITE	S					
Tm13Zn58	FTLITE	S					
Tm2Al	FTLITE	S					
Tm2Fe17	FTLITE	S					
Tm2Sn5	FTLITE	S					
Tm2Zn17	FTLITE	S1	S2				
Tm3Al2	FTLITE	S					
Tm3Si5	FTLITE	S					
Tm3Zn11	FTLITE	S					
Tm3Zn22	FTLITE	S					
Tm5Mg24	FTLITE	S					
Tm5Si3	FTLITE	S					
Tm5Si4	FTLITE	S					
Tm5Sn3	FTLITE	S					
Tm6Fe23	FTLITE	S					
Tm6Mn23	FTLITE	S					
TmAl	FTLITE	S					
TmAl2	FTLITE	S					
TmAl3	FTLITE	S					
TmCu4Al8	FTLITE	S					
TmFe2	FTLITE	S					
TmFe2Al10	FTLITE	S					
TmFe3	FTLITE	S					
TmMg	FTLITE	S					
TmMg2	FTLITE	S					
TmMn12	FTLITE	S					
TmMn2	FTLITE	S					
TmSi	FTLITE	S					
TmSn2	FTLITE	S					
TmSn3	FTLITE	S1	S2				
TmZn	FTLITE	S					
TmZn11	FTLITE	S					
TmZn12	FTLITE	S					
TmZn2	FTLITE	S					
TmZn2Mg	FTLITE	S					
TmZn3	FTLITE	S					
TmZn5	FTLITE	S					
TmZn6Mg3	FTLITE	S					
TmZnMg12	FTLITE	S					
V	FTLITE	S1	S2	S3	S4	S5	L
V11Ge8	FTLITE	S					
V17Ge31	FTLITE	S					
V23C6	FTLITE	S					
V2AlC	FTLITE	S					
V2B3	FTLITE	S					
V2Ga5	FTLITE	S					
V2Hf	FTLITE	S					
V2N	FTLITE	S					
V2Ta	FTLITE	S1	S2				
V2Zr	FTLITE	S					
V3B2	FTLITE	S					
V3B4	FTLITE	S					
V3C2	FTLITE	S					
V3Ga	FTLITE	S					
V3Ge	FTLITE	S					
V3P	FTLITE	S					
V3Si	FTLITE	S					
V4Zn5	FTLITE	S					

V5C2	FTLITE	S				
V5Ge3	FTLITE	S				
V5Si3	FTLITE	S1	S2			
V6Ga5	FTLITE	S				
V7Al45	FTLITE	S				
V8Ga41	FTLITE	S				
VB	FTLITE	S				
VB2	FTLITE	S				
VN	FTLITE	S				
VSn2	FTLITE	S				
VZn16	FTLITE	S				
VZn3	FTLITE	S				
W	FTLITE	S1	S2	S3	L	
W2B	FTLITE	S				
W2B9	FTLITE	S				
W2Zr	FTLITE	S				
W3C2	FTLITE	S				
W5Si3	FTLITE	S1	S2			
WB	FTLITE	S1	S2			
WC	FTLITE	S				
WN	FTLITE	S1	S2			
Y	FTLITE	S1	S2	S3	S4	L
Y11Sn10	FTLITE	S				
Y13Zn58	FTLITE	S				
Y15Zn70Mg15	FTLITE	S				
Y2Fe17	FTLITE	S				
Y2Mn9Al5	FTLITE	S				
Y2Sn5	FTLITE	S				
Y2Zn17	FTLITE	S1	S2			
Y3Si5	FTLITE	S1	S2			
Y3Zn11	FTLITE	S				
Y3Zn22	FTLITE	S				
Y3Zn30Mg13	FTLITE	S				
Y5Si3	FTLITE	S				
Y5Si4	FTLITE	S				
Y5Sn3	FTLITE	S1	S2			
Y5Sn4	FTLITE	S				
Y6Fe23	FTLITE	S				
Y6Mn23	FTLITE	S				
YAl2	FTLITE	S				
YCr2Al20	FTLITE	S				
YCu4Al8	FTLITE	S				
YCuAl	FTLITE	S				
YFe2	FTLITE	S				
YFe2Al10	FTLITE	S				
YFe3	FTLITE	S				
YMn12	FTLITE	S				
YMn2	FTLITE	S				
YNi5	FTLITE	S				
YSi	FTLITE	S				
YSi2	FTLITE	S1	S2			
YSi2Al2	FTLITE	S				
YSn2	FTLITE	S				
YSn3	FTLITE	S1	S2			
YV2Al20	FTLITE	S				
YZn	FTLITE	S				
YZn11	FTLITE	S				
YZn12	FTLITE	S				
YZn2	FTLITE	S1	S2			
YZn2Mg	FTLITE	S				
YZn3	FTLITE	S				
YZn5	FTLITE	S				
YZn6Mg3	FTLITE	S				
YZnMg12	FTLITE	S				
Yb	FTLITE	S1	S2	S3	S4	L

Yb13Zn58	FTLITE	S									
Yb2Zn17	FTLITE	S1	S2								
Yb3Si5	FTLITE	S									
Yb3Zn11	FTLITE	S									
Yb3Zn22	FTLITE	S									
Yb50Si87	FTLITE	S									
Yb5Si3	FTLITE	S									
Yb5Si4	FTLITE	S									
Yb8Si11	FTLITE	S									
YbAl2	FTLITE	S									
YbAl3	FTLITE	S									
YbCr2Al20	FTLITE	S									
YbCu4Al8	FTLITE	S									
YbFe2Al10	FTLITE	S									
YbMg2	FTLITE	S									
YbSi	FTLITE	S									
YbSi2Al2	FTLITE	S									
YbTi2Al20	FTLITE	S									
YbV2Al20	FTLITE	S									
YbZn	FTLITE	S									
YbZn11	FTLITE	S									
YbZn12	FTLITE	S									
YbZn2	FTLITE	S1	S2								
YbZn3	FTLITE	S									
YbZn5	FTLITE	S									
Zn	FTLITE	S1	S2	S3	S4	S5	S6	S7	...	L1	L
Zn12Sc	FTLITE	S									
Zn17Sc2	FTLITE	S1	S2								
Zn17Sc3	FTLITE	S									
Zn22Fe2Ti	FTLITE	S									
Zn22Zr	FTLITE	S									
Zn2Li	FTLITE	S									
Zn2Sc	FTLITE	S									
Zn2Zr	FTLITE	S									
Zn2Zr3	FTLITE	S									
Zn39Zr5	FTLITE	S									
Zn3AlLi	FTLITE	S									
Zn3As2	FTLITE	S1	S2	S3	S4						
Zn3Li2	FTLITE	S									
Zn3P2	FTLITE	S1	S2	S3	S4						
Zn3Sb2	FTLITE	S									
Zn3Zr	FTLITE	S1	S2								
Zn4Sb3	FTLITE	S1	S2								
Zn58Sc13	FTLITE	S									
Zn5Li2	FTLITE	S									
Zn5Sb3	FTLITE	S									
Zn62Ca8Al30	FTLITE	S									
Zn7Li3	FTLITE	S									
Zn9Mn	FTLITE	S									
ZnAlLi	FTLITE	S									
ZnAs2	FTLITE	S									
ZnO	FTLITE	S									
ZnP2	FTLITE	S1	S2								
ZnSb	FTLITE	S									
ZnSc	FTLITE	S									
ZnSiP2	FTLITE	S									
ZnZr	FTLITE	S									
ZnZr2	FTLITE	S									
Zr	FTLITE	S1	S2	S3	S4	S5	S6	S7	S8	L	
Zr2AlC	FTLITE	S									
Zr3P	FTLITE	S									
Zr3Si	FTLITE	S									
Zr5Sn3	FTLITE	S1	S2								
ZrB	FTLITE	S									
ZrB12	FTLITE	S									

ZrB2	FTLITE	S
ZrC	FTLITE	S
ZrH2	FTLITE	S
ZrN	FTLITE	S
ZrSi2	FTLITE	S

Modeling

In the thermodynamic assessments, the liquid phase has been described using the Modified Quasichemical Model in the Pair Approximation (MQMPA) in order to evaluate short-range order (SRO) between the elements. Within this model, it is possible to force some binary interactions to respect a Bragg-Williams (BW) type of configurational entropy (which neglects SRO for the specific binary interactions). This makes possible the incorporation of several optimized binary systems coming from the CALPHAD community where a Bragg-Williams configurational entropy with a Redlich-Kister-Muggianu (R-K) polynomial expression of the excess Gibbs energy are typically used. For each binary system in the present database, the type of configurational entropy is given in the "List of optimized systems and calculated binary phase diagrams". In many cases, an important part of the experimental information on a given binary system is associated to solid-liquid equilibria. Hence a thermodynamic model for the liquid phase that takes into account SRO can permit a better fit of the thermodynamic and phase equilibrium data for the important solid phases that constitute the alloy.

Most solid solution phases have been described using sublattice models based on the Compound Energy Formalism (long-range order (LRO)) which include interstitials and vacancies where appropriate. The FCC_A1 and BCC_B2 solid solutions have C as an interstitial species. Please note that HCP_A3 does not have C as an interstitial species.

Table 4: Optimized binary systems of the FTlite 8.3 Database (quality → Figure 1)

System	Liquid Model	Comments	Source
Ag - Al	Bragg-Williams R-K Polynomial		S.S. Lim, P.L. Rossiter, J.W. Tibbals, Calphad 19 (1995) 131-142.
Ag - As	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2018
Ag - Au	MQMPA (Pair Fraction Exp.)	BW liquid converted to MQMPA, no ordered phases	M. Hassam, J. Agren, M.Gaune-Escard, J.P.Bros, Metall. Trans. 21A (1990) 1877-1884.
Ag - B	Bragg-Williams R-K Polynomial		unpublished assessment of Korb (2004) supplied by GTT to SGTE in 2005
Ag - Ba	Bragg-Williams R-K Polynomial		SGTE
Ag - Be	Bragg-Williams R-K Polynomial		SGTE
Ag - Bi	MQMPA (Pair Fraction Exp.)		J. Wang, CRCT, 2015
Ag - C	MQMPA (Pair Fraction Exp.)	graphite saturation	P. Chartrand, CRCT, 2014
Ag - Ca	MQMPA (Pair Fraction Exp.)		J. Wang, I.-H. Jung and P. Chartrand, "Thermodynamic modeling of then Ag-(Ca, Li, Zn) and Ca-(In, Li) binary systems", 2014
Ag - Co	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2014
Ag - Cr	Bragg-Williams R-K Polynomial		SGTE
Ag - Cu	MQMPA (Pair Fraction Exp.)		J. Wang, CRCT, 2015
Ag - Fe	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2014
Ag - Ga	Bragg-Williams R-K Polynomial	Stoichiometric Ag_2Ga	W. Gierlotka, D. Jendrzejczyk-Handzlik / Journal of Alloys and Compounds 509 (2011) 38–42
Ag - Ge	Bragg-Williams R-K Polynomial		P.Y. Chevalier, Thermochimica Acta 130 (1988) 25-32.
Ag - H	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FactPS Database Valid for Ag-rich region	P. Chartrand, CRCT, 2014
Ag - In	MQMPA (Pair Fraction Exp.)		J. WANG, P. HUDON, D. KEVORKOV, P. CHARTRAND, I.-H. JUNG and M. MEDRAJ, "Thermodynamic and Experimental Study of the Mg-Sn-Ag-In Quaternary System", *Journal of Phase Equilibria and Diffusion*, Volume 35, Issue 3, (June 2014), pp 284-31.
Ag - K	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2014
Ag – Li	MQMPA (Pair Fraction Exp.)		J. Wang, I.-H. Jung and P. Chartrand, "Thermodynamic modeling of then Ag-(Ca, Li, Zn) and Ca-(In, Li) binary systems", submitted 2014
Ag - Mg	MQMPA (Pair Fraction Exp.)		J. WANG, P. HUDON, D. KEVORKOV, P. CHARTRAND, I.-H. JUNG and M. MEDRAJ, "Thermodynamic and Experimental Study of the Mg-Sn-Ag-In Quaternary System", *Journal of Phase Equilibria and Diffusion*, Volume 35, Issue 3, (June 2014), pp 284-31.
Ag - Mn	Bragg-Williams R-K Polynomial		I. Karakaya, W. T. Thompson, Bull. Alloy Phase Diagrams, 1990, 11, (5), 80-486
Ag - Mo	MQMPA (Pair Fraction Exp.)		Refitted from unpublished assessment of J.Korb
Ag - N	MQMPA (Pair Fraction Exp.)	Estimated from Cu - N	P.Chartrand, CRCT, 2022
Ag – Na	MQMPA (Pair Fraction Exp.)		J. WANG, N. MIAO, P. CHARTRAND, I.-H. JUNG, "Thermodynamic evaluation and optimization of the (Na + X) binary systems (X = Ag, Ca, In, Sn, Zn) using combined Calphad and first-principles methods of calculation", Journal of Chemical Thermodynamics, 66 (2013) 22-33
Ag - Nb	Bragg-Williams R-K Polynomial		SGTE
Ag – Ni	MQMPA (Pair Fraction Exp.)		J. Wang, CRCT, 2015
Ag - O	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FACTPS Database (or SGPS) Valid for Ag-rich region	P. Chartrand, CRCT, 2021

Ag - P	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2018
Ag – Pb	Bragg-Williams R-K Polynomial		Leo Lukas (Unpublished work, 2000) based on original work of Zimmermann (B. Zimmerman, Thesis, University of Stuttgart 1976 “Optimisation by experimental and calculation of the binary and ternary systems of Ag, Bi, Pb and Tl”).
Ag - Pt	Bragg-Williams R-K Polynomial		SGnobl
Ag - Sb	Bragg-Williams R-K Polynomial	Stoichiometric Ag_3Sb	E. Zoro, C. Servant, B. Legendre, Journal of Phase equilibria and Diffusion, 2007, 28, 250-257
Ag - Sc	Bragg-Williams R-K Polynomial		SGTE
Ag - Si	Bragg-Williams R-K Polynomial		P.Y. Chevalier, Thermochimica Acta 113 (1988) 33-41.
Ag - Sn	MQMPA (Pair Fraction Exp.)		J. WANG, P. HUDON, D. KEVORKOV, P. CHARTRAND, I.-H. JUNG and M. MEDRAJ, “Thermodynamic and Experimental Study of the Mg-Sn-Ag-In Quaternary System”, *Journal of Phase Equilibria and Diffusion*, Volume 35, Issue 3, (June 2014), pp 284-31
Ag - Sr	MQMPA (Pair Fraction Exp.)		Jian Wang, Ph.D. Thesis, Ecole Polytechnique, Montreal, 2014
Ag - Ta	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2018
Ag - Ti	Bragg-Williams R-K Polynomial		Mei Li, Changrong Li, Fuming Wang, Weijing Zhang, CALPHAD, 2005, 29, 269-275
Ag - V	Bragg-Williams R-K Polynomial		SGTE
Ag - W	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2018
Ag - Y	MQMPA (Pair Fraction Exp.)		Jian Wang et al., Intermetallics 136 (2021) 107260
Ag - Zn	MQMPA (Pair Fraction Exp.)		J. Wang, I.-H. Jung and P. Chartrand, "Thermodynamic modeling of then Ag-(Ca, Li, Zn) and Ca-(In, Li) binary systems", submitted 2014
Ag - Zr	MQMPA (Pair Fraction Exp.)		Y-B. Kang & I.-H. Jung, Intermetallics 2010
Al - As	MQMPA (Pair Fraction Exp.)		P.J. Spencer, 2006 (VLAB Project)
Al - Au	Bragg-Williams R-K Polynomial		J.Murray, H.Okamoto, T.B.Massalski, Bull.Alloy Phase Diags.8 (1987) 20-30 (Modified by A.T.Dinsdale to give compatibility with SGTE unary data and to prevent high-temp. stability of fcc)
Al - B	MQMPA (Pair Fraction Exp.)		P.J. Spencer, 2006 (VLAB Project)
Al - Ba	MQMPA (Pair Fraction Exp.)		J.-P. Harvey, CRCT, 2004 (VLAB Project)
Al - Be	Bragg-Williams R-K Polynomial		M. Piché, M.A.Sc., École Polytechnique, 2002
Al - Bi	MQMPA (Pair Fraction Exp.)		M. Paliwal and In-Ho Jung, "Thermodynamic modeling of Al-Bi, Al-Sb, Mg-Al-Bi and Mg-Al-Sb systems"Calphad, 2010, vol. 34, pp. 51-63.
Al - C	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2004
Al - Ca	MQMPA (Pair Fraction Exp.)		Y-B. Kang, CRCT, 2008
Al - Ce	MQMPA (Pair Fraction Exp.)		L. JIN, Y.-B. KANG, P. CHARTRAND and C.D. FUERST, “Thermodynamic evaluation and optimization of Al-La, Al-Ce, Al-Pr, Al-Nd and Al-Sm systems using the Modified Quasichemical Model for liquids”, CALPHAD: Computer Coupling of Phase Diagrams and Thermochemistry, 35(1), p.30-41, 2011.
Al - Co	Bragg-Williams R-K Polynomial	Stoichiometric AlCo-B2	N. Dupin, I. Ansara, La Revue de Metallurgie-CIT/Sceince et Genie des Materiaux, September 1998, 1121-1129, "Thermodynamic evaluation of the system Al-Co"
Al - Cr	MQMPA (Pair Fraction Exp.)		S.Cui and I.-H.Jung, J. Alloys and Compounds, no.708, 2017 pp.887-902
Al - Cu	Bragg-Williams R-K Polynomial		COST 507, pp.28-33; Vol.Data: C. Robelin, CRCT, 2006 (VLAB Project)
Al - Dy	MQMPA (Pair Fraction Exp.)		L. JIN, Y.-B. KANG, P. CHARTRAND and C.D. FUERST, “Thermodynamic evaluation and optimization of Al-Gd, Al-Tb, Al-Dy, Al-Ho and Al-Er systems using a Modified Quasichemical Model for the liquid”, CALPHAD: Computer Coupling of Phase Diagrams and Thermochemistry, 34(4), p.456-466, 2010

Al - Er	MQMPA (Pair Fraction Exp.)		L. JIN, Y.-B. KANG, P. CHARTRAND and C.D. FUERST, "Thermodynamic evaluation and optimization of Al-Gd, Al-Tb, Al-Dy, Al-Ho and Al-Er systems using a Modified Quasichemical Model for the liquid", CALPHAD: Computer Coupling of Phase Diagrams and Thermochemistry, 34(4), p.456-466, 2010
Al - Eu	MQMPA (Pair Fraction Exp.)		Liling Jin, Ph.D. Thesis, Ecole Polytechnique (2012)
Al - Fe	MQMPA (Pair Fraction Exp.)	Missing Fe_3Al $D0_3$ (lt)	A. T. Phan & Y-B Kang, Acta Materiala 2014
Al - Ga	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2016 modified from A.Watson CALPHAD 1992
Al - Gd	MQMPA (Pair Fraction Exp.)		L. JIN, Y.-B. KANG, P. CHARTRAND and C.D. FUERST, "Thermodynamic evaluation and optimization of Al-Gd, Al-Tb, Al-Dy, Al-Ho and Al-Er systems using a Modified Quasichemical Model for the liquid", CALPHAD: Computer Coupling of Phase Diagrams and Thermochemistry, 34(4), p.456-466, 2010
Al - Ge	Bragg-Williams R-K Polynomial		I. Ansara, J. P. Bros, M. Gambino, CALPHAD 1979, 3(3), 225
Al - H	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FactPS Database Valid for Al – AlH_3	J.-P. HARVEY and P. CHARTRAND, "Modeling the Hydrogen Solubility in Liquid Aluminum Alloys", *Metallurgical and Materials Transactions. B, Process Metallurgy and Materials Processing Science*, 41(4), p. 908-924, 2010.
Al - Hf	Bragg-Williams R-K Polynomial		T.Wang,Z.Jin & J.-C.Zhao, JPE, vol.23, no.5, p.416, 2002
Al - Ho	MQMPA (Pair Fraction Exp.)		L. JIN, Y.-B. KANG, P. CHARTRAND and C.D. FUERST, "Thermodynamic evaluation and optimization of Al-Gd, Al-Tb, Al-Dy, Al-Ho and Al-Er systems using a Modified Quasichemical Model for the liquid", CALPHAD: Computer Coupling of Phase Diagrams and Thermochemistry, 34(4), p.456-466, 2010
Al - In	Bragg-Williams R-K Polynomial		I. Ansara, C Chatillon, H. L. Lukas, T. Nishizawa, H. Ohtani, K. Ishida, M. Hillert, B. Sundman, B. B. Argent, A. Watson, T. G. Chart, T. Anderson, CALPHAD 1994, 18(4), 177-222
Al - K	MQMPA (Pair Fraction Exp.)	Estimated from Al-Na	P. Chartrand, CRCT, 2000
Al - La	MQMPA (Pair Fraction Exp.)		L. JIN, Y.-B. KANG, P. CHARTRAND and C.D. FUERST, "Thermodynamic evaluation and optimization of Al-La, Al-Ce, Al-Pr, Al-Nd and Al-Sm systems using the Modified Quasichemical Model for liquids", CALPHAD: Computer Coupling of Phase Diagrams and Thermochemistry, 35(1), p.30-41, 2011.
Al - Li	MQMPA (Pair Fraction Exp.)		J.-P. HARVEY and P. CHARTRAND, "Modeling the Hydrogen Solubility in Liquid Aluminum Alloys", *Metallurgical and Materials Transactions. B, Process Metallurgy and Materials Processing Science*, 41(4), p. 908-924, 2010.
Al - Lu	MQMPA (Pair Fraction Exp.)		Liling Jin, Ph.D. Thesis, Ecole Polytechnique (2012)
Al - Mg	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2006; Vol.Data: F.Gemme, CRCT, 2003 (VLAB project); C.Aliravci, 2007 (GM Project).
Al - Mn	MQMPA (Pair Fraction Exp.)		M.-S. Kim and Y-B Kang, JPED 2015
Al - Mo	MQMPA (Pair Fraction Exp.)		Zhijun Zhu, CRCT, 2021
Al - N	Bragg-Williams R-K Polynomial	Gaseous species must be taken from FactPS Database Valid for Al - AlN	SGTE
Al - Na	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2000 (FACT Consortium Project)
Al - Nb	Bragg-Williams R-K Polynomial		C Servant and I. Ansara, J. Chim. Phys. 1997, 94, 869-888
Al - Nd	MQMPA (Pair Fraction Exp.)		L. JIN, Y.-B. KANG, P. CHARTRAND and C.D. FUERST, "Thermodynamic evaluation and optimization of Al-La, Al-Ce, Al-Pr, Al-Nd and Al-Sm systems using the Modified Quasichemical Model for liquids", CALPHAD: Computer Coupling of Phase Diagrams and Thermochemistry, 35(1), p.30-41, 2011.
Al - Ni	Bragg-Williams R-K Polynomial		COST-507 K. Hack, GTT-Technologies, private communication, 2003

Al - O	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FACTPS Database Valid for Al - AlO	P. Chartrand, CRCT, 2021
Al - P	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Al - Pb	MQMPA (Pair Fraction Exp.)		Y.-B. Kang, CRCT, 2009
Al - Pr	MQMPA (Pair Fraction Exp.)		L. JIN, Y.-B. KANG, P. CHARTRAND and C.D. FUERST, "Thermodynamic evaluation and optimization of Al-La, Al-Ce, Al-Pr, Al-Nd and Al-Sm systems using the Modified Quasichemical Model for liquids", CALPHAD: Computer Coupling of Phase Diagrams and Thermochemistry, 35(1), p.30-41, 2011.
Al - Pt	Bragg-Williams R-K Polynomial		K.Wu and Z.Jin, Journal of Phase Equilibria, 21(3), 2000, 221-226
Al - Sb	MQMPA (Pair Fraction Exp.)		M. Paliwal and In-Ho Jung, "Thermodynamic modeling of Al-Bi, Al-Sb, Mg-Al-Bi and Mg-Al-Sb systems"Calphad, 2010, vol. 34, pp. 51-63.
Al - Sc	MQMPA (Pair Fraction Exp.)		Y.-B. Kang, A.D. Pelton. P. Chartrand and C. Fuerst, Calphad 32 (2008), pp. 413-422
Al - Si	MQMPA (Pair Fraction Exp.)		J.-P. Harvey, M.A.Sc. thesis, Ecole Polytechnique, 2006; Vol. Data: F. Gemme, CRCT, 2003 (VLAB project)
Al - Sm	MQMPA (Pair Fraction Exp.)		Liling Jin, Ph.D. Thesis, Ecole Polytechnique (2012)
Al - Sn	MQMPA (Pair Fraction Exp.)		Y.-B. Kang and A.D. Pelton, CALPHAD: Computer Coupling of Phase Diagrams and Thermochemistry 34 (2010) 180 188
Al - Sr	MQMPA (Pair Fraction Exp.)		P.-A. Anctil, Projet de fin d'etudes, CRCT, 2003
Al - Ta	Bragg-Williams R-K Polynomial		V.T. Witusiewicz et al. / Intermetallics 18 (2010) 92–106
Al - Tb	MQMPA (Pair Fraction Exp.)		Liling Jin, Ph.D. Thesis, Ecole Polytechnique (2012)
Al - Ti	MQMPA (Pair Fraction Exp.)		Zhijun Zhu, CRCT, 2021
Al - Tm	MQMPA (Pair Fraction Exp.)		Liling Jin, Ph.D. Thesis, Ecole Polytechnique (2012)
Al - V	MQMPA (Pair Fraction Exp.)		Zhijun Zhu, CRCT, 2021
Al - W	Bragg-Williams R-K Polynomial		COST 507, pp.103-108.
Al - Y	MQMPA (Pair Fraction Exp.)		Y.-B. Kang, A.D. Pelton. P. Chartrand and C. Fuerst, Calphad 32 (2008), pp. 413-422
Al - Yb	MQMPA (Pair Fraction Exp.)		Liling Jin, Ph.D. Thesis, Ecole Polytechnique (2012)
Al - Zn	MQMPA (Pair Fraction Exp.)		Liquid: P. Chartrand, CRCT, 2006 (VLAB Project); Vol.Data. F.Gemme, CRCT, 2003 (VLAB Project); solids S. –L. Chen and Y.A. Chang, Calphad, 17 (1993), pp. 113-124.
Al - Zr	Bragg-Williams R-K Polynomial		COST 507, pp.112-116.
As - Au	Bragg-Williams R-K Polynomial		P.J.Spencer, June 1998
As - Bi	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2018
As - Cu	Bragg-Williams R-K Polynomial	Stoichiometric Cu_3As	M.Hamalainen, private communication
As - Fe	Bragg-Williams R-K Polynomial	Missing stoichiometric compounds	P. J. Spencer, 2008
As - Ga	Bragg-Williams R-K Polynomial		C. Chatillon, I. Ansara, A. Watson and B. B. Argent: CALPHAD, 1990, 14(2), 203-14.
As - Ge	Bragg-Williams R-K Polynomial		I. Ansara and D. Dutarte: CALPHAD, 1984, 8(4), 323-342
As - In	Bragg-Williams R-K Polynomial		C. Chatillon, I. Ansara, A. Watson and B. B. Argent: CALPHAD, 1990, 14(2), 203-14.
As - Ni	Bragg-Williams R-K Polynomial		S. Uhland et al., CALPHAD 25[1] (2001) 109-124
As - P	Bragg-Williams R-K Polynomial		I Ansara, C Chatillon, H. L. Lukas, T. Nishizawa, H. Ohtani, K. Ishida, M. Hillert, B. Sundman, B. B. Argent, A. Watson, T. G. Chart, T. Anderson: CALPHAD 1994, 18(4), 177-222
As - Pb	Bragg-Williams R-K Polynomial		M.Hamalainen, private communication
As - Pt	Bragg-Williams R-K Polynomial		M. Li et al. / Journal of Alloys and Compounds 437 (2007) 71–79
As - Sb	Bragg-Williams R-K Polynomial		I Ansara, C Chatillon, H. L. Lukas, T. Nishizawa, H. Ohtani, K. Ishida, M. Hillert, B. Sundman, B. B. Argent, A. Watson, T. G.

			Chart, T. Anderson: CALPHAD 1994, 18(4), 177-222
As - Si	MQMPA (Pair Fraction Exp.)		P.-J. Spencer, 2006
As - Sn	Bragg-Williams R-K Polynomial		L.Wu et al., CALPHAD (74) 2021, 102296
As - Zn	MQMPA (Pair Fraction Exp.)		O. Kidari and P. Chartrand, CRCT, 2023
Au - B	Bragg-Williams R-K Polynomial		SGTE
Au - Bi	Bragg-Williams R-K Polynomial		C. Servant, E. Zoro and B. Legendre, Calphad, 30 (2006) 443
Au - C	Bragg-Williams R-K Polynomial		P.J. Spencer (2007)
Au - Co	Bragg-Williams R-K Polynomial		H.Q.Dong et al., J. Electronic Mater., 38(10) 2009, p.2158
Au - Cr	Bragg-Williams R-K Polynomial		P.J. Spencer, (1998)
Au - Cu	Bragg-Williams R-K Polynomial	No ordered $L1_2$ & $L1_0$ phases	B.Sundman, S.G.Fries, A.Oates, Calphad 22 (1998) 335-354
Au – Fe	Bragg-Williams R-K Polynomial		Y.Liu et al., CALPHAD 476 (2009) 79-83
Au - Ga	Bragg-Williams R-K Polynomial		J. Wang, Y. Liu, L. Liu, H. Zhou, Z. Jin, Calphad 35(2) (2011) 242-248
Au - Ge	Bragg-Williams R-K Polynomial		P. Y. Chevalier: Thermochimica Acta, 1989, 141, 217-22
Au - In	Bragg-Williams R-K Polynomial		I.Ansara, J.P.Nabot, Calphad 16 (1992) 13-18
Au – Ni	Bragg-Williams R-K Polynomial		J. Wang et al., CALPHAD (2005) pp.263-268
Au - Pb	Bragg-Williams R-K Polynomial		J.P.Nabot, Thesis, Grenoble,1986
Au - Pt	Bragg-Williams R-K Polynomial		SGnobl
Au - Sb	Bragg-Williams R-K Polynomial		E.Zoro, C.Servant and B.Legendre, J.Thermal Anal. & Calo., 90[2] (2007) pp.347-353
Au - Si	Bragg-Williams R-K Polynomial		SGTE
Au - Sn	Bragg-Williams R-K Polynomial		P.Y.Chevalier, Thermochimica Acta 130 (1988) 1-13
Au - Ti	Bragg-Williams R-K Polynomial		W.Luo et al., CALPHAD 25(1) 2001 19-26
Au - Zn	Bragg-Williams R-K Polynomial	Intermetallic solutions missing – liquid and FCC-A1 only	H.S.Liu et al., Intermetallics 11 (2003) 987–994
B - Ba	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2022
B - C	MQMPA (Pair Fraction Exp.)		P.-J. Spencer, 2007
B - Ca	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2022
B - Co	Bragg-Williams R-K Polynomial		SGTE
B - Cr	Bragg-Williams R-K Polynomial		L.M. Pan, unpublished research in SGTE Solution Database, 1991.
B - Cu	Bragg-Williams R-K Polynomial		SGTE
B - Fe	Bragg-Williams R-K Polynomial		B. Hallemans, P.Wollants, J.Roos, J. Phase Equilib. 16 (1995), pp. 137-149.
B - Ga	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2014
B - Ge	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2014
B - Hf	Bragg-Williams R-K Polynomial		COST 507, pp.120-122.
B - K	MQMPA (Pair Fraction Exp.)	Estimated	P. Chartrand, CRCT, 2018
B - Li	MQMPA (Pair Fraction Exp.)	Estimated	P. Chartrand, CRCT, 2014
B - Mg	MQMPA (Pair Fraction Exp.)		X.-F. Sheng, CRCT, 2008 (GM Project)
B - Mn	Bragg-Williams R-K Polynomial		B. Sundman et al., JPE, 2010
B - Mo	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2023
B - N	Bragg-Williams R-K Polynomial	Gaseous species must be taken from FactPS Database Valid for B-BN	SGTE
B - Na	MQMPA (Pair Fraction Exp.)	Estimated	P. Chartrand, CRCT, 2018

B - Nb	Bragg-Williams R-K Polynomial		V.T. Witusiewicz et al. / Journal of Alloys and Compounds 448 (2008) 185–194
B - Nd	Bragg-Williams R-K Polynomial		COST-507
B – Ni	Bragg-Williams R-K Polynomial		L.M. Pan, unpublished research in SGTE Solution Database, 1991.
B – Si	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2007
B - Sn	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2014
B – Sr	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2022
B - Ta	Bragg-Williams R-K Polynomial		A.A.A.Pinto da Silva, et al., CALPHAD 63 (2018) 107-115
B – Ti	MQMPA (Pair Fraction Exp.)		P.-J. Spencer, CRCT, 2005
B – V	Bragg-Williams R-K Polynomial		L.M. Pan, unpublished research in SGTE Solution Database, 1991.
B – W	Bragg-Williams R-K Polynomial		H. Duschanek, P. Rogl, J. Phase Equilib. 16 (1995), pp. 150-161.
B – Zn	Bragg-Williams R-K Polynomial		P. Chartrand 2014
B – Zr	MQMPA (Pair Fraction Exp.)		X.-F. Sheng, CRCT, 2008 (GM Project)
Ba - Be	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ba - Ca	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2004
Ba - Ce	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ba - Co	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2018
Ba - Cr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ba - Cu	Bragg-Williams R-K Polynomial		SGTE
Ba - Dy	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ba - Er	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ba - Eu	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ba - Fe	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ba - Ga	Bragg-Williams R-K Polynomial		X.Li et al., CALPHAD 43 (2013) 52-60
Ba - Gd	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ba - H	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FactPS Database Valid for Ba – BaH_2	P. Chartrand, 2016
Ba - Hf	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2018
Ba - Ho	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ba - K	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2005 (VLAB project)
Ba - La	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ba - Li	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2003 (VLAB project)
Ba - Lu	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ba - Mg	MQMPA (Pair Fraction Exp.)		J.-P. Harvey, Projet de fin d'etudes, CRCT, 2004 (VLAB project)
Ba - Mn	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ba - Mo	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2021
Ba - Na	ideal		Est.
Ba - Nb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2016
Ba - Nd	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ba - Ni	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2016
Ba - Pr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ba - Sc	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014

Ba - Si	MQMPA (Pair Fraction Exp.)		J.P. Harvey 2005
Ba - Sm	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ba – Sr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ba - Ta	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2018
Ba - Tb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ba – Ti	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ba - Tm	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ba – V	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2018
Ba - W	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2018
Ba - Y	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ba - Yb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ba - Zn	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014 modified from J.P. Spencer 2006
Ba – Zr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Be - Ca	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Be - Cu	Bragg-Williams R-K Polynomial		P.J. Spencer, 2003
Be – Fe	Bragg-Williams R-K Polynomial	Stoichiometric BeFe	M. Piché, M.A.Sc., École Polytechnique, 2002
Be – K	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Be – Li	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Be - Mg	Bragg-Williams R-K Polynomial		M. Piché, M.A.Sc., École Polytechnique, 2002
Be - Mn	Bragg-Williams R-K Polynomial		M. Piché, M.A.Sc., École Polytechnique, 2002
Be – Na	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Be – Si	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Be – Sn	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Be – Sr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Be – Zn	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Bi - Co	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Bi - Cr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Bi – Cu	MQMPA (Pair Fraction Exp.)		J. Wang, CRCT, 2015
Bi – Fe	Bragg-Williams R-K Polynomial		from FSstel
Bi – Ga	MQMPA (Pair Fraction Exp.)		B.Kumar et al., CALPHAD 74 (2021)
Bi – Ge	Bragg-Williams R-K Polynomial		P. Y. Chevalier: Thermochimica Acta, 1988, 132, 111-116
Bi – In	Bragg-Williams R-K Polynomial		D.Boa, I.Ansara, Thermochimica Acta 314 (1998) 79-86
Bi - K	MQMPA (Pair Fraction Exp.)		Z.M. CAO, W. XIE, P. CHARTRAND, S.H. WEI, G.W. DU and Z.-Y. QIAO, "Thermodynamic assessment of the Bi-alkali metal (Li, Na, K, Rb) systems using the modified quasichemical model for the liquid phase", *CALPHAD*, 46 (2014), pp.159-167
Bi - Li	MQMPA (Pair Fraction Exp.)		Z.M. CAO, W. XIE, P. CHARTRAND, S.H. WEI, G.W. DU and Z.-Y. QIAO, "Thermodynamic assessment of the Bi-alkali metal (Li, Na, K, Rb) systems using the modified quasichemical model for the liquid phase", *CALPHAD*, 46 (2014), pp.159-167
Bi - Mg	MQMPA (Pair Fraction Exp.)		M. Paliwal and In-Ho Jung, "Thermodynamic modeling of Mg-Bi and Mg-Sb systems and short-range-ordering behavior of the liquid solutions"Calphad, 2009, vol. 33, pp. 744-754.
Bi - Mn	Bragg-Williams R-K Polynomial		K. Oikawa, Y. Mitsui, K. Koyama and K. Anzai, Materials Transactions, Vol. 52, No. 11 (2011) pp. 2032 to 2039
Bi - Na	MQMPA (Pair Fraction Exp.)		Z.M. CAO, W. XIE, P. CHARTRAND, S.H. WEI, G.W. DU and Z.-Y. QIAO, "Thermodynamic assessment of the Bi-alkali metal (Li, Na, K, Rb) systems using the modified quasichemical model for the liquid phase", *CALPHAD*, 46 (2014), pp.159-167

Bi - Ni	MQMPA (Pair Fraction Exp.)		J. Wang, CRCT, 2015
Bi - Pb	Bragg-Williams R-K Polynomial		D.Boa, I.Ansara, Thermochimica Acta 314 (1998) 79-86
Bi - Sb	MQMPA (Pair Fraction Exp.)		P. Chartrand 2018 modified from P.J. Spencer, 2006
Bi - Si	MQMPA (Pair Fraction Exp.)		P.J. Spencer, 2006
Bi - Sn	MQMPA (Pair Fraction Exp.)		J. Wang, CRCT, 2015
Bi - V	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2014
Bi - Zn	Bragg-Williams R-K Polynomial		C.Girard, Thesis, Marseille, 1985
C - Ca	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2018
C - Co	Bragg-Williams R-K Polynomial		A. Fernandez Guillermet: Z. Metallkde., 1987, 78, 700-9
C - Cr	Bragg-Williams R-K Polynomial		B. J. Lee: CALPHAD 1992, 16(2), 121-149
C - Cu	MQMPA (Pair Fraction Exp.)		S. Shubhank and Y.-B.Kang CALPHAD 45 (2014) 127–137
C - Fe	MQMPA (Pair Fraction Exp.)	Incl. metastable carbides	M-S Kim, Y-B Kang JPE 2015
C - Ge	MQMPA (Pair Fraction Exp.)		P.Chartrand, 2014
C - Hf	Bragg-Williams R-K Polynomial		Bittermann and Rogl, JPE, 18(4), p 344, 1997
C - Mg	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
C - Mn	MQMPA (Pair Fraction Exp.)		M.K. Paek, Y-B Kang, CALPHAD 46 (2014), 92-102
C – Mo	Bragg-Williams R-K Polynomial		SGTE
C – Na	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2013
C - Nb	Bragg-Williams R-K Polynomial		WM Huang: Mater. Sci. and Techn. 1990, 6(8), 687-694
C - Ni	Bragg-Williams R-K Polynomial		B. J. Lee: CALPHAD, 1992, 16(2), 121-149
C - P	Bragg-Williams R-K Polynomial		P. Gustafson: Inst. Met. Res. (Report IM-2549, 1990))
C - Pb	Bragg-Williams R-K Polynomial		unpublished assessment of T. G. Chart, NPL 1987
C - Pt	Bragg-Williams R-K Polynomial		GTT, 2005
C - Sb	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2018
C - Si	MQMPA (Pair Fraction Exp.)		M-K Paek, Y-B Kang CALPHAD 46 (2014) 92–102
C - Sn	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2007
C - Ta	Bragg-Williams R-K Polynomial		P. Chartrand, 2003
C - Ti	MQMPA (Pair Fraction Exp.)		P.J. Spencer, 2007 (VLAB Project)
C - V	Bragg-Williams R-K Polynomial		WM Huang : Z. Metallkde, 1991, 82, (3), 174-181
C - W	Bragg-Williams R-K Polynomial		P. Gustafson: Report TRITA 0212 (1985), Mat. Sci and Tech. 1986, 2(7), 653-658
C - Zr	Bragg-Williams R-K Polynomial		A. Fernandez Guillermet: J. Alloys Compounds, 1995, 217, 69-89
Ca - Ce	MQMPA (Pair Fraction Exp.)		Rui Gao, Thesis, McGill Univ., 2019
Ca – Co	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2014
Ca - Cr	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2014
Ca - Cu	MQMPA (Pair Fraction Exp.)		Jian Wang et al., Calphad 75 (2021) 102325
Ca - Dy	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ca - Er	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ca - Eu	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ca - Fe	MQMPA (Pair Fraction Exp.)		S.Cui, M.Paliwal and I.-H. Jung, MetTrans 2014
Ca - Ga	Bragg-Williams R-K Polynomial		X.Li et al., CALPHAD 43 (2013) 52-60
Ca - Gd	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ca - Ge	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2023

Ca - H	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FactPS Database Valid for Ca – CaH_2	J.-P. HARVEY and P. CHARTRAND, "Modeling the Hydrogen Solubility in Liquid Aluminum Alloys", *Metallurgical and Materials Transactions. B, Process Metallurgy and Materials Processing Science*, 41(4), p. 908-924, 2010.
Ca - Hf	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2018
Ca - Ho	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ca - In	MQMPA (Pair Fraction Exp.) + BW		J. Wang, I.-H. Jung and P. Chartrand, "Thermodynamic modeling of then Ag-(Ca, Li, Zn) and Ca-(In, Li) binary systems", submitted 2014
Ca - K	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2003 (VLAB project)
Ca - La	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ca - Li	MQMPA (Pair Fraction Exp.)		J. Wang, I.-H. Jung and P. Chartrand, "Thermodynamic modeling of then Ag-(Ca, Li, Zn) and Ca-(In, Li) binary systems", submitted 2014
Ca - Lu	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ca - Mg	MQMPA (Pair Fraction Exp.)		J. Wang, Ph.D. Thesis, Ecole Polytechnique, 2014
Ca - Mn	MQMPA (Pair Fraction Exp.)		P.J. Spencer, 2006 (GM project)
Ca – Mo	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ca - Na	MQMPA (Pair Fraction Exp.)		J. WANG, N. MIAO, P. CHARTRAND, I.-H. JUNG, "Thermodynamic evaluation and optimization of the (Na + X) binary systems (X = Ag, Ca, In, Sn, Zn) using combined Calphad and first-principles methods of calculation", Journal of Chemical Thermodynamics, 66 (2013) 22-33
Ca - Nb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2016
Ca - Nd	MQMPA (Pair Fraction Exp.)		Rui Gao, 2019 (McGill Thesis)
Ca - Ni	Bragg-Williams R-K Polynomial		M. Medraj, 2006
Ca - O	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FACTPS Database Valid for Ca - CaO	P. Chartrand, 2000
Ca - Pb	Bragg-Williams R-K Polynomial		V.P.Itkin and C.B.Alcock, J. Phase Equilib. 1992, pp.162-169
Ca - Pr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ca - Sc	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ca - Si	MQMPA (Pair Fraction Exp.)		M. HEYRMAN and P. CHARTRAND, "Thermodynamic Evaluation and Optimization of the Ca-Si System", *J. Phase Equilibria and Diffusion*, 27 [3], 220-230, 2006
Ca - Sm	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ca - Sn	MQMPA (Pair Fraction Exp.)		Jian Wang, Ph.D. Thesis, Ecole Polytechnique, Montreal, 2014
Ca - Sr	MQMPA (Pair Fraction Exp.)		Jian Wang, Ph.D. Thesis, Ecole Polytechnique, Montreal, 2014
Ca - Ta	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2018
Ca - Tb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ca - Ti	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2018
Ca - Tm	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ca – V	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2018
Ca - W	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2018
Ca - Y	MQMPA (Pair Fraction Exp.)		Rui Gao 2019 Thesis McGill
Ca - Yb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ca - Zn	MQMPA (Pair Fraction Exp.)		P. Spencer, A.D. Pelton., Y.-B. Kang, P. Chartrand, and C. Fuerst, Calphad 32 (2007), pp. 423-431
Ca - Zr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ce - Co	MQMPA (Pair Fraction Exp.)		L. Jin, P. Chartrand, CRCT, 2020
Ce - Cr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014

Ce - Cu	Bragg-Williams R-K Polynomial		SGTE
Ce - Eu	MQMPA (Pair Fraction Exp.)		Y.-B. Kang, CRCT, 2008
Ce - Fe	MQMPA (Pair Fraction Exp.)		B. Konar and I.-H. Jung, McGill, 2014
Ce - Gd	MQMPA (Pair Fraction Exp.)	estimated from Ce-Y	Y.-B. Kang, CRCT, 2008
Ce - Ho	MQMPA (Pair Fraction Exp.)	Ideal	Y.-B. Kang, CRCT, 2008
Ce - In	MQMPA (Pair Fraction Exp.)		P.J. Spencer, 2006
Ce - K	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ce - La	MQMPA (Pair Fraction Exp.)	ideal	Y.-B. Kang, CRCT, 2008
Ce - Li	MQMPA (Pair Fraction Exp.)		Y.-B. Kang, CRCT, 2005
Ce - Mg	MQMPA (Pair Fraction Exp.)		Y.-B. KANG, L. JIN, P. CHARTRAND, A. E. GHERIBI, K. BAI and P. WU, "Thermodynamic evaluations and optimizations of binary Mg-light Rare-Earth (La, Ce, Pr,Nd, Sm) Systems", *CALPHAD*, 38, 100-116, 2012
Ce - Mn	MQMPA (Pair Fraction Exp.)		Y.-B. Kang, A.D. Pelton., P. Chartrand, P. Spencer and C. Fuerst, J. Phase Equil. Diff. 28 (2007), pp. 342-354
Ce - Mo	Bragg-Williams R-K Polynomial		W.Chan, M.C. Gao, O.N. Dogan, P. King, JPEDAV (31) 2010
Ce - Na	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ce - Nb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Ce - Pr	MQMPA (Pair Fraction Exp.)		Y.-B. Kang, CRCT, 2008
Ce - Sc	MQMPA (Pair Fraction Exp.)	ideal	Y.-B. Kang, CRCT, 2008
Ce - Si	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Ce - Sm	MQMPA (Pair Fraction Exp.)		Y.-B. Kang, CRCT, 2008
Ce - Sn	MQMPA (Pair Fraction Exp.)		Kim, Thesis, McGill Univ., 2016
Ce - Sr	MQMPA (Pair Fraction Exp.)		P.J. Spencer, 2006
Ce - Ta	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Ce - Ti	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ce - V	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ce - Y	MQMPA (Pair Fraction Exp.)		Y.-B. Kang, A.D. Pelton., P. Chartrand, P. Spencer and C. Fuerst, J. Phase Equil. Diff. 28 (2007), pp. 342-354
Ce - Zn	MQMPA (Pair Fraction Exp.)		Zhijun Zhu and A.D. Pelton, 2014
Ce - Zr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Co - Cr	MQMPA (Pair Fraction Exp.)		A.Kusoffsky, B.Jansson, Calphad 21 (1997) 321-333; liquid converted to MQMPA [2022Cha]
Co - Cu	Bragg-Williams R-K Polynomial		P.J.Spencer - L.Kaufman interaction parameters with SGTE element data
Co - Dy	MQMPA (Pair Fraction Exp.)		L. Jin, P. Chartrand, CRCT, 2020
Co - Er	MQMPA (Pair Fraction Exp.)		L. Jin, P. Chartrand, CRCT, 2020
Co - Fe	MQMPA (Pair Fraction Exp.)		A.F.Guillermet, High Temp. High Press. 19 (1988) 477-499; liquid converted to MQMPA [2021Cha]
Co - Ga	Bragg-Williams R-K Polynomial		A. Chari et al. / CALPHAD: Computer Coupling of Phase Diagrams and Thermochemistry 34 (2010) 189–195
Co - Gd	MQMPA (Pair Fraction Exp.)		L. Jin, P. Chartrand, CRCT, 2020
Co - Hf	Bragg-Williams R-K Polynomial		Lu, Cheng, ..., Du J.Alloys & Compounds 2015
Co – Ho	MQMPA (Pair Fraction Exp.)		L. Jin, P. Chartrand, CRCT, 2020
Co – In	Bragg-Williams R-K Polynomial		D. Boa, B. K. Dongui, I. Ansara: CALPHAD 25 (2001) 645-650
Co – K	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Co - La	MQMPA (Pair Fraction Exp.)		L. Jin, P. Chartrand, CRCT, 2020
Co – Li	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Co – Mg	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2018

Co – Mn	Bragg-Williams R-K Polynomial		W.Huang, Calphad 13 (1989) 231-242
Co - Mo	Bragg-Williams R-K Polynomial		SGTE
Co – N	Bragg-Williams R-K Polynomial	Gaseous species must be taken from FACTPS Database Valid for Co – Co_2N	SGTE
Co – Na	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Co – Nb	Bragg-Williams R-K Polynomial		K.C.H.Kumar, I.Ansara, P.Wollants, L.Delaey, J.Alloys and Cpds. 267 (1998) 105-112
Co - Nd	MQMPA (Pair Fraction Exp.)		L. Jin, P. Chartrand, CRCT, 2020
Co – Ni	Bragg-Williams R-K Polynomial		A.F.Guillermet, Z.Metallkde. 78 (1987) 639-647; Z.Metallkde. 79 (1988) 524-536
Co - O	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FACTPS Database Valid for Co - CoO	P. Chartrand, CRCT, 2021
Co – Pb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2018
Co - Pr	MQMPA (Pair Fraction Exp.)		L. Jin, P. Chartrand, CRCT, 2020
Co - Pt	Bragg-Williams R-K Polynomial		D.E. Kim et al. / CALPHAD: Computer Coupling of Phase Diagrams and Thermochemistry 35 (2011) 323–330
Co - Sb	Bragg-Williams R-K Polynomial		Y.Zhang et al., CALPHAD 33 (2009) 405–414
Co – Sc	MQMPA (Pair Fraction Exp.)		L. Jin, P. Chartrand, CRCT, 2020
Co – Si	Bragg-Williams R-K Polynomial	Stoichiometric CoSi Inverted L-L miscibility gap above 3000°C	S.D.Choi, Calphad 16 (1992) 151-159
Co - Sm	MQMPA (Pair Fraction Exp.)		L. Jin, P. Chartrand, CRCT, 2020
Co – Sn	Bragg-Williams R-K Polynomial		L.Liu et al., J.Electron.Mater.33(9) (2004) 935-939
Co – Sr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2018
Co – Ta	Bragg-Williams R-K Polynomial		SGTE
Co - Tb	MQMPA (Pair Fraction Exp.)		L. Jing, CRCT, 2021
Co – Ti	Bragg-Williams R-K Polynomial		G.Cacciamani, R.Ferro, I.Ansara, N.Dupin, submitted to "Intermetallics", 1999
Co – V	Bragg-Williams R-K Polynomial	Stoichiometric Co_3V	J. Bratberg, B. Sundman: J. Phase Equil., (2003), 24(6), 495-503
Co – W	Bragg-Williams R-K Polynomial		Markstrom, Sundman & Frisk JPE (2005)
Co - Y	MQMPA (Pair Fraction Exp.)		L. Jin, P. Chartrand, CRCT, 2020
Co – Zn	Bragg-Williams R-K Polynomial	Missing $CoZn_7$(ht) and CoZn(ht)	G.P. Vassilev, M. Jiang: J. Phase Equil. and Diffusion 2004, 25, 259-268
Co - Zr	Bragg-Williams R-K Polynomial		Durga & Kumar, CALPHAD 2010
Cr - Cu	MQMPA (Pair Fraction Exp.)		S. Cui and I-H Jung, CALPHAD 2017
Cr - Dy	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Cr - Er	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Cr - Eu	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Cr - Fe	MQMPA (Pair Fraction Exp.)		S. Cui and I-H Jung, CALPHAD 2017
Cr - Ga	Bragg-Williams R-K Polynomial		P.Chartrand, CRCT, 2022 (modified from A. Belgacem-Bouzida et al. / Journal of Alloys and Compounds 397 (2005) 155–160)
Cr - Gd	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Cr - H	MQMPA (Pair Fraction Exp.)	estimated from Ti-H; Gaseous species must be taken from FactPS Database Valid for Cr rich region	P. Chartrand 2010
Cr - Hf	Bragg-Williams R-K Polynomial		J.Pavlu et al. CALPHAD 2010
Cr - Ho	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014

Cr - K	MQMPA (Pair Fraction Exp.)	estimated from Fe-K	P. Chartrand 2003
Cr - La	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Cr - Li	MQMPA (Pair Fraction Exp.)	estimated from Fe-Li	P. Chartrand 2003
Cr - Lu	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Cr - Mg	MQMPA (Pair Fraction Exp.)		S. Cui et al., Journal of Alloys and Compounds, 2017
Cr - Mn	Bragg-Williams R-K Polynomial		COST 507, pp.145-148.
Cr - Mo	Bragg-Williams R-K Polynomial		COST 507
Cr - N	Bragg-Williams R-K Polynomial	Gaseous species must be taken from FactPS Database Valid for Cr-CrN **Spurious formation of BCC-A2 above 2200°C (when gas NOT included)**	SGTE
Cr - Na	MQMPA (Pair Fraction Exp.)	estimated from Fe-Na	P. Chartrand, CRCT, 2003
Cr - Nb	Bragg-Williams R-K Polynomial		J.G.Costa Neto, S.G.Fries, H.-L.Lukas, Calphad 17 (1993) 219-228
Cr - Nd	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Cr - Ni	Bragg-Williams R-K Polynomial		B.J. Lee, Calphad 16 1992, pp. 121-149.
Cr - O	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FACTPS Database Valid for Cr - CrO	P.Chartrand, CRCT, 2021
Cr - P	Bragg-Williams R-K Polynomial	Valid in the Cr – Cr_2P region only	SGTE
Cr - Pb	Bragg-Williams R-K Polynomial		P. Chartrand, 2003
Cr - Pr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Cr - Pt	Bragg-Williams R-K Polynomial		Oikawa et al. Journal of Magnetism and Magnetic Materials 236 (2001) 220–233
Cr - Sc	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Cr - Si	MQMPA (Pair Fraction Exp.)		Senlin Cui & In-Ho Jung, Met.Trans.2017
Cr - Sm	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Cr - Sn	Bragg-Williams R-K Polynomial		R. Jerlerud Perez, B. Sundman: CALPHAD, 25 (2001) 59-66
Cr - Sr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Cr - Ta	Bragg-Williams R-K Polynomial		SGTE
Cr - Tb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Cr - Ti	MQMPA (Pair Fraction Exp.)		Zhijun Zhu, CRCT, 2021
Cr - Tm	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Cr - V	Bragg-Williams R-K Polynomial		B.J.Lee, Z.Metallkde 83 (1992) 292-299
Cr - W	Bragg-Williams R-K Polynomial		P. Gustafson, Calphad 12 (1988), pp. 277-292.
Cr - Y	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Cr - Yb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Cr - Zn	Bragg-Williams R-K Polynomial		I.Ansara, COST 507 (1998) ISBN 92-828-3902-8, p.158-160
Cr - Zr	Bragg-Williams R-K Polynomial		K.Zeng, M.Hamalainen, I.Ansara, COST 507 (1998) ISBN 92-828-3902-8 p 161-164
Cu – Eu	Bragg-Williams R-K Polynomial		SGTE
Cu - Fe	MQMPA (Pair Fraction Exp.)		Shubhank and Y-B. Kang, CALPHAD 2014
Cu - Ga	Bragg-Williams R-K Polynomial	Missing Cu_9Ga_4 γ_1, γ_2, γ_3 solid solutions	Li et al., CALPHAD 32(2) (2008), 447-453
Cu - Ge	Bragg-Williams R-K Polynomial		Wang et al. J.Alloys Cmpds 2010

Cu - H	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FactPS Database Valid for Cu - CuH	J.-P. HARVEY and P. CHARTRAND, "Modeling the Hydrogen Solubility in Liquid Aluminum Alloys", *Metallurgical and Materials Transactions. B, Process Metallurgy and Materials Processing Science*, 41(4), p. 908-924, 2010.
Cu - Ho	Bragg-Williams R-K Polynomial		SGTE
Cu - In	Bragg-Williams R-K Polynomial	γ-CuIn, η-CuIn are missing	C.R.Kao, A.Bolcavage et al, J Phase Equilibria 14 (1993) 22-30
Cu - K	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2014
Cu – La	Bragg-Williams R-K Polynomial		SGTE
Cu - Li	Bragg-Williams R-K Polynomial		COST 507, pp.168-169.
Cu - Mg	MQMPA (Pair Fraction Exp.)		S. Cui and I-H. Jung, 2017
Cu - Mn	MQMPA (Pair Fraction Exp.)		S. Cui and I-H. Jung, 2017
Cu – Mo	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2018
Cu - N	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2022
Cu - Na	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2014
Cu - Nb	Bragg-Williams R-K Polynomial		B.J. Lee database, private comunication to SGTE, 1999.
Cu - Nd	Bragg-Williams R-K Polynomial		SGTE
Cu - Ni	MQMPA (Pair Fraction Exp.)		J. Wang, CRCT, 2015
Cu - O	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FACTPS Database Valid for Cu – Cu_2O	P. Chartrand, CRCT, 2018
Cu - P	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2018
Cu - Pb	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2018
Cu - Pr	Bragg-Williams R-K Polynomial		SGTE
Cu - Pt	Bragg-Williams R-K Polynomial		T.Abe, B.Sundman, H.Onodera, JPEDAV (2006) 27:5-13
Cu - Sb	Bragg-Williams R-K Polynomial		SGTE 2004
Cu - Sc	Bragg-Williams R-K Polynomial		SGTE
Cu - Si	MQMPA (Pair Fraction Exp.)		S. Cui and I-H. Jung, CALPHAD, 2017
Cu - Sm	Bragg-Williams R-K Polynomial		SGTE
Cu - Sn	MQMPA (Pair Fraction Exp.)		J. Wang, CRCT, 2015
Cu - Sr	Bragg-Williams R-K Polynomial		SGTE
Cu - Ti	Bragg-Williams R-K Polynomial		K.C.H. Kumar, I. Ansara, P. Wollants, L. Delaey, Z.Metallkde. 87 (1996), pp. 666-672.
Cu - V	Bragg-Williams R-K Polynomial		B.J. Lee database, private comunication to SGTE, 1999.
Cu - W	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2018
Cu - Y	Bragg-Williams R-K Polynomial		COST 507, pp.182-185.
Cu - Zn	Bragg-Williams R-K Polynomial		Liang, Hsiao, Schmid-Fezter CALPHAD, 2015
Cu - Zr	MQMPA (Pair Fraction Exp.)		D.H.Kang I.H.Jung Intermetallics 2010
Dy - Er	MQMPA (Pair Fraction Exp.)	ideal	Y-B. Kang, CRCT, 2008 (GM Project)
Dy - Fe	MQMPA (Pair Fraction Exp.)		B. Konar and I.-H. Jung, McGill, 2014
Dy - Gd	MQMPA (Pair Fraction Exp.)	ideal	Y-B. Kang, CRCT, 2008
Dy - Ho	MQMPA (Pair Fraction Exp.)	ideal	Y-B. Kang, CRCT, 2008
Dy - K	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Dy - Li	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Dy - Mg	MQMPA (Pair Fraction Exp.)		Y-B. Kang and L. Jin, CRCT, 2012
Dy - Mn	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012

Dy - Na	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Dy - Nb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Dy - Nd	MQMPA (Pair Fraction Exp.)	ideal	Y-B. Kang, CRCT, 2008
Dy - Pb	MQMPA (Pair Fraction Exp.)		M.Zydzik et al., CALPHAD 46 (2014) 1-17
Dy - Si	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Dy - Sn	MQMPA (Pair Fraction Exp.)		Kim, Thesis, McGill Univ., 2016
Dy - Sr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Dy - Ta	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Dy - Tb	MQMPA (Pair Fraction Exp.)	ideal	P. Chartrand, 2014
Dy - Ti	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Dy - V	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Dy - Y	MQMPA (Pair Fraction Exp.)	ideal	Y-B. Kang, CRCT, 2008
Dy - Zn	MQMPA (Pair Fraction Exp.)		Zhijun Zhu and A.D. Pelton, 2014
Dy - Zr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Er - Fe	MQMPA (Pair Fraction Exp.)		B. Konar and I.-H. Jung, McGill, 2014
Er - Gd	MQMPA (Pair Fraction Exp.)	ideal	Y-B. Kang, CRCT, 2008
Er - Ho	MQMPA (Pair Fraction Exp.)	ideal	Y-B. Kang, CRCT, 2008
Er - K	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Er - Li	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Er - Mg	MQMPA (Pair Fraction Exp.)		Y-B. Kang and L. Jin, CRCT, 2012
Er - Mn	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Er - Na	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Er - Nb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Er - Nd	MQMPA (Pair Fraction Exp.)	ideal	Y-B. Kang, CRCT, 2008
Er - Sc	MQMPA (Pair Fraction Exp.)		Y-B. Kang, CRCT, 2008
Er - Si	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Er - Sn	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2016
Er - Sr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Er - Ta	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Er - Tb	MQMPA (Pair Fraction Exp.)		Y-B. Kang, CRCT, 2008
Er - Ti	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Er - V	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Er - Y	MQMPA (Pair Fraction Exp.)		Y-B. Kang, CRCT, 2008 (GM Project)
Er - Zn	MQMPA (Pair Fraction Exp.)		Zhijun Zhu and A.D. Pelton, 2014
Er - Zr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Eu - K	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Eu - Li	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Eu - Mg	MQMPA (Pair Fraction Exp.)		Y-B. Kang and L. Jin, CRCT, 2012 (GM Project)
Eu - Mn	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Eu - Na	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Eu - Nb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Eu - Si	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Eu - Sr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014

Eu - Ta	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Eu - Ti	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Eu - V	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Eu - Zn	MQMPA (Pair Fraction Exp.)		Zhijun Zhu and A.D. Pelton, 2014
Eu - Zr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Fe - Gd	MQMPA (Pair Fraction Exp.)		B. Konar and I.-H. Jung, McGill, 2014
Fe - H	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FactPS Database Valid for Fe-rich region	J.-P. HARVEY and P. CHARTRAND, "Modeling the Hydrogen Solubility in Liquid Aluminum Alloys", *Metallurgical and Materials Transactions. B, Process Metallurgy and Materials Processing Science*, 41(4), p. 908-924, 2010.
Fe - Hf	Bragg-Williams R-K Polynomial		M.Idbenali et al., Journal of Alloys and Compounds 456 (2008) 151–158
Fe - Ho	MQMPA (Pair Fraction Exp.)		B. Konar and I.-H. Jung, McGill, 2014
Fe - In	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2022 modified from M.Ohno and K.Yoh, Materials Transactions, Vol. 50, No. 5 (2009) pp. 1202 to 1207
Fe - K	MQMPA (Pair Fraction Exp.)	from Fe in liquid K	P. Chartrand, 2003
Fe - La	MQMPA (Pair Fraction Exp.)		B. Konar and I.-H. Jung, McGill, 2014
Fe - Li	MQMPA (Pair Fraction Exp.)	from Fe in liquid Li	P. Chartrand, 2003
Fe - Lu	MQMPA (Pair Fraction Exp.)		B. Konar and I.-H. Jung, McGill, 2014
Fe - Mg	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2006
Fe - Mn	MQMPA (Pair Fraction Exp.)		M-S Kim, Y-B Kang, JPE, 2015
Fe - Mo	Bragg-Williams R-K Polynomial		SGTE
Fe - N	Bragg-Williams R-K Polynomial	Gaseous species must be taken from FactPS Database Valid for Fe-Fe_2N	SGTE
Fe - Na	MQMPA (Pair Fraction Exp.)	from Fe in liquid Na	P. Chartrand, CRCT, 2003
Fe - Nb	Bragg-Williams R-K Polynomial		Khvan & Hallstedt CALPHAD 2013
Fe – Nd	MQMPA (Pair Fraction Exp.)		B. Konar and I.-H. Jung, McGill, 2014
Fe – Ni	Bragg-Williams R-K Polynomial		A.Dinsdale, T.Chart, NPL, unpublished work, 1986: I.Ansara - fcc ordering
Fe - O	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FACTPS Database Valid for Fe – FeO **Missing non-stoichiometric wustite-FeO** (considered stoichiometric)	P. Chartrand, CRCT, 2021
Fe – P	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2018
Fe – Pb	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2018
Fe – Pr	MQMPA (Pair Fraction Exp.)		B. Konar and I.-H. Jung, McGill, 2014
Fe - Pt	Bragg-Williams R-K Polynomial		P.Fredriksson & B.Sundman, CALPHAD 25(4) 2001, 535-548
Fe – Sb	Bragg-Williams R-K Polynomial		C.Li et al., CALPHAD 47 (2014) 23-34
Fe – Sc	MQMPA (Pair Fraction Exp.)		B. Konar and I.-H. Jung, McGill, 2014
Fe – Si	MQMPA (Pair Fraction Exp.)		S. Cui and I-H Jung CALPHAD 2017
Fe – Sm	MQMPA (Pair Fraction Exp.)		B. Konar and I.-H. Jung, McGill, 2014
Fe - Sn	Bragg-Williams R-K Polynomial		K.C.H.Kumar, P.Wollants, L.Delaey, Calphad 20 (1996) 139-149 (with modifs from P. Chartrand (2018))
Fe - Sr	Bragg-Williams R-K Polynomial		P. Chartrand, CRCT, 2014
Fe - Ta	Bragg-Williams R-K Polynomial		SGTE
Fe - Tb	MQMPA (Pair Fraction Exp.)		B. Konar and I.-H. Jung, McGill, 2014

Fe - Ti	Bragg-Williams R-K Polynomial		P.J. Spencer, 2001 (FACT Consortium)
Fe - Tm	MQMPA (Pair Fraction Exp.)		B. Konar and I.-H. Jung, McGill, 2014
Fe - V	Bragg-Williams R-K Polynomial		W.Huang, Z.Metallkde 82 (1991) 391-401
Fe - W	Bragg-Williams R-K Polynomial		J-O Andersson and P Gustafson: CALPHAD, 1983, 7(4), 317-326
Fe - Y	MQMPA (Pair Fraction Exp.)		B. Konar and I.-H. Jung, McGill, 2014
Fe - Zn	MQMPA (Pair Fraction Exp.)		P. Chartrand (2018) MQMPA calibrated on the solids of Xiong, Du Liu CALPHAD 2009 (later modifications by M.Jacobs)
Fe - Zr	MQMPA (Pair Fraction Exp.)		J.J. Marin Bejarano, CRCT, 2009
Ga - Ge	Bragg-Williams R-K Polynomial		I Ansara, J P Bros, M Gambino: CAPHAD, 1979, 3, 225-233
Ga - In	Bragg-Williams R-K Polynomial		B. C. Rugg, T. G. Chart: CALPHAD, 1990, 14(2), 115-123
Ga - Li	Bragg-Williams R-K Polynomial		H.Azza et al., J. Phase Equilib. Diffus. (2017) 38:788–795
Ga - Mg	MQMPA (Pair Fraction Exp.)		Y-B. Kang, CALPHAD 2014
Ga - Mo	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2023
Ga – N	Bragg-Williams R-K Polynomial		J. Unland, B. Onderka, A. Davydov, R. Schmid-Fetzer, J. of Crystal Growth, 256, 33-51 (2003)
Ga - Na	Bragg-Williams R-K Polynomial		J. Wang et al. / Journal of Crystal Growth 307 (2007) 59-65
Ga - Ni	Bragg-Williams R-K Polynomial		Z.-M.Cao, X.Shi, W.Xie, I.Ohnuma, K.Ishida & Z.-Y.Qiao, Rare Met. (2015) 34(2) 864-872
Ga - P	Bragg-Williams R-K Polynomial		I. Ansara, C. Chatillon, H. L. Lukas, T. Nishizawa, H. Ohtani, K. Ishida, M. Hillert, B. Sundman, B. B. Argent, A. Watson, T. G. Chart, T. Anderson: CALPHAD, 1994, 18(4), 177-222
Ga - Pb	Bragg-Williams R-K Polynomial		I. Ansara, F. Ajersch: J. Phase Equil., 1991, 12(1), 73-77
Ga - Pt	Bragg-Williams R-K Polynomial		M. Li et al. / Intermetallics 14 (2006) 826–831
Ga - Sb	Bragg-Williams R-K Polynomial		I. Ansara, C. Chatillon, H. L. Lukas, T. Nishizawa, H. Ohtani, K. Ishida, M. Hillert, B. Sundman, B. B. Argent, A. Watson, T. G. Chart, T. Anderson: CALPHAD, 1994, 18(4), 177-222
Ga - Sc	Bragg-Williams R-K Polynomial		Z.K. Jun et al. / Journal of Alloys and Compounds 463 (2008) 511–515
Ga - Si	Bragg-Williams R-K Polynomial		Olesinski BAPD (6) 1985, 362-364
Ga – Sn	MQMPA (Pair Fraction Exp.)		B.Kumar et al., Metals (2021)
Ga - Sr	Bragg-Williams R-K Polynomial		X.Li et al., CALPHAD 43 (2013) 52-60
Ga – Ti	Bragg-Williams R-K Polynomial		Y.Liu et al., CALPHAD 41 (2013) 140-149
Ga - V	Bragg-Williams R-K Polynomial		D. Ling et al./CALPHAD 51(2015) 125-132
Ga - Zn	MQMPA (Pair Fraction Exp.)		Dutkiewicz, J., Moser, Z., Zabdyr, L., Gohil ,D. D., Chart, T. G., Ansara I., Girard, C.: Bull. Alloy Phase Diagrams, 1990, 11(1), 77-82; liquid converted to MQMPA [2022Cha]
Ga - Zr	Bragg-Williams R-K Polynomial		W. Luo et al. / Journal of Alloys and Compounds 587 (2014) 497–505
Gd - Ho	MQMPA (Pair Fraction Exp.)	ideal	Y-B. Kang, CRCT, 2008
Gd - K	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Gd - La	MQMPA (Pair Fraction Exp.)		Y-B. Kang, CRCT, 2008
Gd - Li	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Gd - Mg	MQMPA (Pair Fraction Exp.)		Y-B. Kang and L. Jin, CRCT, 2012
Gd - Mn	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Gd - Mo	Bragg-Williams R-K Polynomial		Zinkevich, JPE (22) no.1, 2001
Gd - Na	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Gd - Nb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Gd - Nd	MQMPA (Pair Fraction Exp.)	ideal	Y-B. Kang, CRCT, 2008
Gd - Sc	MQMPA (Pair Fraction Exp.)		Y-B. Kang, CRCT, 2008

Gd - Si	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Gd - Sm	MQMPA (Pair Fraction Exp.)	ideal	Y-B. Kang, CRCT, 2008
Gd - Sn	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2016
Gd - Sr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Gd - Ta	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Gd - Tb	MQMPA (Pair Fraction Exp.)	ideal	Y-B. Kang, CRCT, 2008
Gd - Ti	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Gd - V	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Gd - Y	MQMPA (Pair Fraction Exp.)	ideal	Y-B. Kang, CRCT, 2008
Gd - Yb	MQMPA (Pair Fraction Exp.)		Y-B. Kang, CRCT, 2008
Gd - Zn	MQMPA (Pair Fraction Exp.)		Zhijun Zhu and A.D. Pelton, 2014
Gd - Zr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ge - In	Bragg-Williams R-K Polynomial		P. Y. Chevalier: 1989, 155, 227-240
Ge – K	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2023 with solids from Y. Wang et al. / CALPHAD: Computer Coupling of Phase Diagrams and Thermochemistry 37 (2012) 72–76
Ge - Mg	MQMPA (Pair Fraction Exp.)		Dmitri Nassyrov and In-Ho Jung, "Thermodynamic modeling of the Mg-Ge-Pb system"Calphad, 2009, vol. 33, pp. 521-529.
Ge – Na	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2023 with solids from Y. Wang et al. / CALPHAD: Computer Coupling of Phase Diagrams and Thermochemistry 37 (2012) 72–76
Ge - Ni	Bragg-Williams R-K Polynomial		S.Jin et al./CALPHAD 38 (2012) 23–34
Ge - P	Bragg-Williams R-K Polynomial		H. Dong, X. Tao and M. Paulasto-Krockel, Journal of Electronic Materials (2021) 50:4272-4
Ge - Pb	Bragg-Williams R-K Polynomial		P. Chevalier, Thermochemica Acta, 1989, vol 155, pp. 227-240
Ge - Pt	Bragg-Williams R-K Polynomial		J.S. Wang et al. / CALPHAD: Computer Coupling of Phase Diagrams and Thermochemistry 33 (2009) 561-569
Ge - Sb	Bragg-Williams R-K Polynomial		P. Y. Chevalier, Thermochimica Acta, 1989, 155, 227-240
Ge - Si	Bragg-Williams R-K Polynomial		Z. H. Long, H.S. Liu, Z.P. Jin: J. Alloys Compounds, 479 (2009) 262-267
Ge - Sn	Bragg-Williams R-K Polynomial		Y. Feutelais, B. Legendre, S. G. Fries: CALPHAD, 1996, 20(1), 109-123
Ge - Sr	Bragg-Williams R-K Polynomial		Y. Du et al. / CALPHAD: Computer Coupling of Phase Diagrams and Thermochemistry 33 (2009) 719–722
Ge - V	Bragg-Williams R-K Polynomial		C.P. Wang et al. / Intermetallics 16 (2008) 544-549
Ge - Zn	Bragg-Williams R-K Polynomial		P. Chevalier, Thermochimica Acta, 1989, vol 155, pp. 227-240
H - Li	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FactPS Database Valid for Li - LiH	J.-P. HARVEY and P. CHARTRAND, "Modeling the Hydrogen Solubility in Liquid Aluminum Alloys", *Metallurgical and Materials Transactions. B, Process Metallurgy and Materials Processing Science*, 41(4), p. 908-924, 2010.
H - Mg	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FactPS Database Valid for Mg – MgH_2	J.-P. HARVEY and P. CHARTRAND, "Modeling the Hydrogen Solubility in Liquid Aluminum Alloys", *Metallurgical and Materials Transactions. B, Process Metallurgy and Materials Processing Science*, 41(4), p. 908-924, 2010.
H - Mn	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FactPS Database Valid for Mn-rich region	J.-P. HARVEY and P. CHARTRAND, "Modeling the Hydrogen Solubility in Liquid Aluminum Alloys", *Metallurgical and Materials Transactions. B, Process Metallurgy and Materials Processing Science*, 41(4), p. 908-924, 2010.
H - Na	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FactPS Database Valid for Na - NaH	J.-P. HARVEY and P. CHARTRAND, "Modeling the Hydrogen Solubility in Liquid Aluminum Alloys", *Metallurgical and Materials Transactions. B, Process Metallurgy and Materials Processing Science*, 41(4), p. 908-924, 2010.
H - Ni	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FactPS Database Valid for Ni-rich region	J.-P. HARVEY and P. CHARTRAND, "Modeling the Hydrogen Solubility in Liquid Aluminum Alloys", *Metallurgical and Materials Transactions. B, Process Metallurgy and Materials Processing Science*, 41(4), p. 908-924, 2010.
H - Si	MQMPA (Pair Fraction Exp.)	Gaseous species must be	J.-P. HARVEY and P. CHARTRAND, "Modeling the Hydrogen

		taken from FactPS Database Valid for Si-rich region	Solubility in Liquid Aluminum Alloys", *Metallurgical and Materials Transactions. B, Process Metallurgy and Materials Processing Science*, 41(4), p. 908-924, 2010.
H - Sn	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FactPS Database	P. Chartrand, CRCT, 2023; fitting optimized solubility from M.-C.Heuzey (FTmisc).
H - Sr	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FactPS Database Valid for Sr – SrH_2	J.-P. HARVEY and P. CHARTRAND, "Modeling the Hydrogen Solubility in Liquid Aluminum Alloys", *Metallurgical and Materials Transactions. B, Process Metallurgy and Materials Processing Science*, 41(4), p. 908-924, 2010.
H - Ti	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FactPS Database Valid for Ti – TiH_2	J.-P. HARVEY and P. CHARTRAND, "Modeling the Hydrogen Solubility in Liquid Aluminum Alloys", *Metallurgical and Materials Transactions. B, Process Metallurgy and Materials Processing Science*, 41(4), p. 908-924, 2010.
H - Zn	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FactPS Database Valid for Zn-rich region	J.-P. HARVEY and P. CHARTRAND, "Modeling the Hydrogen Solubility in Liquid Aluminum Alloys", *Metallurgical and Materials Transactions. B, Process Metallurgy and Materials Processing Science*, 41(4), p. 908-924, 2010.
H - Zr	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FactPS Database Valid for Zr-rich region	P. Chartrand, CRCT, 2014 from Ti-H of J.P. Harvey 2006
Hf - K	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2018
Hf - Li	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2023
Hf - Mg	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2014
Hf – Mn	Bragg-Williams R-K Polynomial		P.Zhou et al., JPE 33(1) 2012 pp.20-28
Hf - Mo	Bragg-Williams R-K Polynomial	Stoichiometric $HfMo_2$ C15 and C36 phases	G. Shao / Intermetallics 10 (2002) 429–434
Hf - N	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2023
Hf – Na	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2018
Hf - Nb	Bragg-Williams R-K Polynomial		SGTE
Hf - Ni	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2023
Hf – Si	Bragg-Williams R-K Polynomial		SGTE
Hf - Sn	Bragg-Williams R-K Polynomial		C. Tang et al. / CALPHAD: Computer Coupling of Phase Diagrams and Thermochemistry 39 (2012) 91–96
Hf – Sr	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2018
Hf – Ta	Bragg-Williams R-K Polynomial		SGTE
Hf – Ti	Bragg-Williams R-K Polynomial		COST 507, pp.208-209.
Hf - V	Bragg-Williams R-K Polynomial		Servant JPE 2005
Hf - Zr	Bragg-Williams R-K Polynomial		SGTE
Ho - K	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ho - Li	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ho - Mg	MQMPA (Pair Fraction Exp.)		Y-B. Kang and L. Jin, CRCT, 2012
Ho - Mn	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Ho - Na	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ho - Nb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Ho - Si	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Ho - Sn	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2016
Ho - Sr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ho - Ta	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Ho - Tb	MQMPA (Pair Fraction Exp.)	ideal	Y-B. Kang, CRCT, 2008
Ho - Ti	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014

Ho - V	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ho - Y	MQMPA (Pair Fraction Exp.)	ideal	Y-B. Kang, CRCT, 2008
Ho - Zn	MQMPA (Pair Fraction Exp.)		Zhijun Zhu and A.D. Pelton, 2014
Ho - Zr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
In - Li	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2022
In - Mg	MQMPA (Pair Fr Y. Liang et al. / Journal of Alloys and Compounds 475 (2009) 220–226 action Exp.)		J. WANG, P. HUDON, D. KEVORKOV, P. CHARTRAND, I.-H. JUNG, M. MEDRAJ, "Experimental and thermodynamic study of the Mg-Sn-In-Zn quaternary system", *Journal of Alloys and Compounds*, 588 (2014) 75-95.
In - Na	MQMPA (Pair Fraction Exp.)		J. WANG, N. MIAO, P. CHARTRAND, I.-H. JUNG, "Thermodynamic evaluation and optimization of the (Na + X) binary systems (X = Ag, Ca, In, Sn, Zn) using combined Calphad and first-principles methods of calculation", Journal of Chemical Thermodynamics, 66 (2013) 22-33
In - Ni	Bragg-Williams R-K Polynomial		P.Waldner and H.Ipser, Z.Metallk, 93(8) 2002, 825-832
In - P	Bragg-Williams R-K Polynomial		I.Ansara, C.Chatillon, Calphad 18 (1994) 204
In - Pb	Bragg-Williams R-K Polynomial		D.Boa, I.Ansara, Thermochimica Acta 314 (1998) 79-86
In - Pt	Bragg-Williams R-K Polynomial		Y. Liang et al. / Journal of Alloys and Compounds 475 (2009) 220–226
In - Sb	Bragg-Williams R-K Polynomial		T.J.Anderson, Calphad 18 (1994) 206
In - Si	Bragg-Williams R-K Polynomial		R.W.Olesinski, N.Kanani, G.J.Abbaschian, Bull.Alloy Phase Diags.6 (1985) 128-130
In - Sn	MQMPA (Pair Fraction Exp.)		J. WANG, P. HUDON, D. KEVORKOV, P. CHARTRAND, I.-H. JUNG, M. MEDRAJ, "Experimental and thermodynamic study of the Mg-Sn-In-Zn quaternary system", *Journal of Alloys and Compounds*, 588 (2014) 75-95
In - V	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
In - Zn;	MQMPA (Pair Fraction Exp.)		J. WANG, P. HUDON, D. KEVORKOV, P. CHARTRAND, I.-H. JUNG, M. MEDRAJ, "Experimental and thermodynamic study of the Mg-Sn-In-Zn quaternary system", *Journal of Alloys and Compounds*, 588 (2014) 75-95
K - La	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
K - Li	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2003
K - Lu	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
K - Mg	MQMPA (Pair Fraction Exp.)	from Mg in liquid K	P. Chartrand, 2003
K - Mn	MQMPA (Pair Fraction Exp.)	from Fe-K	P. Chartrand, 2013
K - Mo	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2003
K - Na	MQMPA (Equivalent Fraction Exp.)		P. Chartrand, 2000
K - Nb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
K - Nd	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
K - Ni	MQMPA (Pair Fraction Exp.)	from Fe-K	P. Chartrand, 2013
K - O	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FACTPS Database Valid for K – K_2O	P. Chartrand, CRCT, 2021
K - Pr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
K - Sc	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
K - Sm	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
K - Sr	MQMPA (Pair Fraction Exp.)	estimated	P. Chartrand, 2003
K - Ta	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
K - Tb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
K - Ti	MQMPA (Pair Fraction Exp.)	from Fe-K	P. Chartrand, 2013

K - Tm	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
K - V	MQMPA (Pair Fraction Exp.)	from Fe-K	P. Chartrand, 2013
K - W	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2018
K - Y	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
K - Yb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
K - Zn	MQMPA (Pair Fraction Exp.)	from Na-Zn	P. Chartrand, 2014
K - Zr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
La - Li	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
La - Mg	MQMPA (Pair Fraction Exp.)		Y.-B. KANG, L. JIN, P. CHARTRAND, A. E. GHERIBI, K. BAI and P. WU, "Thermodynamic evaluations and optimizations of binary Mg-light Rare-Earth (La, Ce, Pr,Nd, Sm) Systems", *CALPHAD*, 38, 100-116, 2012
La - Mn	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
La - Na	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
La - Nb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
La - Nd	MQMPA (Pair Fraction Exp.)		Y-B. Kang, CRCT, 2008
La - Ni	Bragg-Williams R-K Polynomial		SGTE
La - Sc	MQMPA (Pair Fraction Exp.)		Y-B. Kang, CRCT, 2008
La - Si	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
La - Sn	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2016
La - Sr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
La – Ta	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
La – Ti	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
La – V	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
La – Y	MQMPA (Pair Fraction Exp.)		Y-B. Kang, CRCT, 2008
La – Zn	MQMPA (Pair Fraction Exp.)		Zhijun Zhu and A.D. Pelton, 2014
La - Zr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Li - Lu	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Li - Mg	MQMPA (Pair Fraction Exp.)		P.J. Spencer, 2006
Li - Mn	MQMPA (Pair Fraction Exp.)		Y.-B. Kang, CRCT, 2005
Li – Mo	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2003
Li - Na	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2001
Li – Nb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2016
Li - Nd	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Li – Ni	MQMPA (Equivalent Fraction Exp.)		P. Chartrand, 2003
Li – O	MQMPA (Pair Fraction Exp.)	Gaseous species taken from FACTPS Database	P. Chartrand, CRCT, 2021
Li - Pb	MQMPA (Pair Fraction Exp.)	Liquid only	P. Chartrand, 2003
Li – Pr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Li - Sb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2022
Li – Sc	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Li – Si	MQMPA (Pair Fraction Exp.)		J.-P. Harvey, CRCT, 2007
Li – Sm	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Li – Sn	MQMPA (Pair Fraction Exp.)		J. WANG, J. HAN, I.-H. JUNG, D. BAIROS and P. CHARTRAND, "Thermodynamic optimizations on the binary Li-Sn system and ternary Mg-Sn-Li system", *CALPHAD*, accepted, (July

			2014).
Li – Sr	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2003
Li - Ta	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2023
Li – Tb	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2014
Li – Ti	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2014
Li – Tm	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2014
Li – V	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2014
Li - W	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2022
Li – Y	MQMPA (Pair Fraction Exp.)		Y.-B. Kang, CRCT, 2005
Li – Yb	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2014
Li – Zn	MQMPA (Pair Fraction Exp.)		P.J. Spencer, CRCT, 2006
Li – Zr	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2014
Lu - Mg	MQMPA (Pair Fraction Exp.)		Y-B. Kang, L. Jin, CRCT, 2012
Lu - Mn	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Lu – Na	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Lu – Nb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Lu – Si	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Lu – Sn	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2016
Lu – Sr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Lu – Ta	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Lu – Ti	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Lu – V	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Lu – Yb	MQMPA (Pair Fraction Exp.)		Y-B. Kang, CRCT, 2008
Lu – Zn	MQMPA (Pair Fraction Exp.)		Zhijun Zhu and A.D. Pelton, 2014
Lu – Zr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Mg - Mn	MQMPA (Pair Fraction Exp.)		Y.-B. Kang, A.D. Pelton. P. Chartrand, P. Spencer and C. Fuerst, J. Phase Equil. Diff. 28 (2007), pp. 342-354
Mg - Mo	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Mg - Na	MQMPA (Equivalent Fraction Exp.)		P. Chartrand, CRCT, 2003 (FACT Consortium)
Mg – Nb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Mg - Nd	MQMPA (Pair Fraction Exp.)		Y.-B. KANG, L. JIN, P. CHARTRAND, A. E. GHERIBI, K. BAI and P. WU, “Thermodynamic evaluations and optimizations of binary Mg-light Rare-Earth (La, Ce, Pr,Nd, Sm) Systems”, *CALPHAD*, 38, 100-116, 2012
Mg - Ni	Bragg-Williams R-K Polynomial		M.Jacobs, COST 507 report (1998) ISBN 92-828-3902-8, p.218-220
Mg - O	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FACTPS Database Valid for Mg - MgO	P. Chartrand, CRCT, 2021
Mg - Pb	MQMPA (Pair Fraction Exp.)		Dmitri Nassyrov and In-Ho Jung, "Thermodynamic modeling of the Mg-Ge-Pb system"Calphad, 2009, vol. 33, pp. 521-529.
Mg - Pr	MQMPA (Pair Fraction Exp.)		Y.-B. KANG, L. JIN, P. CHARTRAND, A. E. GHERIBI, K. BAI and P. WU, “Thermodynamic evaluations and optimizations of binary Mg-light Rare-Earth (La, Ce, Pr,Nd, Sm) Systems”, *CALPHAD*, 38, 100-116, 2012
Mg - Pt	Bragg-Williams R-K Polynomial		W.Gierlotka et al., J.Mater.Res.,37(11) 2022,p.1904
Mg - Sb	MQMPA (Pair Fraction Exp.)		M. Paliwal and In-Ho Jung, "Thermodynamic modeling of Mg-Bi and Mg-Sb systems and short-range-ordering behavior of the liquid solutions"Calphad, 2009, vol. 33, pp. 744-754

Mg - Sc	MQMPA (Pair Fraction Exp.)		Y.-B. KANG, A.D. PELTON, P. CHARTRAND and C.D. FUERST, ``Critical Evaluation and Thermodynamic Optimization of the Al-Ce, Al-Y, Al-Sc and Mg-Sc Binary Systems'', *CALPHAD*, 32(2), 413-422, 2008
Mg - Si	MQMPA (Pair Fraction Exp.)		J.-P. Harvey, M.A.Sc. thesis, Ecole Polytechnique, 2006 (VLAB Project); Vol. Data F. Gemme, CRCT, 2003 (VLAB project)
Mg - Sm	MQMPA (Pair Fraction Exp.)		Y.-B. KANG, L. JIN, P. CHARTRAND, A. E. GHERIBI, K. BAI and P. WU, "Thermodynamic evaluations and optimizations of binary Mg-light Rare-Earth (La, Ce, Pr,Nd, Sm) Systems", *CALPHAD*, 38, 100-116, 2012
Mg - Sn	MQMPA (Pair Fraction Exp.)		Y.-B. Kang and A.D. Pelton, CALPHAD: Computer Coupling of Phase Diagrams and Thermochemistry 34 (2010) 180 188
Mg - Sr	MQMPA (Pair Fraction Exp.)		Jian Wang, Ph.D. Thesis, Ecole Polytechnique, Montreal, 2014
Mg - Ta	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2017
Mg - Tb	MQMPA (Pair Fraction Exp.)		Y.-B. Kang, CRCT, 2008
Mg - Ti	MQMPA (Pair Fraction Exp.)		X.-F. Sheng, Projet de fin d'etudes, CRCT, 2008
Mg - Tm	MQMPA (Pair Fraction Exp.)		Y.-B. Kang, CRCT, 2008
Mg – V	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Mg – W	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Mg - Y	MQMPA (Pair Fraction Exp.)		Y.-B. KANG, A.D. PELTON, P. CHARTRAND, P. SPENCER and C. FUERST, "Thermodynamic Database Development of the Mg-Ce-Mn-Y System for Mg Alloy Design", *Metall. and Mater. Trans. A*, 38A, 1231-1243, 2007.
Mg - Yb	MQMPA (Pair Fraction Exp.)		Y.-B. Kang, CRCT, 2008
Mg - Zn	MQMPA (Pair Fraction Exp.)		Liquid: P.J. Spencer, 2006; Solids from COST-507; Vol. Data liquid: F. Gemme, CRCT, 2003; Vol. Data solids C.Aliravci, CRCT, 2007
Mg - Zr	MQMPA (Pair Fraction Exp.)		J.J. Marin Bejarano, CRCT, 2009
Mn - Mo	Bragg-Williams R-K Polynomial		COST-507
Mn – N	Bragg-Williams R-K Polynomial	Gaseous species must be taken from FactPS Database Valid for Mn-Mn_6N_5 **Spurious stability of BCC-A2 above 2700°C when gas not present.**	SGTE
Mn - Na	MQMPA (Pair Fraction Exp.)	from Fe-Na	P. Chartrand, 2013
Mn - Nb	Bragg-Williams R-K Polynomial		Z.-K. Liu & B. Hallstedt CALPHAD 2012
Mn - Nd	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Mn - Ni	Bragg-Williams R-K Polynomial	Tentative intermetallic phases	NPL (National Physics Laboratory, UK), unpublished work, 1989.
Mn - O	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FACTPS Database Valid for Mn - MnO	P. Chartrand, CRCT, 2021
Mn – P	Bragg-Williams R-K Polynomial	Valid for Mn-Mn_3P region	SGTE
Mn - Pb	Bragg-Williams R-K Polynomial		SGTE
Mn - Pr	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Mn - Sb	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2023
Mn - Sc	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Mn - Si	MQMPA (Pair Fraction Exp.)	Mn_5Si_2 not present	M.K. Paek, Y-B Kang, CALPHAD 46 (2014), 92-102; A. Shukla, Y.-B. Kang and A.D.
Mn - Sm	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Mn - Sn	Bragg-Williams R-K Polynomial		J. Miettinen: CALPHAD, 2001, 25(1), 43-58
Mn - Sr	MQMPA (Pair Fraction Exp.)		P.J. Spencer, 2006

Mn – Ta	Bragg-Williams R-K Polynomial		X.Yan et al., J. Alloys & Cmpds 865 (2021) 158715
Mn – Tb	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Mn - Ti	Bragg-Williams R-K Polynomial		N.Saunders, COST 507 (1998) ISBN 92-828-3902-8, p.241-244
Mn - Tm	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Mn - V	Bragg-Williams R-K Polynomial		W. Huang, Met. Trans.A 22A (1991) pp. 1911-1920.
Mn - W	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2018
Mn - Y	MQMPA (Pair Fraction Exp.)		Y.-B. KANG, A.D. PELTON, P. CHARTRAND, P. SPENCER and C. FUERST, "Thermodynamic Database Development of the Mg-Ce-Mn-Y System for Mg Alloy Design", *Metall. and Mater. Trans. A*, 38A, 1231-1243, 2007
Mn - Yb	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Mn - Zn	MQMPA (Pair Fraction Exp.)		Y.-B. Kang, CRCT, 2005
Mn - Zr	Bragg-Williams R-K Polynomial		H.J. Seifert, J. Groebner, F. Aldinger, F.H. Hayes, G. Effenberg, C. Baetzner, H. Flandorfer, P. Rogl, A. Saccone, R. Ferro, Proc.3rd. International Magnesium Conference, Ed. G. W. Lorimer, Inst.of Materials, London, 1997, pp. 257-270.
Mo - N	Bragg-Williams R-K Polynomial	Gaseous species must be taken from FactPS Database Valid for Mo-Mo_2N	SGTE
Mo - Na	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2003
Mo - Nb	Bragg-Williams R-K Polynomial		COST-507
Mo - Ni	Bragg-Williams R-K Polynomial		COST-507
Mo - P	Bragg-Williams R-K Polynomial		SGTE
Mo - Pt	Bragg-Williams R-K Polynomial		Ph.D. Thesis Tewfik BENLAHARCHE from U. Lorraine (France) 2008
Mo - Sc	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2021; based on Wang et al. Journal of Phase Equilibria and Diffusion Vol. 36 No. 1 2015
Mo - Si	Bragg-Williams R-K Polynomial		P.Y. Chevalier, 2003 Report to SGTE
Mo - Sr	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2021
Mo - Ta	Bragg-Williams R-K Polynomial		COST-507
Mo - Ti	MQMPA (Pair Fraction Exp.)		Zhijun Zhu, CRCT, 2021
Mo - V	Bragg-Williams R-K Polynomial		SGTE
Mo - W	MQMPA (Pair Fraction Exp.)	Ideal liquid	SGTE
Mo - Y	Bragg-Williams R-K Polynomial		W.Chan, M.C. Gao, O.N. Dogan, P. King, JPEDAV (31) 2010; 414-420
Mo - Zn	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2014
Mo - Zr	Bragg-Williams R-K Polynomial	Stoichiometric Mo_2Zr C15	Perez, B. Sundman, CALPHAD 27 2003, 253-262
N - Nb	Bragg-Williams R-K Polynomial	Gaseous species must be taken from FactPS Database Valid for Nb-NbN	from FSstel
N - Ni	Bragg-Williams R-K Polynomial	Gaseous species must be taken from FactPS Database Valid for Ni-rich region	SGTE
N - Si	Bragg-Williams R-K Polynomial	Gaseous species must be taken from FactPS Database Valid for Si-rich region	SGTE
N - Ta	Bragg-Williams R-K Polynomial	Gaseous species must be taken from FactPS Database Valid for Ta-TaN	SGTE
N - Ti	Bragg-Williams R-K Polynomial	Gaseous species must be taken from FactPS	from FSstel

		Database Valid for Ti-TiN	
N - V	Bragg-Williams R-K Polynomial	Gaseous species must be taken from FactPS Database Valid for V-VN	SGTE
N - W	Bragg-Williams R-K Polynomial	Gaseous species must be taken from FactPS Database Valid for W-rich region	SGTE
N - Zr	Bragg-Williams R-K Polynomial	Gaseous species must be taken from FactPS Database Valid for Zr-ZrN	X. Ma et al. / Journal of Alloys and Compounds 373 (2004) 194–201
Na - Nb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2016
Na - Nd	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Na - Ni	MQMPA (Pair Fraction Exp.)	from Fe-Na	P. Chartrand, 2013
Na - O	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FACTPS Database Valid for Na – Na_2O	P. Chartrand, CRCT, 2021
Na - Pr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Na - Sc	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Na - Si	MQMPA (Pair Fraction Exp.)		J.-P. Harvey, M.A.Sc. thesis, Ecole Polytechnique, 2006 (VLAB Project)
Na - Sm	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Na - Sn	MQMPA (Pair Fraction Exp.)		J. WANG, N. MIAO, P. CHARTRAND, I.-H. JUNG, "Thermodynamic evaluation and optimization of the (Na + X) binary systems (X = Ag, Ca, In, Sn, Zn) using combined Calphad and first-principles methods of calculation", Journal of Chemical Thermodynamics, 66 (2013) 22-33
Na - Sr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2003
Na - Ta	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2016
Na - Tb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Na - Ti	MQMPA (Pair Fraction Exp.)	from Fe-Na	P. Chartrand, 2013
Na - Tm	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Na - V	MQMPA (Pair Fraction Exp.)	from Fe-Na	P. Chartrand, 2013
Na - W	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2018
Na - Y	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Na - Yb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Na - Zn	MQMPA (Pair Fraction Exp.)		J. WANG, N. MIAO, P. CHARTRAND, I.-H. JUNG, "Thermodynamic evaluation and optimization of the (Na + X) binary systems (X = Ag, Ca, In, Sn, Zn) using combined Calphad and first-principles methods of calculation", Journal of Chemical Thermodynamics, 66 (2013) 22-33
Na - Zr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Nb - Nd	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Nb - Ni	Bragg-Williams R-K Polynomial		J.-M. Joubert, N.Dupin, B.Sundman CALPHAD 2004
Nb - Pr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Nb - Sc	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Nb - Si	Bragg-Williams R-K Polynomial		SGTE
Nb - Sm	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Nb - Sn	Bragg-Williams R-K Polynomial		C. Toffolon, Gachon, B. Sundman, JPE 2002
Nb – Sr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017

Nb – Ta	MQMPA (Pair Fraction Exp.)	Ideal liquid	P. Chartrand, 2017
Nb - Tb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Nb – Ti	Bragg-Williams R-K Polynomial		COST 507, pp.256-260.
Nb - Tm	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Nb - V	Bragg-Williams R-K Polynomial		K.C.H. Kumar, P. Wollants, L. Delaey, Calphad **18** (1994), pp. 71-79.
Nb - W	Bragg-Williams R-K Polynomial		P. Gustafson, Z. Metallkde **79** (1988), pp. 388-396.
Nb – Y	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Nb - Yb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Nb - Zn	Bragg-Williams R-K Polynomial		Z. Long, JPED 2016
Nb - Zr	Bragg-Williams R-K Polynomial		A.F. Guillermet, Z. Metallkde. **82** (1991), pp. 478-487.
Nd - Pb	Bragg-Williams R-K Polynomial		M.Zydzik et al., CALPHAD 46 (2014) 1-17
Nd - Pr	MQMPA (Pair Fraction Exp.)		Y.-B. Kang, CRCT, 2008
Nd – Sb	Bragg-Williams R-K Polynomial		SGTE
Nd - Sc	MQMPA (Pair Fraction Exp.)		Y.-B. Kang, CRCT, 2008
Nd - Si	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Nd - Sm	MQMPA (Pair Fraction Exp.)	Ideal liquid	Y.-B. Kang, CRCT, 2008
Nd - Sn	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Nd - Sr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Nd - Ta	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Nd - Ti	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Nd - V	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Nd - Y	MQMPA (Pair Fraction Exp.)		Y.-B. Kang, CRCT, 2008
Nd - Yb	MQMPA (Pair Fraction Exp.)		Y.-B. Kang, CRCT, 2008
Nd - Zn	MQMPA (Pair Fraction Exp.)		Zhijun Zhu and A.D. Pelton, 2014
Nd - Zr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ni - O	MQMPA (Pair Fraction Exp.)	Gaseous species must be taken from FACTPS Database Valid for Ni - NiO	P. Chartrand, CRCT, 2021
Ni - P	Bragg-Williams R-K Polynomial	Ni-Ni_6P_5	NPL, unpublished work, 1989
Ni - Pb	Bragg-Williams R-K Polynomial		Cui Ping Wang, Xing Jun Liu, I. Ohnuma, R. Kainuma, K. Ishida: CALPHAD, 2000, 24(2), 149-167
Ni - Pt	Bragg-Williams R-K Polynomial		X.-G. Lu et al. / CALPHAD: Computer Coupling of Phase Diagrams and Thermochemistry 33 (2009) 450-456
Ni - Sb	Bragg-Williams R-K Polynomial		Y. Zhang et al., CALPHAD 32 (2008) 378–388
Ni - Sc	Bragg-Williams R-K Polynomial	Stoichiometric NiSc B2	Z. Cao et al. / Thermochimica Acta 586 (2014) 30–39
Ni - Si	Bragg-Williams R-K Polynomial	Spurious Ni_3Si $L1_2$ below 120°C	M. Lindholm, B. Sundman, Met.Trans.A 26A (1996), pp. 2897-2903.
Ni - Sn	Bragg-Williams R-K Polynomial	Stoichiometric α-$Ni_3Sn_{2(lt)}$	COST-531
Ni - Sr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ni - Ta	Bragg-Williams R-K Polynomial		SGTE
Ni - Ti	Bragg-Williams R-K Polynomial		C.S. Oh, J. Korean Inst.Met.Mater. **33** (1995), pp. 129-136.
Ni - V	Bragg-Williams R-K Polynomial		COST 507, pp. 261-263.
Ni - W	Bragg-Williams R-K Polynomial		SGTE
Ni - Y	Bragg-Williams R-K Polynomial		Z. Du, W. Zhang, Report F-96-07, May 1996, Univ.Science and Tech., Beijing.
Ni – Zn	Bragg-Williams R-K Polynomial		SGTE

Ni - Zr	Bragg-Williams R-K Polynomial		G. Ghosh, J.Mater.Res. 9 (1994), pp. 598-616.
O – Pb	MQMPA (Pair Fraction Exp.)	Gaseous species taken from FACTPS Database Valid for Pb - PbO	P. Chartrand, CRCT, 2021
O - Si	MQMPA (Pair Fraction Exp.)	Gaseous species taken from FACTPS Database Valid for Si - SiO	P. Chartrand, CRCT, 2021
O – Ti	MQMPA (Pair Fraction Exp.)	Gaseous species taken from FACTPS Database Valid for Ti – Ti_2O	P. Chartrand, CRCT, 2021
O – V	MQMPA (Pair Fraction Exp.)	Gaseous species taken from FACTPS Database Valid for V – V_2O	P. Chartrand, CRCT, 2021
O - Zn	MQMPA (Pair Fraction Exp.)	Gaseous species taken from FACTPS Database Valid for Zn – ZnO	P. Chartrand, CRCT, 2021
P - Sb	Bragg-Williams R-K Polynomial		I.Ansara, C.Chatillon, Calphad 18 (1994) 208
P - Si	MQMPA (Pair Fraction Exp.)		P.J. Spencer, 2006
P - Sn	Bragg-Williams R-K Polynomial		J.Miettinen, Calphad, Vol. 25, No. 1, pp. 67-78
P - Zn	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2022
Pb - Pr	MQMPA (Pair Fraction Exp.)		M.Zydzik et al., CALPHAD 46 (2014) 1-17
Pb - Pt	Bragg-Williams R-K Polynomial		Z.H.Long et al.,JPEDAV (2009) 30:318–322
Pb - Sb	Bragg-Williams R-K Polynomial		H.Ohtani, K.Okuda, K.Ishida, J.Phase Equilibria 16 (1995) 416-429
Pb - Si	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2022; based on R.W.Olesinski, G.J.Abbaschian, Bull.Alloy Phase Diags. 5 (1984) 271-273
Pb - Sn	Bragg-Williams R-K Polynomial		Based on H.Ohtani, K.Okuda, K.Ishida, J.Phase Equilib.16 (1995) 416-429
Pb - Sr	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2018 using solids from H.Zhang, C.Zhang, W.W.Wang, Y.Du, P.Zhou, B.Hu, Z.Liu, J.C.Wang, J.Wang, J.Min.Metall.Sect.B-Metall. 53(3) B (2017) 179-187
Pb - Tb	MQMPA (Pair Fraction Exp.)		M.Zydzik et al., CALPHAD 46 (2014) 1-17
Pb - Zn	Bragg-Williams R-K Polynomial		T.Jantzen, P.J.Spencer, Calphad 22 (1998) 417-434
Pb - Zr	Bragg-Williams R-K Polynomial		Dixon P. R., Argent B. B., Chart T. G.: CALPHAD, 1998, 22(3), 397-416
Pr - Sb	Bragg-Williams R-K Polynomial		SGTE
Pr - Si	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Pr - Sn	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2016
Pr - Sr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Pr - Ta	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Pr - Ti	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Pr - V	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Pr - Zn	MQMPA (Pair Fraction Exp.)		Zhijun Zhu and A.D. Pelton, 2014
Pr - Zr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Pt – Si	Bragg-Williams R-K Polynomial		L.L. Xu et al. / Computer Coupling of Phase Diagrams and Thermochemistry 32 (2008) 101–105
Pt - Sn	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2023 based on solids from J.Hu et al., Mater. Res. Express 9 (2022) 016507
Pt - Ta	Bragg-Williams R-K Polynomial		SGnobl
Pt - Ti	Bragg-Williams R-K Polynomial		SGTE
Pt - V	Bragg-Williams R-K Polynomial		C.P. Wang et al. / Intermetallics 16 (2008) 544-549
Sb – Si	MQMPA (Pair Fraction Exp.)		P.J. Spencer, 2006
Sb – Sm	Bragg-Williams R-K Polynomial		SGTE
Sb - Sn	Bragg-Williams R-K Polynomial		C.S.Oh, J.H.Shim, B.J.Lee, D.N.Lee, J.Alloys and Cpds. 238

			(1996) 155-166
Sb - Zn	Bragg-Williams R-K Polynomial		L.A.Zabdyr, Calphad 21 (1997) 349-358
Sc - Si	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Sc - Sr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Sc - Ta	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Sc – Ti	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Sc - V	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Sc - W	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2021
Sc - Y	MQMPA (Pair Fraction Exp.)		Y-B. Kang, CRCT, 2008
Sc - Zn	MQMPA (Pair Fraction Exp.)		Zhijun Zhu and A.D. Pelton, 2014
Sc – Zr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Si – Sm	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Si – Sn	Bragg-Williams R-K Polynomial		M.H.G.Jacobs, P.J.Spencer, Calphad 20 (1996) 89-91
Si – Sr	MQMPA (Pair Fraction Exp.)		J.-P. Harvey, CRCT, 2005
Si – Ta	Bragg-Williams R-K Polynomial	Spurious inverted L-L miscibility gap above 2700°C	C. Vahlas, P.Y. Chevalier, E. Blanquet, Calphad **13** (1989), pp. 273-292.
Si – Tb	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Si – Ti	MQMPA (Pair Fraction Exp.)		FSstel
Si - Tl	MQMPA (Pair Fraction Exp.)		P. Chartrand, CRCT, 2018
Si - Tm	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Si - V	Bragg-Williams R-K Polynomial		COST 507, pp. 270-273.
Si - W	Bragg-Williams R-K Polynomial		C. Vahlas, P.Y. Chevalier, E. Blanquet, Calphad **13** (1989), pp. 273-292.
Si - Y	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Si - Yb	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2012
Si - Zn	MQMPA (Pair Fraction Exp.)		A. Shukla, Y.-B. Kang and A.D. Pelton, Calphad 32 (2008) pp. 470-477
Si - Zr	Bragg-Williams R-K Polynomial		COST 507, pp. 280-283.
Sm - Sn	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2016
Sm - Sr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Sm - Ta	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Sm - Ti	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Sm - V	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Sm - Y	MQMPA (Pair Fraction Exp.)	ideal	Y-B. Kang, CRCT, 2008 (GM Project)
Sm - Zn	MQMPA (Pair Fraction Exp.)		Zhijun Zhu and A.D. Pelton, 2014
Sm - Zr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Sn - Sr	MQMPA (Pair Fraction Exp.)		Jian Wang, Ph.D. Thesis, Ecole Polytechnique, Montreal, 2014
Sn - Ta	Bragg-Williams R-K Polynomial		Lifang Yan et al., Materials 2021, 14, 1568
Sn - Tb	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2016
Sn - Ti	Bragg-Williams R-K Polynomial		F.Hayes, COST 507 (1998) ISBN 92-828-3902-8, p.284-28
Sn - Tm	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2016
Sn - V	MQMPA (Pair Fraction Exp.)		Chen, Gierlotka, and Chen, Journal of ELECTRONIC MATERIALS, Vol. 37, No. 11, 2008
Sn - Y	MQMPA (Pair Fraction Exp.)		Junghwan Kim and In-Ho Jung, McGill, 2016
Sn - Zn	MQMPA (Pair Fraction Exp.)		M. Medraj, Concordia, 2011

Sn - Zr	Bragg-Williams R-K Polynomial	Spurious inverted L-L miscibility gap above 1700°C in the Sn-rich region	J.Korb, K.Hack, COST 507 (1998) ISBN 92-828-3902-8, p.290-292
Sr - Ta	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2018
Sr - Tb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Sr - Ti	Bragg-Williams R-K Polynomial		Y. Peng et al., Journal of Phase Equilibria and Diffusion Vol. 32 No. 1 2011, p.42
Sr - Tm	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Sr – V	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2016
Sr - W	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2016
Sr - Y	MQMPA (Pair Fraction Exp.)		P.J. Spencer, 2006
Sr - Yb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Sr - Zn	MQMPA (Pair Fraction Exp.)		P. Spencer, A.D. Pelton., Y.-B. Kang, P. Chartrand, and C. Fuerst, Calphad 32 (2007), pp. 423-431
Sr - Zr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ta - Tb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Ta - Ti	Bragg-Williams R-K Polynomial		COST 507, pp. 293-296.
Ta - Tm	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Ta - V	MQMPA (Pair Fraction Exp.)		P Chartrand, CRCT 2018 using Danon & Servant JACmpd, 2004
Ta - W	Bragg-Williams R-K Polynomial		A.F. Guillermet, W. Huang, unpublished research, KTH, 1995.
Ta - Y	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Ta - Yb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2017
Ta - Zr	Bragg-Williams R-K Polynomial		A.F. Guillermet, J.Alloys and Compounds, 226 (1995), pp. 174-184
Tb - Ti	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Tb - V	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Tb - Y	MQMPA (Pair Fraction Exp.)		Y-B. Kang, CRCT, 2008 (GM Project)
Tb - Zn	MQMPA (Pair Fraction Exp.)		Zhijun Zhu and A.D. Pelton, 2014
Tb - Zr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ti - Tm	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ti - V	MQMPA (Pair Fraction Exp.)		Liquid from Zhijun Zhu, CRCT, 2021; Solids from N.Saunders, COST 507 (1998) ISBN 92-828-3902-8, p.297-298
Ti - W	Bragg-Williams R-K Polynomial		N.Saunders, COST 507 (1998) ISBN 92-828-3902-8, p.297-298
Ti - Y	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ti - Yb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Ti - Zn	Bragg-Williams R-K Polynomial		K. Doi, S. Ono, H. Ohtani, M. Hasebe: J. Phase Equilib. Diff., 2006, 27(1), 63-74
Ti - Zr	MQMPA (Pair Fraction Exp.)		Liquid from P. Chartrand, CRCT, 2022; Solids from K.C.H. Kumar, P. Wollants, L. Delaey, J.Alloys and Compounds, 225 (1994), pp.121-127.
Tm - V	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Tm - Zn	MQMPA (Pair Fraction Exp.)		Zhijun Zhu and A.D. Pelton, 2014
Tm - Zr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
V - W	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014 changed to MQMPA from FSstel
V - Y	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
V - Yb	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
V - Zn	MQMPA (Pair Fraction Exp.)	estimated	P. Chartrand, 2018 (L. est. From Fe-Zn)
V - Zr	Bragg-Williams R-K Polynomial		COST 507, pp. 303-304.

W - Zr	MQMPA (Pair Fraction Exp.)		Liquid from P. Chartrand, CRCT, 2022; Solids from SGTE
Y - Zn	MQMPA (Pair Fraction Exp.)		Zhijun Zhu and A.D. Pelton, 2014
Y - Zr	Bragg-Williams R-K Polynomial		H. Flandorfer, J. Groebner, A. Stamou, N. Hassiotis, A. Saccone, P. Rogl, R. Wouters, H.J. Seifert, D. Maccio, R. Ferro, G. Haidemenopoulos, L. Delaey, G. Effenberg, Z. Metallkde. 88 (1997), pp.529-538.
Yb - Zn	MQMPA (Pair Fraction Exp.)		Zhijun Zhu and A.D. Pelton, 2014
Yb - Zr	MQMPA (Pair Fraction Exp.)		P. Chartrand, 2014
Zn - Zr	Bragg-Williams R-K Polynomial		SGTE