



## Al Alloys

The Al alloys module in JMatPro deals with the following elements:

Al B Bi C Ca **Ce\*\*** Co Cr Cu Fe H La Li Mg Mn Mo Ni **O\*\***  
Pb Sc Si Sn Sr Ti V Zn Zr

and the following phases:

AL LIQUID AL11RE3\_ALPHA AL13CR4SI4 AL20CU2MN3 AL2CU  
AL2SI2M AL3FE AL3M\_D022 AL3M\_D023 AL3M\_L12 AL3NI  
AL3NI2 AL4C3 AL4M\_D13 AL4SIC4 AL5CU2MG8SI6 AL6MN  
AL7CR AL7CU2M AL7CU4NI AL8FEMG3SI6 AL8SIC7 AL9M2  
ALFESI\_ALPHA ALFESI\_BETA **ALFESI\_DELTA\*\*** ALLI AL3MG2 ALLISI  
ALPHA E\_ALCRMGMN ZN\_HCP MGZN2 ALB2 MB2 MC MG2SI  
MG2X\_C1 PB\_FCC LIQ\_2 R\_ALCULI SIC SILICON S\_AL2CUMG  
T1\_ALCULI T2\_ALCULI TAU\_ALLIMG TB\_ALCULI T\_ALCUMGZN  
SN AL13CO4 ZN\_FCC GAS ALFEMOSI BI EPSILON\_BIPB MG3Bi2  
**AL13CEMG6\*\* AL2O3\*\* MGO\*\* MGAL2O4\*\* ALSC2SI2\*\***  
**AL12MO\***

In addition it considers the following meta-stable phases:

GP BETA" BETA\_PRIME B\_PRIME ETA\_PRIME S\_PRIME\  
THETA\_PRIME T\_PRIME Q\_PRIME **CLUSTER\***

\*\* denotes additions made in version 12.0

\* denotes additions made in version 13.0

## Co alloys

The Co alloys module in JMatPro deals with the following elements:

Al B C Co Cr Cu Fe Hf Mn Mo N Nb Ni O Pt Re Ru Si Ta Ti V W Zr

and the following phases:

LIQUID GAMMA DELTA ETA GAMMA\_PRIME MU LAVES SIGMA  
G\_PHASE P\_PHASE R\_PHASE M2(C,N) M23C6 MC M6C M7C3  
M3B2 MB2 NI2M NIMO MN HCP\_A3 COBALT\_HCP



## Fe alloys

The Fe alloys module in JMatPro deals with the following elements:

Al B C Co Cr Cu Fe Mg Mn Mo N Nb Ni O P S Si Ta Ti V W

and the following phases:

LIQUID AUSTENITE FERRITE CEMENTITE CHI DELTA ETA LAVES  
GRAPHITE M2(C,N) M(C,N) M23C6 M3C2 M7C3 M6C MC\_SHP  
CR2B FE2B FE3B M3B2 MB2\_C32 M2O3 M3O4 M2SIO4 M2P  
M3P MG3N2 MGS MNS MOP MO\_B2 MS\_B81 MULLITE ALN  
(FE,NI)AL FE4N FETIP G\_PHASE MU\_PHASE PI\_PHASE R\_PHASE  
SIGMA SIO2 SPINEL\_AB2O4 TI4C2S2 Z\_PHASE MN BN CU  
ALPHA\_CR KSI\_CARBIDE GAS KAPPA OMEGA

Important: this list includes all the phases and elements available for Fe alloys as a whole. For the JMatPro sub-modules General Steels, Stainless Steels and Cast Iron these are reduced to sets limited to elements and phases relevant to the material type. For more details on this please evaluate the demo version of JMatPro.

## Mg alloys

The Mg alloys module in JMatPro deals with the following elements:

Ag Al Ca Ce Cu Fe Gd La Mg Mn Nd Sc Si Sn Sr Y Zn Zr

and the following phases:

LIQUID MG MG2CU MGZN2 MG2CA MG(CU,ZN)2 AL2RE  
MG12RE MG17SR2 MG24RE5 MG2ZN3 MG3RE\_D03 MG41RE5  
MG5RE MGZN MG17AL12 AL11MN4 AL11RE3\_ALPHA AL2FE  
AL2ZR AL3FE AL3RE\_D019 AL3ZR AL4MN AL4M\_D13 AL5FE2  
AL8MN5 FE ALPHA\_MN BETA\_MN PHI\_ALMGZN Q\_AL7CU3MG6  
T\_ALCUMGZN ALPHA\_ZR MG7ZN3 MG2SN CA2SN CA2MG6ZN3  
CA2MG5ZN13 MG4AG MG7RE I\_MGREZN Z\_MGYZN MG2SI  
T\_MGZNCE W\_MGREZN X\_MGREZN



## Ni alloys

The Ni alloys module in JMatPro deals with the following elements:

Al B C Co Cr Cu Fe Hf Mn Mo N Nb Ni O Pt Re Ru Si Ta Ti V W Zr

and the following phases:

LIQUID GAMMA GAMMA\_PRIME GAMMA" DELTA ETA LAVES  
MU SIGMA GRAPHITE G\_PHASE MC M2(C,N) M23C6 M6C  
M7C3 M2B\_ORTH M2B\_TETR M3B2 M3B MB2 MB\_ORTH M3O4  
M2O3 M2SiO4 MO\_B2 MULLITE NI2M NI5M NI3SI\_H NI5SI2  
NI7M2 NIMO PI\_PHASE P\_PHASE R\_PHASE SiO2 SPINEL\_AB2O4  
Z\_PHASE NIAL LIQUID\_O MN HCP\_A3 COBALT\_HCP PTAL  
PT2AL\_H PT2AL\_L PT3AL PT5AL3 L10 NI4MO BCC CR3NI5SI2  
CR5B3 CR3X\_A15 ALN NIW\* NI6SI2B\*

\* denotes additions made in version 13.0

## Ti alloys

The Ti alloys module in JMatPro deals with the following elements:

Al B C Cr Cu Fe H Mn Mo N Nb Ni O Re Ru Si Sn Ta Ti V Zr

and the following phases:

LIQUID ALPHA BETA LAVES MC ALPHA\_TIMN BETA\_TIMN  
C15\_FCC CHI\_A12 GAS TIB2 TIH2 SIC TI2CU TI2NI TI3AL  
TI5SI3 TIB TIM\_B2 TIZRSI

## Zr alloys

The Zr alloys module in JMatPro deals with the following elements:

C Cr Fe H Hf N Nb Ni O Si Sn Zr

and the following phases:

LIQUID ALPHA BETA LAVES ZR(C,N) ZR2M ZR2SI ZR3FE ZR3SI  
ZR3SI2 ZR5FE4NB ZR7FESN2 ZRSN2 ZR4SN  
A5B3 C15\_FCC MH2



## Solder alloys

The solder alloys module in JMatPro deals with the following elements:

Ag Al Au Bi Cu In Ni Pb Sb Sn Zn

and the following phases:

SN LIQUID PB BI IN ZN AG3SN NIAL INSB AG9IN4 AGIN2  
AL2AU AL2CU AL3AU8 AL3NI AL3NI2 NI5AL3 ALAU ALAU4  
NI3AL ALPHA1\_AUZN ALPHA2\_AUZN ALPHA3\_AUZN ALPHA\_ALAU2  
AU11ZN14 AU2BI AU2PB AU4IN3SN3 AU5SN AU5ZN3 AU7IN3  
AUIN AUIN2 AUNI2SN4 AUPB2 AUPB3 AUSB2 AUSN2 AUSN4  
CU6SN5 CU6SN5\_PRIME BETA\_ALAU2 BETA\_AUIN\_H BETA\_AUIN\_L  
BETA\_CUSB BETA\_NIZN BI3IN5 BI3NI BIIN BIIN2 CU10SN3  
CU11IN9 CU11SB2 CU2IN3SN CU2SB CU3SN CU41SN11 CU7IN3  
CU9SB2 DELTA\_ALCU EPSILON1\_AUZN EPSILON\_ALCU  
EPSILON\_PBIN ETA\_ALCU ETA\_CUIN\_L FCC\_A1 GAMMA2\_AUZN  
GAMMA3\_AUZN GAMMA\_ALAU2 GAMMA\_AUIN GAMMA\_CUIN  
ZETA\_AG(SN,IN) IN7NI3 IN9NI13 INNI INSN\_GAMMA NI3SN4  
NI5SB2 NISB2 NIZN8 PSI\_AUIN SB17ZN23\_H SB17ZN23\_L  
SB19ZN31 SB2SN3 SB4ZN6 SB9ZN11 SBSN SBZN BETA\_IN  
ZETA\_ALCU

## Cu alloys

The Cu alloys module in JMatPro deals with the following elements:

Al Cr Cu Fe Mg Mn Ni P Pb Si Sn Zn Bi Nb Zr

and the following phases:

LIQUID A3B\_DO19 A3B\_DO3 AB\_B2 CU\_BCC BETA\_NIZN  
CU10SN3 CU3P CU3SN CU41SN11 DELTA\_CUSI CU\_FCC  
GAMMA\_CUSI GAMMA\_D82 GAMMA\_D83 GAMMA\_H  
GAMMA\_PRIME HCP\_A3 LAVES\_C15 LIQ\_2 M2SI\_C23 NI3SI2  
NI3SI\_H NI5SI2 PB\_FCC FE\_FCC FE\_BCC (CR,NB)\_BCC M5SI3  
BI\_RHOMB NI3NB CR2NB MU\_PHASE AL3ZR  
CU51ZR14 CU5ZR CU8ZR3 CU10ZR7 CUZR CUZR2