



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 AL3RE_DO19 AL4C3 AL4M_D13 AL4SIC4 AL5CU2MG8SI6
AL6MN AL7CR AL7CU2M AL7CU4NI AL8FEMG3SI6 AL8SIC7
AL9M2 ALFESI_ALPHA ALFESI_BETA **ALFESI_DELTA*** ALLI AL3MG2
ALLISI ALPHA E_ALCRMGMN GRAPHITE 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*

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

*** denotes additions made in version 12.0**

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_CARBIIDE 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

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
AUIIN AUIIN2 AUNI2SN4 AUPB2 AUPB3 AUSB2 AUSN2 AUSN4
CU6SN5 CU6SN5_PRIME BETA_ALAU2 BETA_AUIIN_H BETA_AUIIN_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_AUIIN GAMMA_CUIN
ZETA_AG(SN,IN) IN7NI3 IN9NI13 INNI INSN_GAMMA NI3SN4
NI5SB2 NISB2 NIZN8 PSI_AUIIN 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**

* denotes additions made in version 11.0 and **12.0