JPEDAV (2007) 28:406–407
DOI: 10.1007/s11669-007-9118-6
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Mn-Ni (Manganese-Nickel)

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The Mn-Ni phase diagram in [Massalski2] was adopted from [1991Gok].

[2005Guo] reviewed numerous reports quoted by [1991Gok] and more recent reports of [1995Col]. They concluded that the existence of a series of two-phase fields between 680 and 420 °C around the equiatomic region, as shown in [1991Gok], is impossible and that many intermediate compounds in the diagram of [1991Gok] do not exist.

Figure 1 shows the Mn-Ni phase diagram obtained by [2005Guo] by thermodynamic modeling. Table 1 shows Mn-Ni crystal structure data adopted from [1991Gok] for corresponding phases. Table 2 shows special points in Fig. 1.

References

1991Gok: N.A. Gokcen, The Mn-Ni (Manganese-Nickel) System, *J. Phase Equilibria*, 1991, **12**(3), p 313-321

1995Col: B.R. Coles, The Equiatomic Region of the Mn-Ni System, *J. Phase Equilibria*, 1995, **16**(2), p 108-109

2005Guo: C. Guo and Z. Du, Thermodynamic Optimization of the Mn-Ni System, *Intermetallics*, 2005, **13**(5), p 525-534

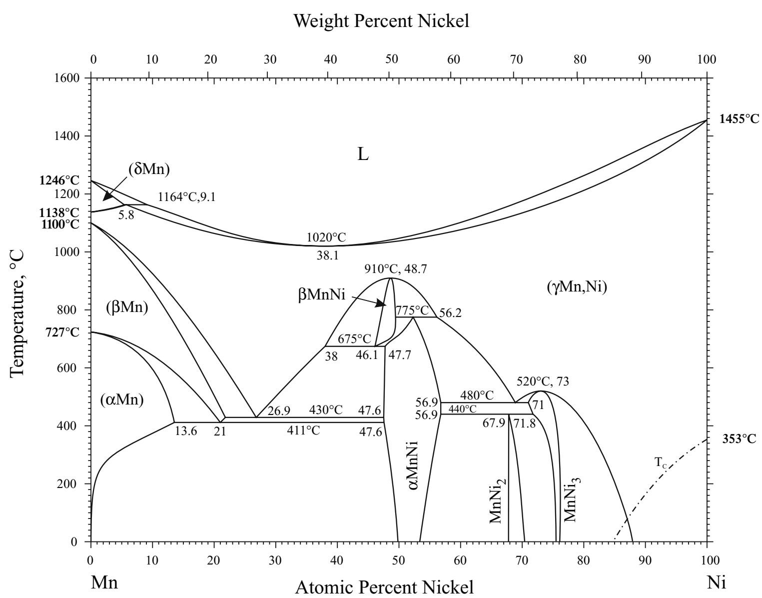

Fig. 1 Mn-Ni phase diagram

Table 1 Mn-Ni crystal structure data

Phase	Composition, at.% Ni	Pearsonsymbol	Spacegroup	Struktur-bericht designation	Prototype
(δMn)	0-5.5	*cI*2	$Im\bar{3}m$	*A*2	W
(γMn, Ni)	0 to 100	*cF*4	$Fm\bar{3}m$	*A*1	Cu
(βMn)	0 to 21.8	*cP*20	$P4_132$	*A*13	βMn
(αMn)	0-13.6	*cI*58	$I\bar{4}3m$	*A*12	αMn
βMnNi	46.1-49.5	*cP*2	$Pm\bar{3}m$	*B*2	CsCl
αMnNi	47.6-56.9	*tP*4	$P4/mmm$	$L1_0$	AuCu
$MnNi_2$	67.9-70.5	...	...	...	...
$MnNi_3$	71-76	*cP*4	$Pm\bar{3}m$	$L1_2$	$AuCu_3$

Table 2 Special points of the Mn-Ni system

Reaction	Composition, at.% Ni			Temperature, °C	Reaction type
L = (δMn)		0		1246	Melting
(δMn) = (γMn, Ni)		0		1138	Allotropic
(γMn, Ni) = (βMn)		0		1100	Allotropic
(βMn) = (αMn)		0		727	Allotropic
L + (δMn) = (γMn, Ni)	9.1	5.5	5.8	1164	Peritectic
(βMn) = (αMn) + αMnNi	21	13.6	47.6	411	Eutectoid
(γMn, Ni) = (βMn) + αMnNi	26.9	21.8	47.6	430	Eutectoid
(γMn, Ni) = βMnNi		48.7		910	Maximum
βMnNi = (γMn, Ni) + αMnNi	46.1	38	47.4	675	Eutectoid
(γMn, Ni) + βMnNi = αMnNi	49.5	56.2	52.3	775	Peritectoid
(γMn, Ni) = αMnNi + $MnNi_3$	68.9	56.9	71	480	Eutectoid
αMnNi + $MnNi_3$ = $MnNi_2$	56.9	71.8	67.9	440	Peritectoid
L = (γMn, Ni)		38.1		1020	Minimum
(γMn, Ni) = $MnNi_3$		73		520	Maximum
L = (γMn, Ni)		100		1455	Melting