Mg-Y (Magnesium-Yttrium)

H. Okamoto

The Mg-Y phase diagram in [Massalski2] was redrawn from [88Nay], in which the phase boundaries of (βY) and (αY) were estimated due to lack of experimental data. By optimization of thermodynamic and phase diagram data, [88Ran] calculated the Mg-Y phase diagram (Fig. 1). Special points of Fig. 1 are given in Table 1. The temperatures and compositions are calculated values. The calculated boundaries and the experimental data agree well. The calculated phase diagram shows more plausible phase relationships of the Mg-Y system.

Mg-Y crystal structure data are given in Table 2.

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60Gib: E.D. Gibson and O.N. Carlson, *Trans. ASM, 52*, 1084-1096 (1960).

61Miz: D. Mizer and J.B. Clark, *Trans. AIME, 221*, 207-208 (1961).

65Smi: J.F. Smith, D.M. Bailey, D.B. Novotny, and J.E. Davison, *Acta Metall., 13*, 889-895 (1965).

67Mia: D. Miannay, P. Gregoire, P. Azov, and P. Bastien, *Compt. Rend. C, 265*, 1107-1112 (1967) in French.

Table 1 Special Points of the Mg-Y Phase Diagram

Reaction	Composition, at.% Y			Temperature, °C	Reaction type
L ↔ Mg		0		650	Melting
L ↔ (Mg) + ε	8.1	3.4	13.3	567.4	Eutectic
L + Mg_2Y ↔ ε	14.3	33.3	16.4	624.8	Peritectic
L + MgY ↔ Mg_2Y	46	25.9	33.3	782.3	Peritectic
L + (βY) ↔ MgY	61.8	41.5	48.5	934.5	Peritectic
(βY) ↔ MgY + (αY)	72	49.7	83.4	774.8	Eutectoid
L ↔ βY		100		1522	Melting
βY ↔ αY		100		1478	Allotropic

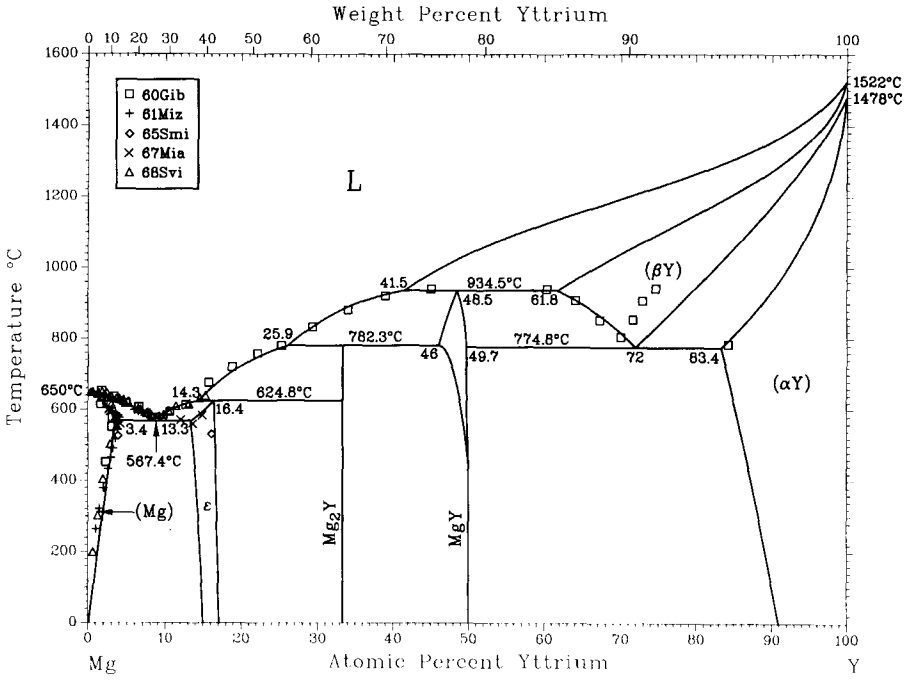

Fig. 1 Mg- rich part of the Mg-Y system.

Table 2 Mg-Y Crystal Structure Data

Phase	Composition, at.% Y	Pearson symbol	Space group	Strukturbericht designation	Prototype
(Mg)	0 to 3.4	*hP2*	$P6_3/mmc$	*A3*	Mg
ε	13.3 to 16.4	*cI58*	$I4\bar{3}m$	*A12*	αMn
Mg_2Y	33.3	*hP12*	$P6_3/mmc$	*C14*	$MgZn_2$
MgY	46 to 49.7	*cP2*	$Pm\bar{3}m$	*B2*	CsCl
(βY)	61.8 to 100	*cI2*	$Im\bar{3}m$	*A2*	W
(αY)	83.4 to 100	*hP2*	$P6_3/mmc$	*A3*	Mg

68Svi: Z.A. Sviderskaya and E.M. Padezhnova, *Izv. Akad. Nauk SSSR, Met.,* (6), 183-190 (1968) in Russian; TR: *Russ. Metall.,* (6), 126-130 (1968).

88Nay: A.A. Nayeb-Hashemi and J.B. Clark, *Phase Diagrams of Binary Magnesium Alloys,* ASM International, Metals Park, OH, 344-349 (1988).

88Ran: Q. Ran, H.L. Lukas, G. Effenberg, and G. Petzow, *Calphad, 12*(4), 375-381 (1988).

Pd-S (Palladium-Sulfur)

H. Okamoto

The Pd-S phase diagram in [Massalski2] was redrawn from [76Mat]. [85Tay] reported an improved phase diagram (Fig. 1), which is based on more data points obtained by DTA. Special points of Fig. 1 are summarized in Table 1. Crystal structure data are given in Table 2.

Cited References

35Wei: F. Weibke and J. Laar, *Z. Anorg. Allg. Chem., 224,* 49-61 (1935) in German.

68Ros: E. Rost and E. Vestersjo, *Acta Chem. Scand., 10,* 1620-1624 (1968).

76Mat: P. Matkovic, M. El-Boragy, and K. Schubert, *J. Less-Common Met., 50,* 165-176 (1976).

85Tay: J.R. Taylor, *Metall. Trans. B, 16,* 143-148 (1985).

Table 1 Special Points of the Pd-S Phase Diagram

Reaction		Composition, at.% S		Temperature, °C	Reaction type
L ↔ Pd		0		1555	Melting
L + (Pd) ↔ Pd_4S	20	0	20	774	Peritectic
L + Pd_4S ↔ Pd_3S	26.5	20	25	646	Peritectic
Pd_3S ↔ Pd_4S + $Pd_{17}S_7$	25	20	30.4	556	Eutectoid
L ↔ Pd_3S + $Pd_{16}S_7$	28	25	30.4	625	Eutectic
L + PdS ↔ $Pd_{16}S_7$	29.5	50	30.4	639	Peritectic
L ↔ PdS		50		~1000	Congruent

Table 2 Pd-S Crystal Structure Data

Phase	Composition, at.% S	Pearson symbol	Space group	Strukturbericht designation	Prototype	Reference
(Pd)	0	*cF4*	$Fm\bar{3}m$	*A1*	Cu	[Massalski2]
Pd_4S	20	*tP10*	$P\bar{4}2_1c$	...	...	[35Wei]
Pd_3S	25	*oC16*	*Ama2*	...	...	[68Ros]
$Pd_{16}S_7$	30.4	*cP64*	$Pm\bar{3}m$	...	...	[76Mat]
PdS	50	*tI16*	$P4_2/m$	*B34*	PdS	[35Wei]
PdS_2	66.7	*oP12*	*Pbca*	...	...	[35Wei]