Comment on Al-Mn (Aluminum-Manganese)

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Fig. 1 shows the Al-Mn phase diagram calculated by [92Jan]. The diagram is somewhat different from [Massalski2] (Fig. 2), which was redrawn from [87Mca] (with phase names changed for easier comparison).

The primary concern of the editor with regard to Fig. 1 is the for of Al_8Mn_5 phase field extended to include the δ phase field. Many ternary phase diagrams, for example Al-Co-Mn and Al-Cr-Mn, clearly indicate that δ and (δMn) belong the same bcc phase field. Therefore, bcc δ and orthorhombic Al_8Mn_5 should be differentiated, as in Fig. 2. In this regard, however, the liquidus and solidus of (δMn) and δ in Fig. 2 should be smoothly continuous in the metastable range, which is not the case in [87Mca]. The absence of λ in [92Jan] may be justifiable because λ with a composition very similar to Al_4Mn may be metastable [93Oka].

The Al-Mn crystal structure data in [87Mca] are updated in Table 1.

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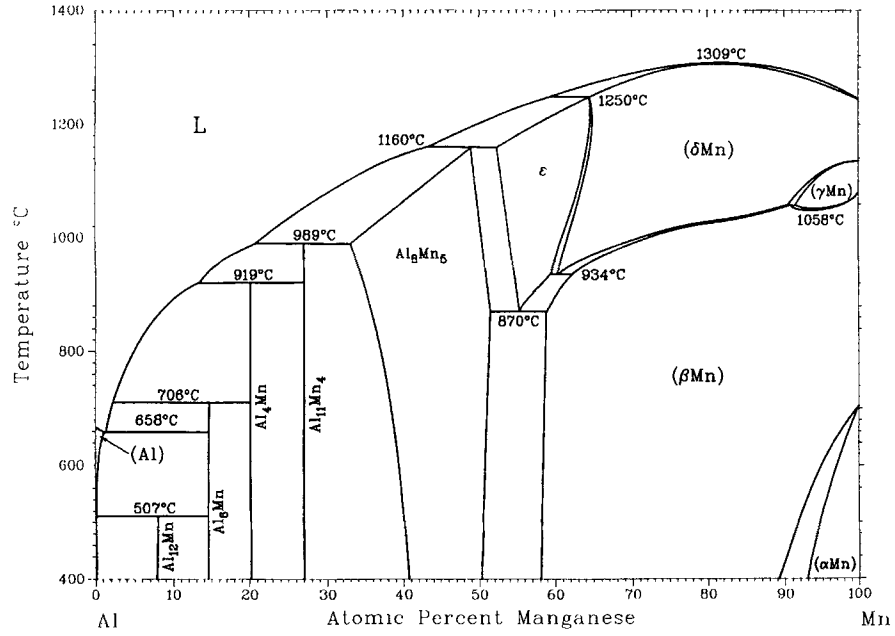

Fig. 1 Al-Mn phase diagram calculated by [92Jan].

Table 1 Al-Mn Crystal Structure Data

Phase	Composition, at.% Mn(1)	Pearson symbol	Space group	Strukturbericht designation	Prototype	Reference
(Al)	0 to 0.2	*cF*4	$Fm\bar{3}m$	*A*1	Cu	...
$Al_{12}Mn$	7.7	*cI*27	$Im\bar{3}$	.	...	[75Bar]
Al_6Mn	14.3	*oC*28	*Cmcm*	$D2_h$	Al_6Mn	[38Hof]
δ	?	*oP*60	*Pnnn*	...	...	[76Oni]
Al_4Mn	20	*hP*574	$P6_3/mmc$	...	..	[89Sho]
$\beta Al_{11}Mn_4$	?	*oP*160	*Pnma*	...	...	[61Tay]
$\alpha Al_{11}Mn_4$	26.7	*aP*30	$P\bar{1}$	..	...	[58Bla]
γ	?	...	...	...	...	...
Al_8Mn_5	33 to 50	*hR*26	$R\bar{3}m$	$D8_{10}$	Al_8Cr_5	[60Sch]
δ	35 to 52	*cI*2	*Im3m*	*A*2	W	[30Wes]
ε	52 to 64	*hP*2	$P6_3/mmc$	*A*3	Mg	[58Kon]
(δMn)	60 to 100	*cI*2	$Im\bar{3}m$	*A*2	W	...
(γMn)	91 to 100	*cF*4	$Fm\bar{3}m$	*A*1	Cu	...
(βMn)	59 to 100	*cP*20	$P4_132$	*A*13	βMn	...
(αMn)	? to 100	*cI*58	$I\bar{4}3m$	*A*12	αMn	...

(1) Primarily according to [92Jan].

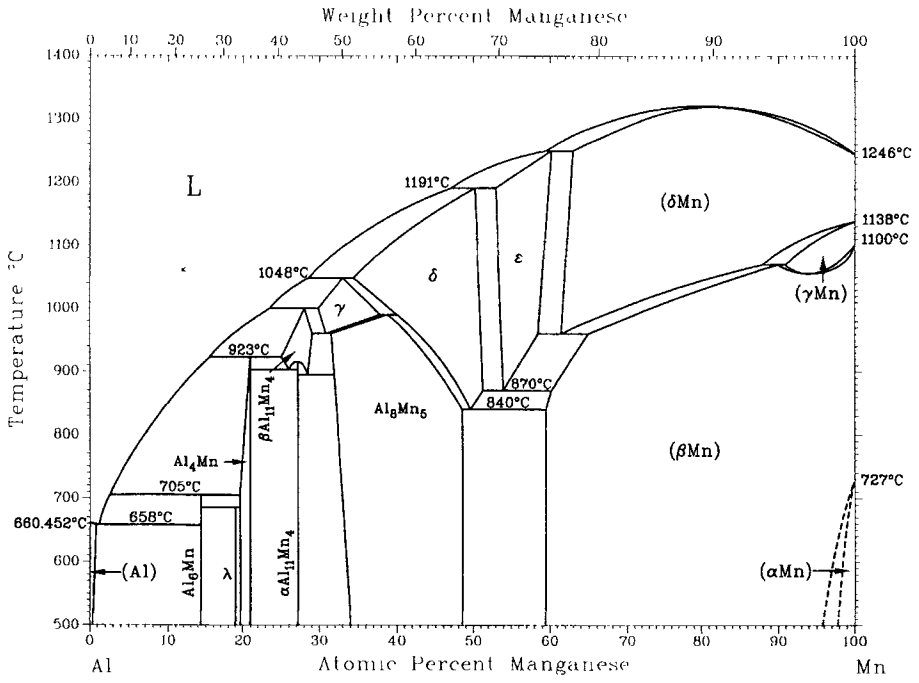

Fig. 2 Al-Mn phase diagram [Massalski2]