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Al-Re (Aluminum-Rhenium)

H. Okamoto

The Al-Re phase diagrams were reviewed by [2002Oka]. The phase diagram calculated by [1998Hua] turned out to be inconsistent with the experimental results reported later by [1999Cor]. Therefore, the diagram of [1998Hua] was subject to further improvement. In addition, [2002Oka] pointed out several thermodynamically unlikely features in the diagram of [1999Cor].

[2008Bal] reinvestigated the Al-Re system in the composition range 0-30 at.% Re. Figure 1 shows the Al-Re phase diagram constructed by combining primarily

Table 1 Al-Re crystal structure data

Phase	Composition, at.% Re	Pearson symbol	Space group	Strukturbericht designation	Prototype
(Al)	0	*cF*4	$Fm\bar{3}m$	*A*1	Cu
$Al_{12}Re$	7.7	*cI*26	$Im\bar{3}$	…	$Al_{12}W$
Al_6Re	14.3	*oC*28	*Cmcm*	$D2_h$	Al_6Mn
αAl_4Re	20.5-21	*aP*40	$P\bar{1}$	…	…
βAl_4Re	22.5-23.5	…	…	…	…
Al_3Re	25-25.5	*mP**	…	…	…
$Al_{11}Re_4$	26-26.7	*aP*30	$P\bar{1}$	…	$Al_{11}Mn_4$
AlRe	50	*tP*4	*P*4/*nmm*	*B*11	CuTi
$AlRe_2$	66.7	*tI*6	*I*4/*mmm*	$C11_b$	$MoSi_2$
(Re)	96-100	*hP*2	$P6_3/mmc$	*A*3	Mg

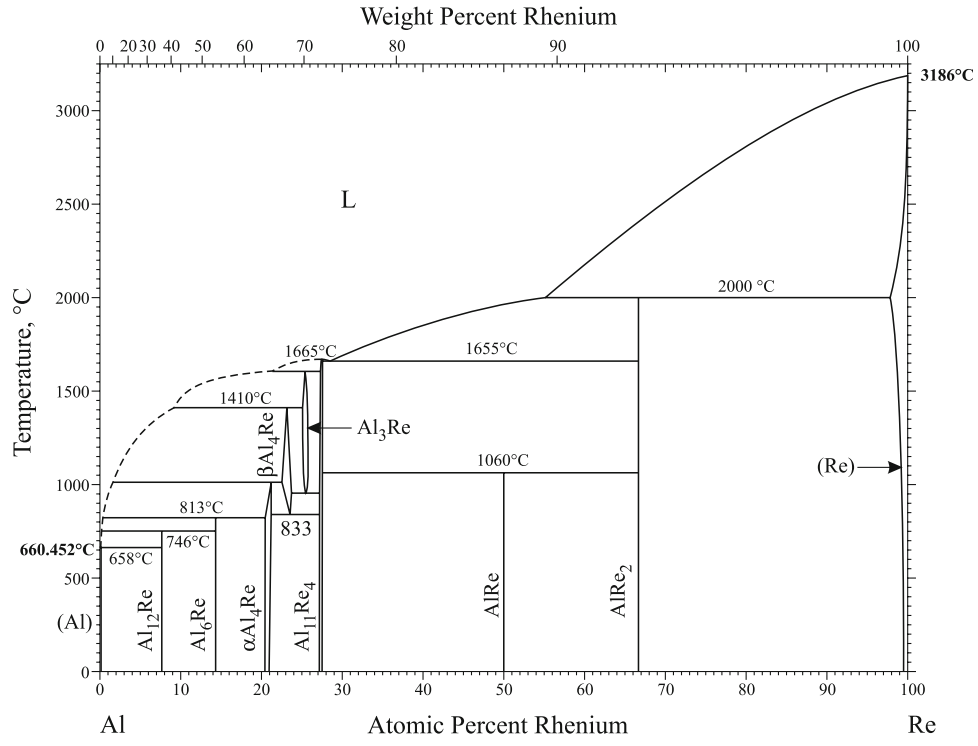

Fig. 1 Al-Re phase diagram

[2008Bal] (0-30 at.% Re) and [1984Sch] (30-100 at.% Re). The phase diagram has been modified by taking into account the works of [2001Sch] and [1999Cor]. According to [2001Sch], $AlRe_2$ decomposes into $Al_{11}Re_4$ and (Re) on heating by a peritectoid reaction at 1494 °C. But a much higher temperature of 2000 °C is accepted in Fig. 1 based on [1999Cor]. This feature is in agreement of [1984Sch]. The compound existing at around the equiatomic composition may be either AlRe proposed by [1984Sch] and adopted by [1998Hua] or Al_2Re_3 according to [1999Cor]. Figure 1 tentatively shows AlRe because the crystal structure of AlRe is known [1984Sch] but that of Al_2Re_3 has not been well established.

Table 1 shows Al-Re crystal structure data.

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