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Al-Mg-Na (Aluminum-Magnesium-Sodium)

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Recently, [2006Zha] computed the phase equilibria of this ternary system, by extrapolating the binary thermodynamic descriptions.

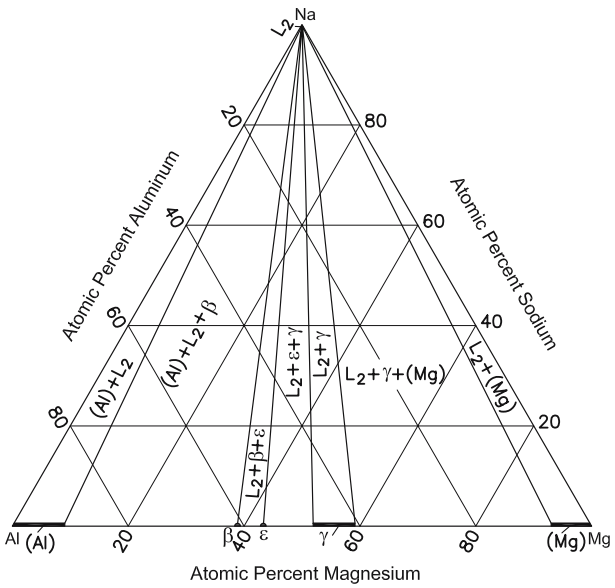

Fig. 1 Al-Mg-Na computed isothermal section at 327 °C [2006Zha]. Thin two-phase regions are omitted

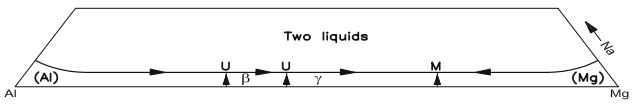

Fig. 2 Al-Mg-Na schematic liquidus projection. The liquidus lines lie very close to the Al-Mg side

Binary Systems

The Al-Mg phase diagram [1998Lia] has the following intermediate phases: Mg_2Al_3 (cubic, labeled β), R or ε (rhombohedral), and $Mg_{17}Al_{12}$ (*A*12, αMn-type cubic, denoted γ). In the Al-Na system [2006Zha], a monotectic reaction occurs at 932 °C, in which liquid L_1 with 0.14 at.% Na decomposes to (Al) and L_2 of almost pure Na. L_2 solidifies into (Al) and (Na) through a eutectic reaction at 371 °C. In the Mg-Na system [2006Zha], the monotectic reaction is at 910 °C, in which L_1 of 2.1 at.% Na decomposes to (Al) and the Na-rich liquid L_2. The final solidification of L_2 is through a eutectic reaction at 371 °C.

Ternary Phase Equilibria

[2006Zha] developed new thermodynamic descriptions of the Al-Na and Mg-Na binary systems and combined the same with the description of the Al-Mg system by [1998Lia], to calculate the phase equilibria of this ternary system. An isothermal section at 327 °C computed by [2006Zha] is shown in Fig. 1. The liquidus lines near the Al and Mg corners computed by [2006Zha] show that the Na solubility in (Al) and (Mg) decreases to extremely low values with the addition of the third component. Here, a schematic liquidus projection is shown in Fig. 2. [2006Zha] also computed a vertical section at constant atom ratio of Al/Na = 1.

References

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