

Al-Mn-Mo-Ti (Aluminum-Manganese-Molybdenum-Titanium)

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The report of [1994Sch] delineated the $L1_2$ region at 1200 °C in quaternary alloys containing up to 8 at.% Mo.

Binary Systems

For Al-Mn, Mn-Mo, and Mn-Ti phase diagrams, see [Massalski2]. Brief descriptions of the Al-Mo, Al-Ti, and Mo-Ti phase diagrams are given in the Al-Mo-Ti update in this issue.

Ternary Systems

An update of the Al-Mn-Ti system is given by [2005Rag]. This issue contains an update on the Al-Mo-Ti system. No information appears to be available on the Al-Mn-Mo system. An early report by [1954Eil] on the Mn-Mo-Ti system gave three isothermal sections for Ti-rich alloys at 650, 600, and 550 °C, and seven vertical sections at 90 wt.% Ti, 80 wt.% Ti, 70 wt.% Ti, 5 wt.% Mn, 10 wt.% Mn, 5 wt.% Mo, and 10 wt.% Mo.

Stability of the $L1_2$ Phase in Quaternary Alloys

With starting metals of >99.5% purity, [1994Sch] arc-melted under Ar about 20 quaternary alloys atmosphere

containing 4 or 8 at.% Mo. The alloys were annealed at 1200 °C for 1 h and were cooled in air. The phase equilibria were studied by x-ray powder diffraction, optical microscopy, and hardness measurements. The single-phase regions of $L1_2$ outlined by [1994Sch] in the 4 at.% Mo and 8 at.% Mo alloys are shown in Fig. 1. The “center” of this region, which is at 64 at.% Al in Al-Mn-Ti ternary alloys [1992Zha], shifts to 59 at.% Al in the Al-Mn-Ti-4 at.% Mo alloy and to 57 to 58 at.% Al in the Al-Mn-Ti-8 at.% Mo alloy. This indicates that Mo substitutes primarily for Al in the quaternary alloys at 1200 °C.

References

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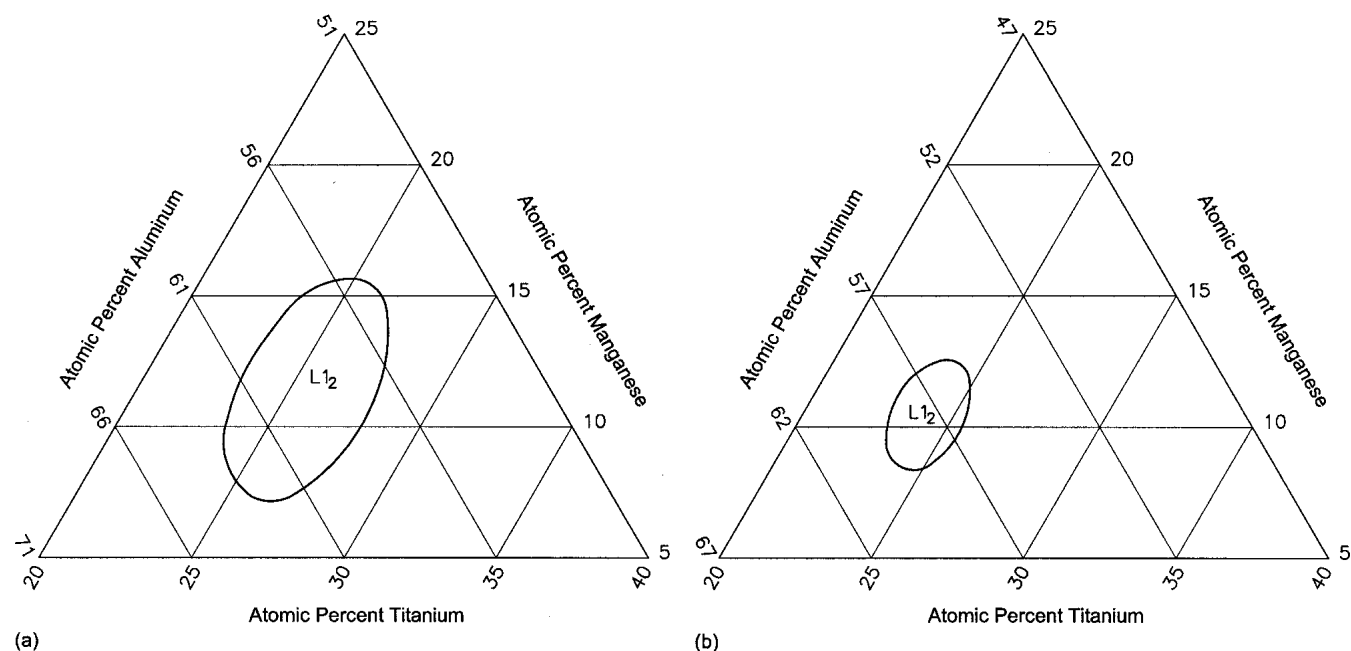


Fig. 1 Al-Mn-Mo-Ti extent of the $L1_2$ phase region in (a) 4 at.% Mo, and (b) 8 at.% Mo alloys [1994Sch]