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Al-Li合金中超点阵相的研究

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ON THE SUPERLATTICE PHASE IN Al-Li ALLOY

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摘要

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摘要 用常规透射电子显微术(TEM)、高分辨电子显微术(HREM)、点阵象模拟和动力学衍射模拟技术研究了Al-2.54Li-1.24Cu-1.01Mg-0.13Zr(AA8090)中的超点阵相。结果证实了Al₃Li和Al₃Zr相的晶体结构符合Silcock提出的模型,并发现,Al-Li-Cu-Mg-Zr合金中同时存在Al₃Zr、Al₃Zr相和Al₃Li/Al₃Zr共生体。在纯二元Al-Li合金中,Al₃Li相主要在淬火过程中调幅分解;在多元合金中,Al₃Li相以第二相质点为核心的析出也是一种重要的形式。

关键词: Al-Li合金 超点阵相 高分辨电子显微术

Abstract: The superlattice phase in Al-2.54Li-1.24Cu-1.01Mg-0.13Zr(AA8090) alloy have been studied by means of conventional transmission electron microscopy (TEM), high-resolution electron microscopy (HREM), lattice image simulation and dynamical diffraction simulation. The research has testified the Silcock's model about the crystal structure of Al₃Li and Al₃Zr phases. It is discovered that Al₃Li, Al₃Zr and the co-precipitated Al₃Li/Al₃Zr phases exist simultaneously in the observed alloy. The co-precipitation of Al₃Li/Al₃Zr forms by that the Al₃Li phase nucleates on and grows coherently around the Al₃Zr phase. A further analysis predicts that the Al₃Li phase precipitates by a spinodal decomposition process during water-quench; Whereas im the complex alloy, the nucleation of Al₃Li phase on the second-phase particle has played an important role on the formation of the superlattice phases.

Keywords: Al-Li alloy superlattice phases high-resolution eletron microscopy

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