Coherent long period super-lattice in Mg97Zn1Yb2 synthesized under high pressure

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Coherent long period phase respect to original hcp-Mg lattice is received special attention as new type strengthening precipitate phase of Mg alloys, because Kawamura et al. reported the 0.2 proof stress of rapidly solidified powder metallurgy Mg97Zn1Y2 alloys over 600 MPa [1]. Subsequently, four type coherent long period stacking order synchronized with chemical concentrations (LPSO) have been discovered at ambient pressure [2].

Recently, our group discovered two type new coherent long period super-lattice in Mg97Zn1Yb2 synthesized under high pressure and crystal structure decided using scanning transmission electron microscope. One has the six periodic chemical and structural order. Yb in the super-lattice have two site with different coordination number and atomic volume [3]. Another has the four periodic chemical and structural order. The structure cannot explained only combination of AB and ABC stacking. In this presentation, the crystal structure and the stability of both phase are discussed and compare with LPSO.


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