

Jump-Like Deformation of Ultrafinegrained AZ31 at Temperature 4,2 - 0,5 K

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Abstract : The drawback of magnesium alloys is poor plasticity, which complicates the forming. Effective way of improving the properties of the cast magnesium alloy AZ31 (3 wt. % Al, 0.8 wt. % Zn, 0.2 wt. % Mn) is to combine hot extrusion at 350°C and equal-channel angular pressing (ECAP) at 180°C. Because of reduced grain sizes, changes in the nature of the grain boundaries, and enhancement of a texture that favors basal dislocation glide, after this kind of processing, increase yield stress and ductility. For study of the effect of microstructure on the mechanisms for plastic deformation, there is some interest in investigating the mechanical properties of the ultrafinegrained (UFG) Mg alloy at low temperatures, before and after annealing. It found that the amplitude and statistics at the low-temperature jump-like deformation the Mg alloy of dependent on microstructure. Reduction of the average density of dislocations and grain growth during annealing causing a reduction in the amplitude of the jump-like deformation and changes in the distribution of surges in amplitude. It found that the amplitude and statistics at the low-temperature jump-like deformation UFG alloy dependent on temperature of deformation. Plastic deformation of UFG alloy at a temperature of 10 K occurs uniformly - peculiarities is not observed. Increasing of the temperature of deformation from 4,2 to 0,5 K is causing a reduction in the amplitude and increasing the frequency of the jump-like deformation.

Keywords : jump-like deformation, low temperature, plasticity, magnesium alloy

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