The Microstructure Evolution of Al-Mg-Sc-Zr Alloy after Deformation by Equal Channel Angular Pressing

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Equal-channel angular pressing is a method of severe plastic deformation, which implies high deformation into the material and leads to grain size reduction and strength increase. It was applied on a twin-roll cast Al-Mg-Sc alloy, which contained $Al_3(Sc,Zr)$ particles formed during annealing at 300 °C for 8 hours. The evolution of the microstructure and mechanical properties after deformation was studied during isochronal heating 50 K/50 min. Strengthening occurred during annealing at lower temperatures and was followed by prominent microhardness drop, which was connected with formation of new grains and recrystallization. The presence of $Al_3(Sc,Zr)$ particles in the matrix is accounted for the high temperature stability.

Keywords: Aluminium alloys, Equal-channel angular pressing, $Al_3(Sc,Zr)$, Thermal stability, Recrystallization

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