Microstructure of Twin-roll Cast Al-Mg-Sc-Zr Alloy

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A model twin-roll cast Al-Mg-Sc-Zr alloy was prepared and the evolution of microstructure during a step-by-step isochronal annealing was characterized by electron microscopy and light optical microscopy. Inhomogeneous structure with significantly finer grains in the middle of the strip is generated by casting. Subsequent annealing up to 550 °C does not alter this grain-size mainly due to the presence of a fine dispersion of $Al_3(Sc,Zr)$ particles, which forms at annealing temperatures below 300 °C. Although these particles coarsen and partially transform at higher annealing temperatures their strengths as recrystallization inhibitors is sufficient to prevent the microstructure from a coarsening. Nevertheless, the beneficial contribution of fine precipitates to microhardness is fully suppressed by the annealing at high temperatures.

Keywords: Al-Mg-Sc-Zr, Twin-Roll Casting, Microstructure

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