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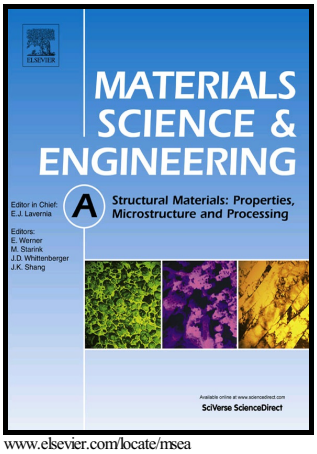

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Influence of melt flow in the gating system on microstructure and mechanical properties of high pressure die casting AZ91D magnesium alloy

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Abstract

The influence of melt flow in the gating system on microstructure and mechanical properties of high pressure die casting AZ91D magnesium alloy was investigated. Experimental and theoretical results showed that the externally solidified crystals (ESCs) were broken and eliminated by the shear stress caused by the turbulent melt flow in gating system. In comparison with the casting fabricated with conventional gating system, a simultaneous increase in both strength (~16% higher ultimate tensile strength) and ductility (~70% higher elongation) were achieved in the casting fabricated with modified gating system. Furthermore, different modes of crack initiation and propagation were found. For the one fabricated with the conventional gating system, the crack initiated at the shrinkage pore and propagated in a quasi-cleavage fracture form. In contrast, for the other one fabricated with the

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