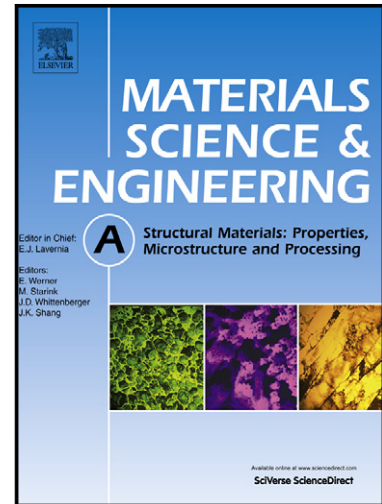


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**Microstructures and mechanical properties of vacuum counter-pressure casting A357 alloy  
under grade-pressurizing solidification: effect of melt temperature**

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**Abstract:**

The effects of melt temperature on relative density, microstructures and mechanical properties of vacuum counter-pressure casting A357 alloy solidified under grade-pressurizing (200 kPa) were investigated. The results show that the relative density and mechanical properties of samples solidified under grade-pressurizing were affected by the melt temperature (580-610 °C). The optimal relative density and mechanical properties were achieved at melt temperature of 590 °C. The microstructures vary with the melt temperature, as a result of the difference in strength of feeding flow and dendrite. The powerful feeding flow obtained by grade-pressurizing solidification can induce the stress being imposed on the dendrites, resulting in the collapsing of primary dendrites network to form the equiaxed dendrites. The feeding pressure loss as a function of the solid volume fraction was suggested for obtaining a reasonable melt temperature for improving density and refining microstructure.

**Keywords:** Melt temperature; Relative density; Microstructures; Feeding flow

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