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Effect of cooling rate on microstructure and mechanical properties of Al alloys

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Abstract

The authors have investigated the effect of cooling rate on microstructure and mechanical properties of Al alloys. The test specimens were heated to 1250⁰c for 4hours and cooled by three methods. The micro hardness and microstructure of the aluminum alloys were examined by optical microscopy and hardness testing machine. Their experimental results indicated that the microstructure can be changed and significantly improved by varying the cooling rate. Thus the heat treatment process used by them can vary the toughness ,ductility and removing the residual stresses. The mechanical properties are closely related to the microstructure obtained after the heat treatment. Of late, the affect of cooling rate on the mechanical properties and microstructure has become an important study. The authors studied the tensile behavior and microstructure of Al alloys as a function of cooling rate .They have shown that yield strength increases with increasing cooling rate, where as the ultimate tensile strength and shear strength are not affected. There were only discrete references in the literature on the effect of cooling rate in relation to the microstructure and mechanical properties .Their experimental study is to understand the effect of cooling rather than on the micro hardness and microstructure. Their have clearly explained their experimental setup, production of micro structure, evaluation of hardness etc.