

# Effect of Artificial Aging on the Microstructure and Mechanical Properties of AJ62 Magnesium Alloys



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**Abstract** Magnesium (Mg) alloys with addition of strontium, such as AJ62, are die-castable and have good creep resistance at high temperatures. The formation of compounds containing strontium are extremely useful to increase the elevated temperature properties and strontium is an effective grain refiner for magnesium alloys. In this study, the effect of artificial aging of AJ62 magnesium alloys on the microstructure development and mechanical properties was studied. The alloys were solution heat treated, cooled to room temperature, before artificially aged to the room temperature. Different heating times and cooling conditions in the aging parameters were used. Aging time and cooling conditions affect the dendrite and eutectic phases refinement and lead to varying mechanical properties. Refinement of dendrite size enhanced the ductile properties.

**Keywords** Magnesium alloys · Artificial aging · Microstructure · Ductility

## 1 Introduction

Magnesium (Mg) is the lightest metal structure, which is desirable in the automotive industry for energy efficiency and system performance [1–4]. Automobile engines that are stronger, lighter, and more efficient are characteristics of a car component that could have a wide range of uses [5–9].

AJ62 magnesium alloys are die-castable alloys with Sr element which offers excellent creep performance. These magnesium alloys were significantly reduced by 24% of weight compared with the equivalent aluminum block [10]. Strontium additions are known to successfully suppress  $Mg_{17}Al_{12}$  and could be replaced by a

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