

HIGH-TEMPERATURE COMPRESSION BEHAVIOR AND MICROSTRUCTURAL EVOLUTION OF AI-5Mg-0.05, 0.1AI2Ca ALLOYS

KIM Bong-H., YOON Young-O., KIM Shae-K.

Korea Institute of Industrial Technology, Yonsei University, Republic of Korea

Abstract

The AI-Mg alloy gives different combinations of good formability and weldability with sufficient strength achieved by the mechanism of solid solution hardening of Mg solute. As automotive applications of AI alloys have grown, the high-strength AI-Mg alloys have seen increasing use. Many researches have continued with the goal of increasing the strength of AI-Mg alloys. The benefits of higher Mg levels for increasing strength of AI-Mg alloys are counterbalanced by its tendency to promote oxidation if the product is not fabricated appropriately.

It is well known that the oxidation of Mg in Al melt can be prevented by addition of small amount of Be or Ca. But, beryllium is extremely harmful to human body and its application is strictly limited. The beneficial effect of Ca on oxidation of Mg has been well reported, together with embrittlement behavior in the condition of high temperature tensile load. Meanwhile, a specially fabricated Mg alloy containing Al2Ca phase has been patented to inhibiting Mg oxidation. So, it is worth to understand the effect of Al2Ca on high temperature compression behavior.

For this purpose, AI-5Mg containing different level of AI2Ca were cast into Y-block (20mm of thickness). The casting block was machined into cylindrical sample with 10mm of diameter and 12mm of height for high temperature compression test. The microstructure of the deformed sample were analyzed and discussed in order to understand the effect of AI2Ca addition on the compression behavior.

Keywords: Aluminum, Al-Mg alloy, 5000 series, rolling, mechanical properties

Author did not supply full text of the paper/poster.