

عنوان مقاله:

The Effect of Sintering and Compaction Conditions on the Microstructure and Properties of AZ₃₁ Magnesium Alloy

محل انتشار:

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خلاصه مقاله:

Magnesium and its alloys are attractive materials in industrial applications due to the low density and high strength. The properties of AZ₃₁ magnesium alloy can be much improved by choosing proper sintering conditions. In this study, the microstructure and mechanical properties of AZ₃₁ prepared by mechanical alloying, compaction, and sintering of elemental powder, were studied. The effect of parameters such as compaction pressure, heating rate, and sintering time were investigated to determine the optimal sintering condition of AZ₃₁ magnesium alloys. Previous researches have focused on the specific conditions of sintering, while in this study, various factors of sintering were examined simultaneously. The results showed that sintering time is one of the major variables that have a considerable effect on the final properties of AZ₃₁. In short sintering times, recrystallization leads to small grain formation inside the powder. However, as the sintering time increases, the growth of new grains slows down and no trace of them can be detected in the microstructure. Furthermore, the conditions for recrystallization were also determined, which can be used to provide small grain size and, consequently, better properties after the initial powder milling and sintering. At optimal sintering conditions, the average grain size, porosity percentage and hardness of the samples AZ₃₁ magnesium alloy were obtained as ۱۰۴ μm and ۲.۰۵%, and ۷۹.۵ HV, respectively which is expectable result in comparison to the bulk AZ₃₁.

کلمات کلیدی:

AZ₃₁ magnesium alloy, Microstructure, Powder Metallurgy, Sintering

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