

Deformation characteristics of fine-grained magnesium alloy AZ31B thin sheet during fast gas blow forming

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Abstract

A series of experiments were performed by use of stepwise pressurization profiles for gas blow forming of an Mg alloy with a male die. Decreasing the forming time for gas blow forming of a commercially available fine-grained Mg alloy AZ31B thin sheet with a thickness of 0.6 mm has been studied in the present work. The results indicated that it was feasible to form a shallow rectangular pan with a height of 10 mm in less than 320 sec. The distribution of thickness along the transverse cross section of the formed pan was confirmed by the results as being sensitive to the pressurization profiles. Grain growth was not a serious problem for forming at a temperature of 370C. Grain size increased from about 5.1 μ m to a maximum size of about 7.1 μ m. The maximum cavity volume fraction in the formed pan was about 1.1% for two different pressurization profiles.

Keyword : AZ31B Mg alloy, Gas blow forming, Pressurization profile