

عنوان مقاله:

Melt spinning of ultrahigh strength aluminum-based amorphous alloys for automotive applications

محل انتشار:

ششمین کنفرانس بین المللی متالورژی پودر (سال: 1397)

تعداد صفحات اصل مقاله: 9

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خلاصه مقاله:

In this study, various amorphous Al-based alloys containing transition metals (TM=Fe, Ni, Cu) and Ce-based rare earth (RE) metals were prepared by melt spinning. X-ray diffractometric, transmission electron microscopy and differential scanning calorimetry were utilized to study the microstructure and stability of the melt spun ribbons. The glass forming ability (GFA) of TM and REM were experimentally analyzed and theoretically evaluated by the instability model proposed by Egami-Waseda model. It is shown that Ni increases GFA of amorphous Al-based alloys while Cu reduces its ability. MM have significant effect on the GFA and thermal stability of the amorphous alloys. TEM studies indicate formation of nucleus of fcc-Al nanocrystals after thermal annealing. By thermodynamic evaluation of the crystallization process and determination of its activation energy, it is concluded that primary crystallization in amorphous Al-based alloys is a complex diffusion controlled process

کلمات کلیدی:

Melt spinning; Amorphous aluminum alloy; Thermal stability; Crystallization; Microstructure

لینک ثابت مقاله در پایگاه سیویلیکا:

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