

عنوان مقاله:

Severe Plastic Deformation of Nanostructured Cu-۳۰%Zn Tubes at Increased Temperatures

محل انتشار:

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خلاصه مقاله:

Severe plastic deformation (SPD) methods were developed for producing of metals and alloys with ultrafine grained (UFG) microstructures having high strength. Parallel tabular channel angular pressing (PTCAP) as a noble severe plastic deformation (SPD) method was used to produce ultrafine grained (UFG) and nanostructured Cu-۳۰%Zn tubes. In this paper, the effect of PTCAP process temperature on the deformation microstructures and mechanical properties were investigated using experimental tests. Optical microscopy (OM) and scanning electron microscopy (SEM) were used to evaluate microstructural evolutions and fractured surface analysis. Microhardness and tensile tests were employed to mechanically characterize the PTCAP processed samples. The results showed the strength and the hardness decrease with increasing process temperature up to ۱۰۰ , but at ۲۰۰ , strength and hardness increase in comparison to that in ۱۰۰ . The rise in the strength and hardness of the sample processed at ۲۰۰ compared to that at ۱۰۰ is because of the partial recrystallization, forming new fine grains with high angle boundaries and twin boundaries. Twinning is dominant deformation mechanism of brass material in order to low stacking fault energy (SFE). Observations revealed that the failure mode in PTCAPed brass was a ductile rupture with the existence of deep dimples. It also indicates that the temperature has no obvious effect on the fracture mood.

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