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Twinning characterization of fiber-textured AZ31B magnesium alloy during tensile deformation

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Abstract The twinning behavior of an AZ31B magnesium alloy with weak fiber texture was investigated and characterized in this work. It was found that both {10-11} contraction and {10-12} extension twinning can be activated during uniaxial tensile process. Numbers of both types of twins increase as tensile deformation continues. However, the increasing rate of contraction twins is much higher than that of extension twins due to the fact that Schmid factor of grains for contraction twinning distributes mainly in the higher value range than that for extension twinning, which results in a more rapid increment of resolved shear stress when loading stress increases. Primary twinning type selection depends on the integrate effect of Schmid factor and critical resolved shear stress. Extension twin variant selection is highly linked to the SF rank although Schmid factor criterion is not absolute and suffers some exceptions. Compared with extension twin, contraction twin variant selection suffers more exceptions of Schmid factor criterion.

Keywords Magnesium alloy; Fiber texture; Twinning; variant; Schmid factor

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