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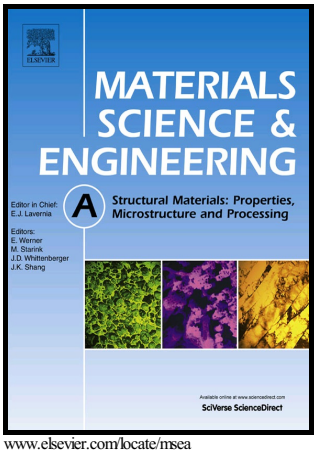

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Strain hardening and tensile behaviors of gradient structure Mg alloys with different orientation relationships

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Abstract.

Surface mechanical attrition treatment (SMAT) was employed to produce gradient structures in AZ31B Mg alloy samples with two different initial textures. The structure of both samples can be regarded as an integration of two main layers: the severely deformed layer exhibited dramatic grain refinement to nano- and submicron-scale with weakened and randomized textures; the less deformed layer exhibited the inherited coarse grains with increased dislocation density, possessing the similar texture with the sample prior to SMAT. All the samples containing different layer constituents cut from the SMAT alloys showed remarkable increase of strength compared to the original Mg alloy. However, the two integral SMAT samples with different initial textures exhibited marked difference in uniform elongation (UE) during tension. That was attributed to the different strain hardening behaviors influenced by the deformation coordination and strain partitioning between layers

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