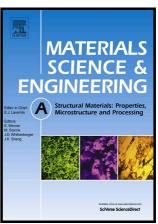
Author's Accepted Manuscript

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ACCEPTED MANUSCRIPT

Twin-assisted precipitation during hot compression of an Mg-Gd-Zn-Zr

magnesium alloy

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ABSTRACT

Dynamic precipitation in an Mg-Gd-Zn-Zr alloy during hot compression at 350°C and 450°C and

at strain rates of 0.001-0.1s⁻¹ is investigated. The deformation conditions were designed such as

to promote twinning or slip of dislocations. The results indicated that both twinned and non-

twinned grains were present at 350°C, with the extent being a function of the applied strain rate.

The formation and propagation of $\{10\overline{1}2\}\langle\overline{1}011\rangle$ primary tensile twins within the twinned grains

was identified as being at root of the twin-assisted precipitation phenomenon. The precipitates

had spherical-morphology in the twinned grains whereas parallel arrays of rod-shaped

precipitates formed in the non-twinned grains due to dynamic precipitation on the slip bands and

the stacking faults. Twin-assisted precipitates were suppressed by increases in the strain rate at

350°C because of the shorter time required for solute element diffusion towards the nucleated

precipitates at that temperature. Increasing the deformation temperature to 450°C changed the

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1

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