

Title: Investigation of deformation mechanisms in textured magnesium alloy

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Abstract: Presented work studies deformation mechanisms dependent on orientation of samples with respect to initial texture of the wrought magnesium alloy using advanced *in-situ* and *ex-situ* methods. The signal of acoustic emission was measured concurrently during the deformation tests conducted both in compression and tension. Subsequently, the microstructure of deformed samples was studied using optical microscopy and electron backscattered diffraction. A significant dependency of mechanical properties and deformation mechanisms on the orientation of samples with respect to the discovered basal texture of the wrought AZ31 alloy sheet was detected. Furthermore a consistent link between basic parameters of acoustic emission and activated deformation mechanisms was established. Also, an asymmetric response of acoustic emission during deformation in compression and tension was detected and explained in terms of different evolution of mechanical twinning during the plastic deformation.

Keywords: magnesium alloys, deformation, twinning, acoustic emission, EBSD