

Title: Investigation of deformation mechanisms in Mg-Gd alloys

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Abstract: In the present work, the deformation behavior of magnesium-gadolinium binary alloys was investigated. Dependence on the concentration of Gd and deformation temperatures was studied. Extruded samples had relatively strong initial texture. Compression tests were done at room temperature and 200°C. Simultaneously with deformation acoustic emission was recorded. Data from acoustic emission was analyzed with advanced statistical methods. Results of the combination of these two experimental methods indicated that at the beginning of the deformation twinning is the dominant mechanism. In the following stage of plastic deformation non-basal slip systems became the governing deformation mechanism. With higher content of Gd the size of twins decreases as a result of the decreased mobility of twin boundaries caused by solute atoms. At higher temperatures twinning activity was increasing. In addition, results were confirmed by optical light and scanning electron microscopy.

Keywords: magnesium alloy, deformation tests, acoustic emission, microscopy