

Title: Influence of Solid Solution Elements and Precipitate Formation on the Mechanical Behaviour of Magnesium Alloys

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Abstract: Mg-1 wt. % Mn alloys containing about 1 wt.% of calcium (MX10), aluminium (AM11), cerium (ME11), yttrium (MW11), neodymium (MN11) and 8 wt.% of aluminium (AM81) were indirectly extruded with two different speeds.

The partially recrystallised microstructures obtained in MX10, AM11, ME11 and MW11 after slow extrusion exhibited bimodal grain size distributions. Only in the case of AM81 and MN11 a fully recrystallised microstructure was found, indicating differences in the grain nucleation rate during recrystallisation. In these alloys, the weakest texture and, correspondingly, the lowest asymmetry in mechanical properties were also observed.

The acoustic emission technique was used to reveal dislocation or twin controlled deformation in differently textured fractions of the microstructure during tensile and compression testing. A direct correlation between the acoustic emission during mechanical testing and the microstructure, texture and particle distribution was found.