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Anisotropy of mechanical and physical properties of an AZ31 magnesium alloy prepared by accumulative roll bonding

Magnesium alloys with their high specific strength and low weight are used as structural materials in different applications. They have suitable mechanical and excellent damping. Magnesium wrought alloys, such as for instant AZ31, are needed for applications where their weight is important. In the accumulative roll bonding (ARB) technique, stacking of a material and conventional roll-bonding are repeated in the process. Samples for further studies were cut from the sheets so that the longer axis was either parallel (L samples) or perpendicular (T samples) to the rolling direction. Tensile tests were performed at temperatures ranging from room temperature up to 300 °C. Different results were obtained for L and T samples. This anisotropy decreases with increasing number of rolling passes and increasing deformation temperature. The amplitude dependent internal friction was

measured at room temperature. Anelastic planar anisotropy of internal friction was observed; the logarithmic decrement was higher in rolled sheets cut perpendicular to the rolling direction than that in the samples where the longer axis was parallel to the rolling direction. The linear thermal expansion of samples was measured in the temperature range from room temperature up to 400 °C. Planar anisotropy of the thermal expansion was found. Thermal diffusivity and thermal conductivity were measured after 1 and 2 passes through the rolling mill. Thermal diffusivity was measured with the laser-flash method in the temperature range between 20 and 350 °C. Thermal conductivity depends on the number of rolling passes. Results are discussed in terms of microstructure and texture of materials prepared with ARB technique.

Biography

Zuzanka Trojanova is the Professor at Charles University in Prague, Faculty of Mathematics and Physics, Department of Physics of Materials. Her research activity has been focused on the complex investigation of the mechanical properties of metals, alloys and metal matrix composites. She is an author and co-author of about 400 scientific papers, mostly in international journals.

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