

Room temperature characterisation of AZ31 magnesium alloy plate

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Abstrak

Recently, advanced technologies have put much attention on the materials selection as an alternative way to reduce the weight of material. Taking into account electronic devices, automobiles, aeronautics, and structural applications they are all required immense raw product. Magnesium and its alloys as one of the lightest metal ($\rho = 1.8 \text{ g/m}^3$) has attracted much intentions for an alternative metal alloy. Such good properties owned in magnesium including good castability, good machinability as well weldability and considerably cheap have made more convenient way for magnesium alloys to be used. However, its poor formability at room temperature is the major drawback of this material. Therefore, this project is intended to investigate the properties of AZ31 magnesium alloy especially for uniaxial tensile test at relatively low strain rate.

Tensile properties were observed on the yield strength and elastic modulus which seems the crucial factor for magnesium tested at relatively low temperature. Slight dependency of plate orientations to the tensile properties for plate samples and tensile directions for sheet samples with three different sample thicknesses were also carried out. The experiment was done with the use of non-contact extensometer of Mini Instron Tensile Test.

The main conclusion from the present study is that the thickness and the samples orientations affected tensile direction properties of the sheet samples. Microyielding occurred during the test which resulted in declining of modulus as the thickness increases. By contrast ultimate tensile strength, yield strength and ductility are generally increased as the thickness increased.