

## Inoculation of Aerospace Grade Mg-Al-Zn-Mn Cast Magnesium Alloy with Carbon Nanopowder

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**Abstract :** A highly efficient, cost-effective grain refinement technique for ML5 magnesium alloy with a commercially pure carbon nanopowder has been proposed. An experimental casting of testing specimens with incremental additions of a carbon nanopowder (0.001 - 0.1 wt.% ) was performed. It has been found that the carbon nanoparticle inoculation of the alloy structure is efficient in a narrow concentration range. The additions of 0.005-0.01 wt. % the grain refiner in the alloy resulted in a maximum increase of ductility properties (appr. Twofold) and improved tensile strength. However, further expansion of the grain refiner content led to the deterioration of the alloy's mechanical properties. In particular, the introduction of 0.1 wt.% of the nanocarbon and more caused internal defects in the metal. The carbon nanoparticle inoculation is a promising way of improving the properties of the Mg-Al-Zn alloys for critical lightweight aerospace applications on an industrial scale.

**Keywords :** carbon nanopowder, inoculation, melt, tensile strength

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