Production of Al-Si-Fe-X alloys by powder metallurgy

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The aim of the present work was to study the effect of chromium and nickel on the Al-Si alloy, which contained certain amount of iron, and to describe, how these alloying elements affect mechanical properties at room and elevated temperature. Nickel and chromium were chosen as alloying elements due to the low solubility and diffusivity in aluminium matrix, which improve mechanical properties and thermal stability at elevated temperature. Measurements were made on the cast alloys, rapidly solidified alloys and compact alloys. Rapidly solidified alloys were produced using a melt spinning process. Compaction of prepared ribbons was carried out using Spark Plasma Sintering. The microstructure of the products was examined using optical microscopy and X-ray diffraction. Vickers hardness was measured to determine mechanical properties.

Key words: aluminium alloys, rapid solidification, melt spinning, Spark Plasma Sintering

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