Recycling of 6061 aluminum alloy by spray forming

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Aluminum alloys of 6000 series are widely used in structural components for aircraft and transport industries due to their high specific strength and low density [1]. Typically, recycled aluminum alloys have lower mechanical properties in comparison to primary ones since cycles of recycling leads to an increase of impurities content. The presence of Fe and Si in these alloys is associated with the formation of intermetallic phases with a platelet-like structure acting as efficient stress concentrator [2]. The aim of this study is to evaluate the properties of recycled 6061 aluminum alloy by spray forming process followed by hot extrusion. The main advantage of spray forming is to obtain a refined microstructure with low level of segregation. Further processing by hot extrusion has the finality to close the pores which are inherent for spray forming products [3]. Conventional solidification was also carried out in a wedge shaped Copper mold to analyze the evolution of the microstructure with increasing cooling rates. The microstructure characterization was carried out by X-Ray diffraction for phase identification and by Scanning Electronic Microscope (SEM) coupled with microanalysis (EDS). The mechanical properties were evaluated by tensile tests performed in a universal testing machine. The results were discussed in terms of grain refinement and possible suppression of deleterious phases by spray forming technique.

Keywords: Recycling, spray forming, Aluminium alloys.

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