

Properties of 7075 aluminium chips deposition produced by multi-layer friction surfacing

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Abstract

The solid-state additive manufacturing process of multi-layer friction surfacing is ideal for building three-dimensional parts from high-strength precipitation-hardened 7075 Aluminium chips. This process can be efficient for aluminum recycling, bypassing the resource-hungry recycling fusion process and maintaining material properties despite the use of chips as raw material. The current study shows that the fully softened chips provide high deposition density. The microstructure retains the elements as the original 7075 aluminium alloy. Thanks to the knowledge already acquired with dense rods, hardening precipitation can be restored with post-T6 heat treatment. This implies a significant improvement in microhardness, effects on microstructure and mechanical properties.

Keywords: Multi-layer friction surfacing; AA7075 chips recycling; microstructure/defect analysis; post-T6 heat treatment; mechanical properties.