

Thermomechanical Processing of a CuZnAl Shape-Memory Alloy

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Abstract : Cu-base shape-memory alloys (CuZnAl, CuAlNi, CuAlBe, etc.) are promising engineering materials for several unconventional devices, such as sensors, actuators, and mechanical vibration dampers. Brittleness is one of the factors that limit the commercial use of these alloys, as it makes thermomechanical processing difficult. In this work, a method for the hot extrusion of a 75.50% Cu, 16,74% Zn, 7,76% Al (weight %) alloy is presented. The effects of the thermomechanical processing in the microstructure and the pseudoelastic behavior of the alloy are assessed by optical metallography, compression and hardness tests. Results show that hot extrusion is a suitable method to obtain severe cross-section reductions in the CuZnAl shape-memory alloy studied. The alloy maintained its pseudoelastic effect after the extrusion and the modifications in the mechanical behavior caused by precipitation during hot extrusion can be minimized by a suitable precipitate dissolution heat treatment.

Keywords : hot extrusion, pseudoelastic, shape-memory alloy, thermomechanical processing

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