

Finite element study of deformation behaviour of Al- 6063 alloy developed by equal channel angular extrusion

ABSTRACT

The objective of this work is to evaluate the equivalent plastic strain levels induced by equal channel angular extrusion (ECAE) in an annealed Al-6063 alloy after six passes at a temperature of 200°C following route A with a constant ram speed of 30 mm/min through a die angle of 90° between the die channels using the finite element method (FEM). ECAE process is simulated using the DEFORM-3D software through a three-dimensional analysis. Grain refinement is simulated by forcing the element size to zero. It is found that for a very fine mesh the PEEQ converges to 1.046.

Keyword: Al-6063; Equal channel angular extrusion (ECAE); Finite element method; Mechanical properties