Microhardness characteristics of AL-6063 alloy processed by equal channel angular extrusion

ABSTRACT

In this study, annealed AL-6063 alloy was processed by the Equal Channel Angular Extrusion (ECAE) up to 6 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. The influence of ECAE processing on the evolution of microhardness in the material was studied using Vickers microhardness testing. The detailed analysis was carried out on the samples of as-received, one, two, three, four, five, and six pass conditions. The grain diameter reduced from 45εm to 2.8 εm after 6 passes of ECAE. The results indicated around 90% increase in Microhardness after 5 passes. Hardness of the inner surface where the billet was under compression was slightly higher than that of the mid-surface.

Keyword: AL-6063; Equal channel angular extrusion; Grain size; Vickers microhardness