

عنوان مقاله:

INTRODUCING TORSIONAL-EQUAL CHANNEL ANGULAR PRESSING (T-ECAP) AS A MODIFICATION OF ECAP PROCESS

محل انتشار:

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خلاصه مقاله:

In the present study, integration of equal channel angular pressing (ECAP), as a well known severe plastic deformation (SPD) technique, and torsion deformation, is studied by using three dimensional finite elements analysis. This process is to be named as Torsional-Equal Channel Angular Pressing (T- ECAP). In this modification a part of the exit channel in the ECAP die is rotating around its axis, to impose extra shear strains to the samples. To study deformation behavior in the T-ECAP process, threedimensional finite element analysis (FEA) was carried out by using the elasto-plastic finite element analysis ABAQUS/Explicit Simulation. To investigate the validity of the simulation results, experimental studies were furthermore performed on commercially pure aluminum (AA 1050). Vickers hardness test was used to determine the distribution of hardness of the deformed samples. The hardness test results showed more uniform distribution of hardness in both sections of the T-ECAP processed samples regarding the ones produced by ECAP process. The load requirement comparison for performing both processes showed lower value for the T-ECAP with respect to the ECAP process. The simulation results for the strain values showed higher magnitude .and more uniform distribution for the T-ECAP with respect to the ECAP process

کلمات کلیدی:

Torsional-Equal Channel Angular Pressing (T-ECAP); Severe Plastic Deformation (SPD); Pure Aluminum; Finite Elements Analysis (FEA)

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