

عنوان مقاله:

Plastic deformation of $\gamma\text{-}\gamma_2$ Aluminum Alloy using Integrated Extrusion-Equal Channel Angular Pressing

محل انتشار:

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خلاصه مقاله:

Grain refinement improves the mechanical properties and formability of metals and alloys. So far, several different grain refinement methods have been proposed and studied. Severe plastic deformation is one of the most promising and efficient methods. Therefore, in the present study the possibility of imposing a two-step severe plastic deformation (Extrusion and Equal channel angular pressing) on $\text{AA}\gamma\text{-}\gamma_2$ alloy using a special designed die is investigated. Using this method, a very coarse grained microstructure with grain size of $94\mu\text{m}$ is refined to grain size of $7.5\mu\text{m}$. Also, microstructural developments during severe deformation with and without preheating are investigated. Plastic strain distribution and temperature variation inside deformed samples are predicted by the use of thermal coupled displacement 3D finite element method. Results of FEM simulations clearly shows that the plastic strain distribution and temperature is non-uniform in sample and this introduces inhomogeneity in the resultant microstructure of sample at different regions.

کلمات کلیدی:

Severe plastic deformation, $\gamma\text{-}\gamma_2$ aluminum alloy, Finite element simulation

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