

Strain Path Changes in Aluminum

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Abstract. Sheet metal forming processes involve large plastic deformation and changes in strain path. In this work, a detailed analysis of commercially pure aluminum alloy submitted to the sequence tension-tension tests with reloads along different directions is presented, taking into consideration the mechanical behavior, microstructure and texture evolution. Two main hardening behavior tendencies are observed, indicating that the frontier of changing occurs for the tension test at 45° from the rolling direction. The homogeneous anisotropic hardening approach (HAH) coupled with the dislocation density hardening model based on physical processes related to the dislocation structure evolutions during strain path changes, is used to capture the experimental results and its performance is discussed.