

[PO-E2]Poster Session 2

Symposium E

Wed. Oct 31, 2018 5:45 PM - 8:00 PM Poster Hall

[P2-40]Automatic analysis and numerical prediction of flow stress curves for aluminium alloys

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In present work, we develop a toolkit for automatic analysis of experimental flow stress curves as well for their numerical prediction by a combined approach of physics based and data driven modelling. By using a single environment it is possible to filter measured raw data, account for temperature increase during a deformation process, extract the mechanical properties such as yield and ultimate strength, obtain the processing maps for the optimization of deformation conditions, as well as to predict the flow stress curves by using a dislocation density based model in combination with algorithms of machine learning. It is possible to account for processes such as work hardening and recovery due to spontaneous annihilation of dislocations and their climb. For testing purposes we choose a conventional AA6082 alloy and perform a series of hot compression tests by using a deformation and quenching dilatometer DIL805A/D of TA Instruments. In order to choose the most suitable algorithm of machine learning, different approaches found in literature for the prediction of flow stress curves are compared. A modified version of a flow stress model is formulated and implemented into a finite element framework, as a result.