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Crystal plasticity and phenomenological approaches for the simulation of deformation behavior in thin copper alloy sheets

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Abstract

In the expanding context of device miniaturization, forming processes of ultra thin sheet metals are gaining importance. Numerical simulation of these processes requires accurate material modeling. In this study, both the phenomenological modeling approach and the crystal plasticity finite element method (CPFEM) are considered. Theoretical definitions of both models, numerical implementation as well as their parameter identification procedures are outlined. Subsequently they are compared on a one to one basis, mainly with regards to their ability to predict mechanical responses for a variety of strain loading paths.

Keywords: A. Sheet metal forming B. Phenomenological modeling B. Crystal plasticity C. Finite elements C. **Parameter identification**

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