

MSE 2024

24 - 26 Sep 2024 (Darmstadt)

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Topic S: Structural Materials

S09: Adiabatic shear band formation for functional surfaces - materials science, processing and modeling perspectives

The formation of adiabatic shear bands (ASBs) is a thermo-mechanical process that typically takes place at high strain rates: the energy dissipated by plastic deformation leads to an increase of temperature, which results in thermal softening and ultimately leads to localization of further deformation in an increasingly narrowed shear zone. Recent advances both in the fields of materials science and process engineering have shown that the formation of ASBs allows to generate surfaces with excellent geometrical and functional properties, for example during high-speed cutting. This has raised interest in more detailed investigations of the underlying mechanisms.

Topics of interest specifically include:

- the effect of microstructure on ASB formation
- microstructural evolution and damage accumulation in ASBs
- the effect of ASB formation on the properties of the newly cut surfaces
- thermo-mechanical modeling of material behavior at high strain rates, including numerical simulations of microstructural evolution and phase transformations
- the relation between high-speed cutting process parameters and ASB formation

The purpose of this symposium is to bring together scientists from the new Research Unit FOR 5380, which focuses on ASB formation during high-speed cutting, with the wider research community studying high-strain rate processes and ASB formation.

Symposium Organizer



Prof. Dr. Thomas Lampke
Chemnitz University of Technology



Prof. Dr. Martin Franz-Xaver Wagner
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