Micro Material Characterization

Motivation

- Several challenges arise in the characterization of elastic material behavior (see Fig. 1)
- Explanations are based on processes in the microstructure of the material

→ Detailed investigation of the microscopic material behavior necessary

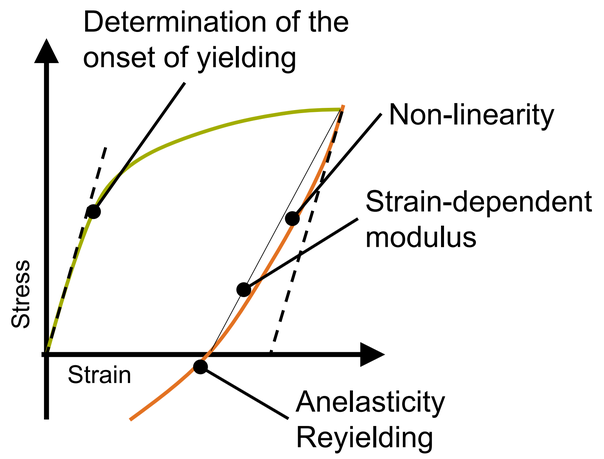

Fig. 1: Challenges in the Characterization of the tension-compression behavior.

Approach

- Cyclic tensile and tensile-compression tests under electron synchrotron radiation (DESY, Hamburg)
- Measurement of macroscopic parameters force, strain and sample temperature
- Measurement of micro strain and dislocations

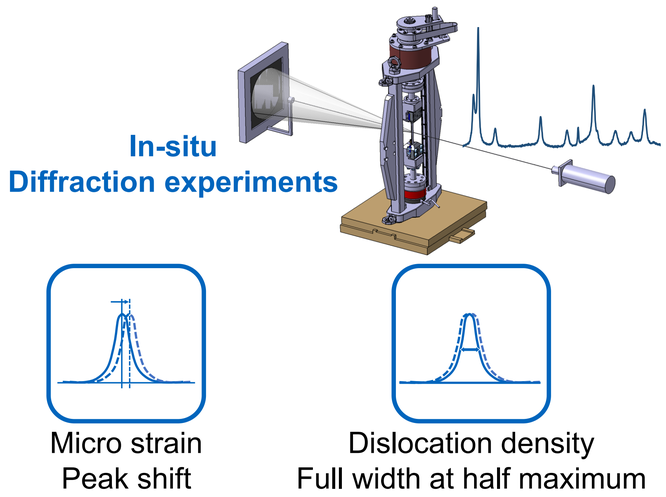

Fig. 2: Experimental and evaluation approach.

Results

- Successful correlation between macroscopic and microscopic parameters
- Comprehensive investigation of the material-dependency of thermoelastic effect (YS_{Tmin})
- Validation of temperature-dependent evaluation method (YS_0) (see Fig. 3)

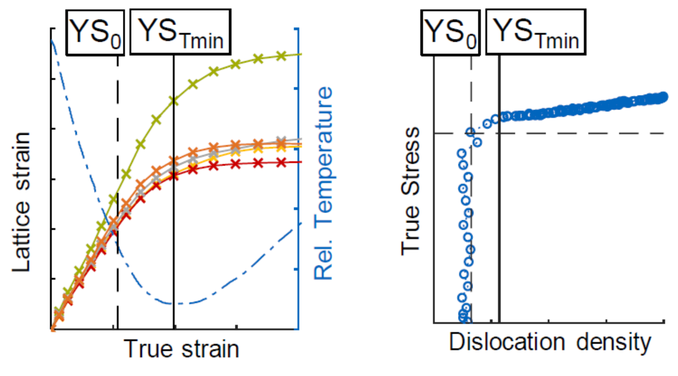

Fig. 3: Comparison of micro strain and temperature elasticity parameters.

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