Contribution ID: **72** Type: **Poster**

Development of a new testing device for in-situ microstructural characterization under mechanical and thermal loading

Wednesday 11 December 2019 15:40 (20 minutes)

The goal of this project (BMBF INA780) is the implementation of an innovative testing machine to perform deformation experiments at high temperatures at various instruments at the research neutron source Heinz Maier-Leibnitz. With neutron diffraction, small angle scattering and radiography (tomography) it is possible to investigate forming phases, their volume fractions as well as size and shape, dislocation density, textures, recrystallization processes and crack propagation. The field of possible loading cases of the newly developed testing machine is manifold. In the current state, uniaxial tensile and compression experiments can be performed. But also more complex loading cases like crack propagation tests in CT-samples or cyclic loading can be implemented. The testing temperature can be varied from room temperature up to 1200 ℃. In addition, a controlled cooling of the samples by pressured gas will also be possible. Due to a completely closed casing, the tests can be conducted in vacuum or special atmospheres.

This testing machine offers a unique possibility for the development of newly high-performance materials. One the one hand, it is possible to measure the microstructural parameter of materials within the thermo-mechanical process chain from forming to the subsequent heat treatment steps. On the other hand, the material behavior under service conditions can also be investigated to predict the failure criterion and the service life of components.

Primary authors: KÜMMEL, Frank; MUNKE, Johannes; SOLIS, Cecilia; HOFMANN, Michael; GILLES, Ralph

Presenter: KÜMMEL, Frank

Session Classification: Poster session

Track Classification: Materials Science