

C08: Multi-Method High-Resolution Microscopy for Materials Science

Many material characteristics and phenomena highly depend on the materials microstructure on the atomic scale. For in-depth understanding, revealing the chemical and crystallographic nature by advanced characterization methods is vital.

Atom probe tomography is one of the well-established high-resolution methods for investigating local three-dimensional chemical compositions, of different phases, interfaces and grain boundaries, as well as crystal defects (e.g. dislocations). However, gaining additional crystallographic information is not always possible. This disadvantage can be overcome by the combination with crystallographic analyses, in particular with transmission electron microscopy, but also with advanced scanning electron microscopic methods (e.g. electron backscatter diffraction), in order to understand the interplay between the crystallographic structure of the materials and their chemical composition, both influencing the overall macroscopic properties.

The aim of this symposium is to bring together experts with a background in technique development with specialists, who tackle cutting-edge research questions by applying these advanced characterization techniques. We welcome contributions applying those techniques, alone or in various combinations to structural and functional materials, as metals and alloys, nano- or multilayer systems, semiconductors and ceramics.

Topics of interest include, but are not limited to:

- High-resolution microscopy techniques (e.g. atom probe tomography, transmission electron microscopy, and (HR-)scanning electron microscopy, electron backscatter diffraction)
- Correlative approaches for gaining chemical and crystallographic information
- Correlative microstructural investigations for microstructure-property relationships
- Implementation of digital image correlation for advanced analysis
- In-situ and in-operando testing at various temperatures and atmospheres (e.g. high-temperature EBSD, environmental SEM/TEM, cryo-APT workflows)
- Workflows for advanced data combination, correlation, and evaluation

Symposium Organizer



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