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TMS2024

153rd Annual Meeting & Exhibition

MARCH 3–7, 2024
HYATT REGENCY ORLANDO
ORLANDO, FLORIDA, USA
#TMSAnnualMeeting

SUBMIT AN ABSTRACT FOR THE FOLLOWING TMS2024 SYMPOSIUM:

ADDITIVE MANUFACTURING

Additive Manufacturing: Advanced Characterization with Synchrotron, Neutron, and In Situ Laboratory-scale Techniques III

The rapidly evolving field of additive manufacturing (AM) features the constant development of new manufacturing technologies and materials and calls for the most advanced characterization tools to enable process monitoring and control and understand the transient microstructural development of AM materials. Facility-based X-ray and neutron techniques and in-house advanced characterization techniques have played a vital role in the research and development of AM technologies.

This symposium aims to bring together scientists, engineers, and industrial professionals in the scattering, imaging, and advanced characterization community, and the additive manufacturing community to discuss these technique's latest development and applications in AM and to discuss potential future directions and foster collaborations. We especially welcome abstracts addressing industrial applications and industrial perspectives on characterization needs.

This symposium will feature two main themes. The first theme will feature a wide range of presentations and discussions on using facility-based X-ray and neutron scattering, imaging, and spectroscopy methods to understand AM processing at different time and length scales.

We welcome abstracts in areas including, but not limited to:

- Time-resolved imaging and diffraction of the AM process
- Structure and microstructure evolution during the build and post-build treatments
- Residual stress measurements and their model validation
- X-ray fluorescence and absorption spectroscopy measurements for AM materials' chemical composition analysis
- Neutron diffraction and small angle neutron scattering measurements to probe the AM materials' internal microstructure.
- Spatially resolved measurements at different length scales, including microdiffraction and microtomography
- In situ characterization of AM material response under thermo-mechanical loadings, including quasi-static, high rate, and cyclic loading.
- Model validation with synchrotron and neutron data, including machine-learning development.

The second theme emphasizes in situ characterization and diagnostics using laboratory-scale techniques. Abstracts are requested in, but not limited to, the following areas:

- Advancement of existing and emerging in situ process monitoring and process control techniques to reveal process phenomena, detect material defects, and control process variation.
- Identification and understanding of the formation of inherent defects and process anomalies during fabrication from laboratory-scale research to industrial-scale implementation, including those using machine learning methods.
- High deposition rate AM processes focusing on electron-beam powder bed fusion and powder/wire-based DED processes.

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QUESTIONS?
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