



SUBMIT AN ABSTRACT FOR THE FOLLOWING SYMPOSIUM

ADDITIVE MANUFACTURING

In-Situ Monitoring and Control of Solidification & Deformation Processes in Metal Additive Manufacturing

Additive manufacturing is a transformational alternative to traditional manufacturing as near-net shape components can be created with complex geometries and material properties. Although components and alloys can be rapidly designed and fabricated for demanding applications, the current methodology to determine appropriate manufacturing conditions is time consuming requiring ex-situ characterization. A fabricated part must be removed, sectioned, and extensively examined to determine if correct machine parameter processing conditions occurred during production to avoid defects. Through understanding and implementing knowledge of conditions that occur during the manufacturing solidification or deformation process, machine parameters can be adjusted during fabrication to correct, heal, and alter the component while it is being created. In-situ modifications also introduces the potential for the science and design of new materials with unique and valuable properties. This symposium invited submissions that bridges the scientific interplay between material microstructure evolution including solidification, solid-state phase transformation and deformation during fabrication and the associated control of the manufacturing fabrication systems.

This symposium would like to invite contributions on topics including, but not limited to:

- In-process data collection during additive manufacturing of solidification cracking, porosity, dimensional integrity, thermal evolution or related microstructure features.
- Interactions between phase transformations and inherent deformation modes in the range of plastic strain gradients occurring in fusion based and solid-state AM.
- Machine learning algorithms related to feedback control of robotic systems and advanced manufacturing techniques.
- Combinatorial experimental and modeling approaches that consider effects from computer vision, robotics, advanced sensors, and human interactions.
- Intersection of multiple data types corresponding to material evolution during advanced manufacturing.

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