CALL FOR ABSTRACTS

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TMS 2018
147th Annual Meeting & Exhibition

MARCH 11 – 15, 2018
PHOENIX, ARIZONA

SUBMIT AN ABSTRACT TO:

ADDITIVE TECHNOLOGIES

ADDITIVE MANUFACTURING OF METALS: ESTABLISHING LOCATION-SPECIFIC, PROCESSING-MICROSTRUCTURE-PROPERTY RELATIONSHIPS III

Advances in additive manufacturing (AM) technology have created the ability to design and construct components with geometries and properties that cannot be achieved through traditional solidification and deformation processes. This ability has promoted multiple new design strategies whose success relies on close integration of engineering and materials science. An additional attractive aspect of additive processing is the ability to custom design specific properties within the component by layering, thereby promoting different microstructures or compositions (e.g., functionally-graded materials). However, the repetitive rapid solidification that occurs during AM also creates microstructures that deviate significantly from those observed in wrought materials with the same nominal composition. The result is a segregated microstructure with significant variations in local composition/phases, and, in some cases, life-limiting defects that are typically absent in wrought alloys. Most AM research currently focuses on refining the build process and on minimizing the residual stresses generated during the build. Consequently, there is far less emphasis on post-build heat treatments that homogenize the as-built microstructures and promote similar properties to wrought alloys.

The main objective of this symposium is to develop a better understanding of the input-material requirements, process capabilities, and the resultant effects on finished product microstructure, texture, and properties. Research that elucidates the process-structure-property-performance relationships resulting from rapid solidification and transient phase transformations is essential. Information regarding the influence of inherent defects on the performance of AM-produced components is also greatly needed. Abstracts are requested that relate transient phenomena, recrystallization, transformation, and rapid solidification to additive manufacturing and its influence on phases, microstructure, and properties.

Technical sessions emphasizing the following specific topics are planned:

- Microstructure evolution in aluminum alloys, stainless steels, and aerospace alloys (e.g., Ti, Ni alloys)
- Texture measurements and control in AM parts
- Defects and their effect on post-build (service) properties
- Residual stress evolution and control
- Novel applications, complex geometries fabricated via AM
- Modeling of AM processes (including liquid and solid-state phase transformation behavior)
- Emerging AM processes

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