

ASTM INTERNATIONAL CONFERENCE ON ADDITIVE MANUFACTURING

Research To Application Through Standardization

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JW Marriott Orlando Bonnet Creek Resort & Spa

Submit an Abstract at www.amcoe.org/icam2022

Environmental Effects on AM Alloys and Parts

Additive manufacturing (AM) has greatly evolved over the past decade. However research has primarily focused on of the development of process parameters, microstructure characterization, and quantifying first order mechanical properties; there has only been limited study on environmentally induced degradation modes. To enable the use of AM for structural engineering components it is critical to understand how the differences in microstructure between AM and traditionally manufactured alloys will impact the various environment induced damage modes (e.g., corrosion, decomposition, stress corrosion cracking, corrosion-fatigue, etc.). Investigation of environmentally induced damage is critical to enable the use of AM processing routes for engineering components since it represents common real-world failure modes. Areas of interest in this topic area include: First, establishing the mechanistic underpinnings of AM specific damage modes and informing the “processing-structure-property” linkages to enable enhanced performance. Second, investigating how post-processing techniques such as heat treatment, surface treatment, or coating may influence

the performance of AM alloys against environmental effects. Third, determining if legacy approaches and standards for characterizing environment induced degradation are sufficient and applicable to AM systems.

This symposium aims to cover the following topics (but not limited to):

- Quantification and characterization of corrosion in AM alloys
- Environmental cracking of AM alloys (e.g., HE, SCC, corrosion-fatigue, etc.)
- Linking microstructure features to corrosion and environmental cracking properties
- Identification of AM specific environmental degradation modes
- Effects of processing parameters on environmental degradation (both build and post-processing)
- Methods to prolong the life of AM parts against environmental effects (e.g., surface enhancements, etc.)
- AM specific standardization/ characterization issues and challenges
- Modeling and simulation of the environmental effects on AM parts

Symposium Organizers



- James Burns, University of Virginia, USA
- Jiadong Gong, QuesTek, USA
- Michael Melia, Sandia National Labs, USA



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