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TMS 2025
154th Annual Meeting & Exhibition



March 23–27, 2025
MGM Grand Las Vegas
Hotel & Casino
Las Vegas, Nevada, USA
#TMSAnnualMeeting



SUBMIT AN ABSTRACT FOR THE FOLLOWING TMS2025 SYMPOSIUM:

ADDITIVE MANUFACTURING

Additive Manufacturing Fatigue and Fracture: Towards Accurate Prediction

The current understanding of fatigue and fracture behavior of additive manufacturing metals is limited and must be expanded before widespread use in fatigue and fracture critical applications can be fully realized. It is the purpose of this symposium to move toward that expanded understanding by providing a forum to present research results from investigations into fatigue and fracture behavior of additive manufacturing of metals.

Topics of interest include (but are not limited to):

- Fatigue Modeling and Prediction
- Data Science Techniques for Fatigue and Fracture
- Novel Fatigue and Fracture Test Techniques (e.g. High-Throughput)
- Critical Flaw Size Investigations
- Microstructure-based Fatigue Studies on Additive-Manufactured Materials (JOINT SESSION with Fatigue in Materials Symposium)
- Effects of Surface Roughness, Residual Stress, and Environment on Fatigue and Fracture
- Processing and Structure Effects on Macroscale Fatigue and Fracture Properties and Performance (see details below)

Processing-structure-property-performance relationships pertinent to this symposium must focus on fatigue and fracture and can include the following. Processing includes machine settings (e.g. layer thickness), melt parameters (e.g. energy density, scan strategy), post-processing (e.g. heat treatment, surface treatment), and feedstock variables (e.g. flowability, spreadability, particle size distribution) that can directly impact fatigue and fracture performance of parts. Structure includes crystallographic microstructure (e.g. texture, phase content, grain size/morphology), internal defects (e.g. pores, inclusions), external defects (e.g. surface roughness), residual stress, and chemistry. Properties include all macroscopic fatigue and fracture properties (e.g. high-cycle fatigue, low-cycle fatigue, linear elastic fracture toughness (K_{Ic}), elastic-plastic fracture toughness (J-int), fatigue crack growth rate, and impact toughness (Charpy)), but do NOT include small-scale mechanical property assessment. Performance includes any end-product testing.

ORGANIZERS

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SYMPOSIUM SPONSORS

TMS Structural Materials Division, TMS Additive Manufacturing Committee, TMS Mechanical Behavior of Materials Committee

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QUESTIONS?

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