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Integrated Multi-Scale Solutions for Accelerated Additive Manufacturing Materials and Process Development and Qualification

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Additive Manufacturing technologies are growing rapidly and moving towards industrial-grade production technology; however the development and qualification of materials and processes remain time-consuming and costly challenges for faster AM adoption. An integrated multi-scale approach designed to accelerate AM materials and process development and qualification will be discussed as a potential solution to overcome these challenges. Our approach combines smartDOE methods, high throughput materials testing and characterization, and process monitoring and control to enable rapid and efficient qualification of new AM materials and processes. Smart utilization of non-destructive testing (NDT) techniques, as well as an Integrated Computational Materials Engineering (ICME) approach, can significantly reduce the time and cost required for materials and process development and qualification in both DED and L-PBF AM technologies.

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