

Additive Manufacturing of Multi-Material Structures

Presented by

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Abstract

Multi-material structures have a wide range of applications and offer unique solutions to many engineering problems. Among multi-material structures, bimetals comprise of two different metals joined together primarily to benefit from the distinctly different properties such as thermo-physical, mechanical, and corrosion/oxidation resistance, including magnetic characteristics. Different build strategies like direct deposition, compositional gradation and intermediate bond layer were employed to fabricate bimetallic structures of various alloys (Inconel 718, GRCo-84, Ti6Al4V and SS410) using Laser Engineered Net Shaping (LENS) system. Deposition of GRCo-84 on Inconel 718 increased the thermal diffusivity of Inconel 718 by 300%. On the contrary, LENS processing of Inconel 718/Ti6Al4V bimetallic joint via direct deposition formed brittle intermetallics at the interface leading to delamination and de-bonding. The use of a compositional bond layer (CBL), mixture of both powders with other additives, was employed as an intermediate layer to bond the two immiscible materials.

Biography

Bonny Onuike is a PhD candidate in mechanical engineering in the School of Mechanical and Material Engineering at Washington State University (WSU). He obtained his MS in Mechanical Engineering in 2016 from WSU as well. Prior to that, he received his Bachelor of Engineering degree in Mechanical (2010) from the University of Port Harcourt Nigeria, and Diploma in Aviation Technology, Aircraft Maintenance Engineering in 2008 from Nigerian Collage of Aviation Technology (NCAT), Nigeria. His research Interests include: Additive manufacturing of multi-material structures for space applications, thermo-mechanical properties' enhancement of conventional materials via composite structure deposition, and interfacial analysis of bimetallic structures.

Thursday, March 28th, 2019

11:00am to Noon

ETRL room 101

Meet the speaker before the seminar in ETRL room 119, 10:30am to 10:50am. Light refreshments will be served.

