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TMS 2018
147th Annual Meeting & Exhibition



**MARCH 11 – 15, 2018
PHOENIX, ARIZONA**

SUBMIT AN ABSTRACT TO:

ADDITIVE TECHNOLOGIES

MULTI-MATERIAL ADDITIVE MANUFACTURING: PROCESSING AND MATERIALS DESIGN

This symposium aims to provide a forum for the dissemination and discussion of state-of-the-art of multi-material additive manufacturing. Using various processes, 3D objects with locally controlled composition, microstructure, and properties can be fabricated. Examples include functionally graded parts with designed composition profiles, printed multi-functional assemblies, and composites with sharp, designed property gradients. This capability unlocks a new space for design and fabrication of a wide variety of objects in which the meso-scale materials distribution and the shape of the 3D objects can be simultaneously controlled. In structural and thermal applications, the stress and thermal fields are often highly non-uniform; control of the materials distribution through multi-material additive manufacturing enables locating different properties at different positions for the optimum overall performance of a 3D object. Multi-material additive manufacturing may also enable fabrication of objects with designed internal architectures to implement unprecedented functionalities. New challenges arise in multi-material additive manufacturing as compared to single material additive manufacturing. In processing, for example, sharp compositional gradients are sometimes desired in design; understanding material incompatibilities across such sharp interfaces, and the degree to which such gradients can be maintained in the end-product is crucial. In design, robust methodologies are needed to determine the optimal materials distribution for given manufacturing constraints and for specific mechanical, thermal, or multi-physics applications. In implementation, the designed gradients must be incorporated into 3D modelling packages so that parts can actually be made.

This symposium will serve as a venue for government, academic, and industrial professionals to share ideas, address fundamental challenges, and define future trends in multi-material additive manufacturing. Both experimental work on multi-material additive manufacturing systems and measurements and theoretical work on computational design and optimization are welcome to provide new physical insights and promote this sub-field of additive manufacturing. All types of materials are of interest, from metals, ceramics, and composites to polymers and bio-materials. Research areas of particular interests include:

- Emerging technologies for multi-material additive manufacturing
- Processing challenges and solutions in multi-material additive manufacturing, e.g. control of the local composition, stress concentrations at interfaces, reactions across adjacent layers, residual stresses and thermal stresses
- New materials, structures, and functions enabled by multi-material additive manufacturing
- Design and optimization for materials distribution and manufacturing strategy in multi-material additive manufacturing.

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ABSTRACT DEADLINE IS JULY 1, 2017. SUBMIT ONLINE AT www.programmaster.org/TMS2018.

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