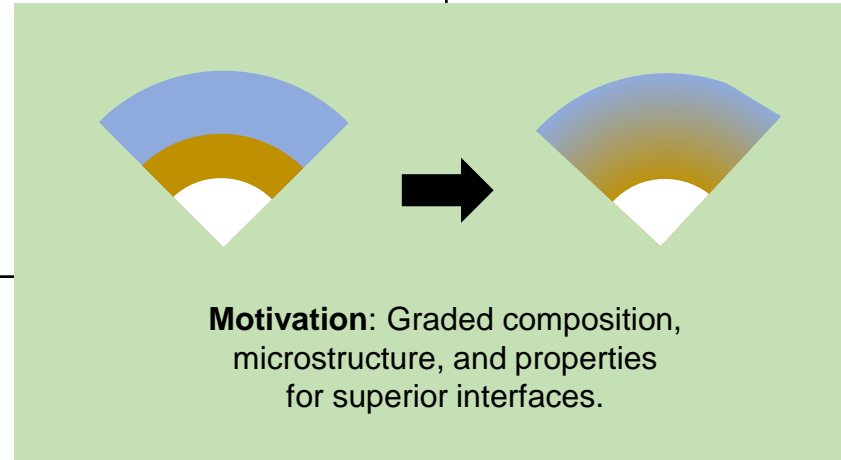


Improving Interfacial Properties through Scalable Additive Manufacturing of Functionally Graded Propulsion Systems

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Research Objectives

- Improve interfacial bonding and minimize residual stresses with functional grading.
- Elucidate interplay of graded composition, microstructure and properties to enable transition to full-scale manufacturing.
- Fundamental characteristics of graded interface (TRL 2) will enable analytical and experimental validation of improved toughness (TRL 3).



Approach

- Manufacture prototypical propulsion chambers with “additively-graded” interfaces.
- Characterize location-specific chemistry, microstructures and properties as a function of grading.
- Design for reduced residual stresses and increased interfacial toughness.

Potential Impact

- Maturation of scientific understanding of graded interfaces with enable commercial AM of multi-material propulsion systems with increased complexity and shorter lead times.
- Increased reliability of AM multi-material components for scalable processing.