



Example graded mesostructure

Technology Summary

This technology presents a novel solution to the creation of Functionally Graded Materials (FGMs): creating the material gradient of an FGM by varying the meso-structural size and thickness of bicontinuous, multi-material geometries. By using a bicontinuous structure each component material exists as a continuous discrete structure. The existence of these discrete structures allow FGMs to be produced by a wider range of additive processes. The bicontinuous nature of the mesostructural geometry also creates a mechanical interlock between the two component materials, allowing for FGMs to be created using two immiscible materials. This mechanical interlock can also act to increase the interfacial strength between FGM components.

Application & Market Utility

FGMs are a new regime of composites with enormous potential to enhance the field of additive manufacturing. FGMs are comprised of two or more materials that transition from one to another throughout the bulk of a structure; this gradual change of composition permits certain areas of a part to be optimized for specific performance requirements. FGMs also allow for a structure to exhibit multiple physical properties that are not possible within the same part using conventional material processing techniques.

Next Steps

This technology is patent pending. The research team seeks licensing opportunities.

TECHNOLOGY READINESS LEVEL

4-7

Seeking

Investment | Licensing | Research

Keywords

- Advanced Manufacturing
- Additive Manufacturing
- Functionally Graded Materials (FGM)
- Material Extrusion
- Material Jetting

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