A process model for Selective Laser Alloying

The present invention consists of a novel process for 3D printing a product, utilizing selective laser alloying of elemental powders to produce metal ceramic parts with specific desired alloys shapes and internal structures.

Problem

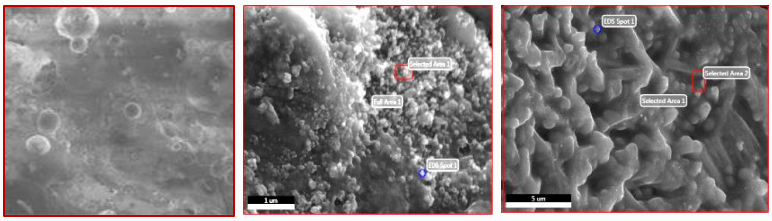
The traditional printing and alloying methods including cast and powder based metallurgical approaches, significantly affect the micro-structure of the output alloy, impairing its quality and desired physical properties. These methods are also very slow and energy consuming.

Solution

This method 1) adjusts the material composition along all three axes of a part, 2) significantly reduces energy consumption in laser processing, 3) processes metallic/ceramic materials from elemental powders with high melting points at lower melting temperatures, and 4) creates micro scale porous structures with controllable shapes, sizes and distributions.

The University of Texas Rio Grande Valley
Office of Technology Commercialization

Laser Alloyed Ti-B_2 Samples with various Surface Structures



Value Proposition

- This novel technology utilized the reaction energy released from the reaction between elemental titanium and boron powder to reduce the process energy and time consumption of laser-based 3D metal printing.
- It provides solution for in-situ alloying with desired materials at desired locations

Competitive Advantages

•3D printing (free forming) hard-to- process metal and ceramic materials

•Production of parts with complex internal/external shapes or structures

•Saves on processing time and heating requirements

•Simplified process model and parameters

•Alloys of varying porosity can be produced by controlling parameters

•Self-sustaining/controllable laser boriding process

IP Status

•Licensing available

Status of Development

•Prototyping stage

For further information regarding this Technology please contact:
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