New Fabrication Process for Hypersonics

A cost-effective process forms ultra-high-temperature, oxidation-resistant parts to precise shapes for hypersonic systems.

Researchers at Purdue University have developed a new fabrication process for hypersonic components for aerospace and military and defense applications. There is a growing need for ultra-high melting, mechanically robust, thermal-shock resistant, and oxidation-resistant materials for advanced components in hypersonic devices in extreme environments. In addition to identifying these unique materials, cost-effective manufacturing methods are needed to generate components with desired microstructural characteristics in complex and high-precision shapes to optimize aerodynamic performance. Current manufacturing techniques often are incapable of reproducing

hypersonic components without causing shrinkage and shape distortions. Purdue researchers have developed a cost-effective process for converting easily-shaped preforms into ultra-high melting, robust near net-shaped hypersonic structures.

Advantages:

-Precise Control Over Component Shape

-Cost Effective

-Ultra High Temperature Materials

Potential Applications:

-Aerospace

-Military and Defense

TRL: 3

Intellectual Property:

Provisional-Patent, 2019-02-07, United States | Utility Patent, 2020-02-06, United States | DIV Patent, 2022-08-21, United States

Technology ID
2019-SAND-68537

Category
Aerospace & National Security/Defense, Electronics, & Surveillance Technologies
Aerospace & National Security/Hypersonics & Propulsion Systems
Chemicals & Advanced Materials/Materials Processing & Manufacturing Technologies

Authors
Kenneth H Sandhage

Further information
Will Buchanan
wdbuchanan@prf.org

Jacob Brejcha
jjbrejcha@prf.org

View online