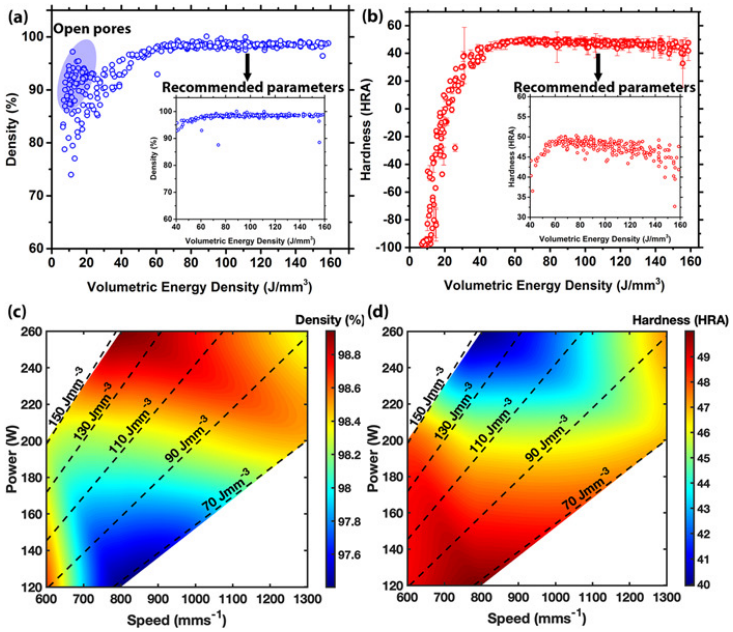
Tailoring Additive Manufacturing to Optimize Dynamic Properties in 316L Stainless Steel



(a) Density plot of each as-built sample as a function of VED.
(b) Hardness measurements for each as-built sample as a function of VED.
(c) and (d) Density and hardness maps for each sample.

Scientific Achievement

Development of a high-throughput approach to manufacture samples using additive manufacturing.

Significance and Impact

This work allows for the investigation of structure–property relationships between build parameters and resulting microstructures.

Research Details

- 316L stainless steel (SS) was manufactured via selected laser melting and its microstructure was altered through changing build parameters, e.g., laser power, speed, and hatch spacing systematically.
- These samples were then subjected to spall recovery experiments to measure the spall strength and quantify the amount of damage as a function of build parameters.

Work was performed, in part, at the Center for Integrated Nanotechnologies.

Derby, B. K.; Agrawal, A.; Jones, D. R.; Pokharel, R.; Martinez, D. T.; Martinez, R.; Wanni, J.; Thoma, D.; Fensin, S. J. Tailoring Additive Manufacturing to Optimize Dynamic Properties in 316l Stainless Steel. *Journal of Applied Physics* **2025**, *137* (10).