# Crack Mitigation Strategies for a High Strength Al Alloy Al92Ti2Fe2Co2Ni2 Fabricated by Additive Manufacturing

Compliant LPBF scaffolding relieves residual stress to print fully dense, crackfree high-strength aluminum parts.

Researchers at Purdue University have developed a crack mitigation strategy for aluminum (Al) alloys made using additive manufacturing. Traditionally, methods to mitigate cracking in these materials require modifying the chemistry (alloying or particle inoculation) or through extensive heating of the build plate beyond the capability of most laser powder bed fusing systems. Purdue's approach utilizes a scaffolding support structure to alleviate residual stresses in the material as the part is fabricated. This system can be applied to a variety of alloys without requiring changes to the alloy chemistry. Applications of this technology include additive manufacturing of high-strength aluminum alloys to create fully dense, crackfree parts.

### **Advantages**

- -Fabrication of fully dense, crack free Al-alloy parts
- -Compatible with conventional laser powder bed fusing systems

# **Applications**

- -Additive manufacturing
- -Aluminum alloys
- -Rapid prototyping / bespoke part fabrication

## **Technology Validation:**

This technology has been validated through fabrication and testing of Al alloy specimens made using this technology. Results showed that a compliant scaffolding structure successfully eliminated crack formation

### **Technology ID**

2024-ZHAN-70392

### Category

Materials Science &
Nanotechnology/Advanced
Functional Materials
Chemicals & Advanced
Materials/Materials Processing &
Manufacturing Technologies

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during production. This was validated using micro-CT analysis.

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**TRL:** 6

# **Intellectual Property:**

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