

Custom Alloy Design for Additive Manufacturing: Printability-Performance Synergy

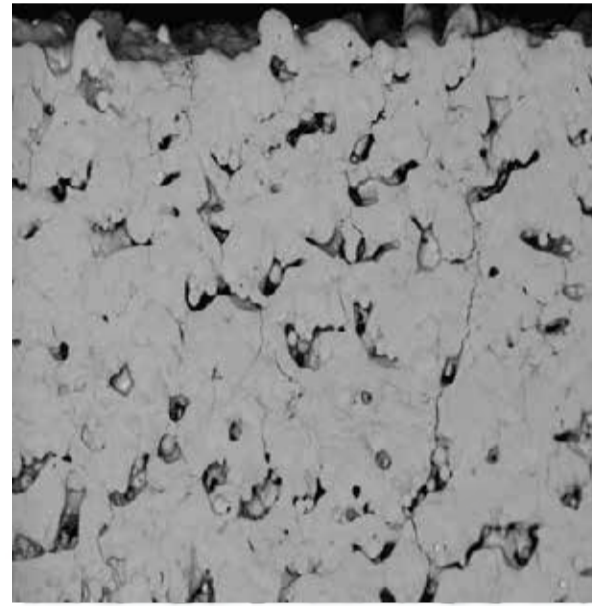


Why New Alloys?

Additive Manufacturing Demands New Materials

Traditional alloys were not designed for AM.

- ✗ Cracking
- ✗ Porosity
- ✗ Residual stress
- ✗ Distortion



TRADITIONAL HIGH-STRENGTH ALLOYS



High Performance

Hard to Print

- ✗ Cracking Susceptibility
- ✗ Poor Powder Flowability
- ✗ Process Instability

TRADITIONAL EASILY PRINTABLE ALLOYS



Easily Printable

Low Performance

- ✓ Lower Strength
- ✓ Limited High-Temp Capability
- ✓ Reduced Wear Resistance

Our goal:

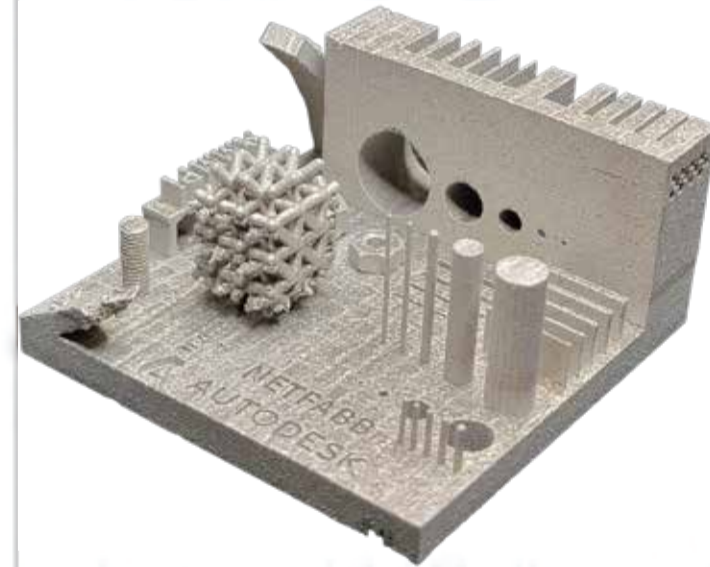
OPTIMIZE BOTH.

PRINTABILITY VALIDATION



- ✓ Thin wall capabilities
- ✓ Unsupported features
- ✓ Repeatability
- ✓ Dimensional accuracy

FROM PRINTABILITY TO PERFORMANCE



A successful AM alloy must enable:

- ✓ Reliable fabrication
- ✓ Geometric freedom
- ✓ Desired mechanical properties

POTENTIAL APPLICATIONS



Aerospace Components

Turbine parts, brackets, lightweight structures



High-Temperature Systems

Heat exchangers, combustion-adjacent parts



Defense & Energy Hardware

Repair parts, rugged structural components



Custom AM Production

Application-specific alloys for printability and performance

