INL/CON-23-74052-Revision-0

LDRD 22A1059-068FP Tailoring the Properties of Multi-Phase Materials Through the Use of Correlative Microscopy and Machine Learning - Poster

August 2023

Thomas A Mason, Colin Clarke Merriman, Cody James Gibson, Jason K Walleser

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Idaho National Laboratory
Idaho Falls, Idaho 83415

http://www.inl.gov

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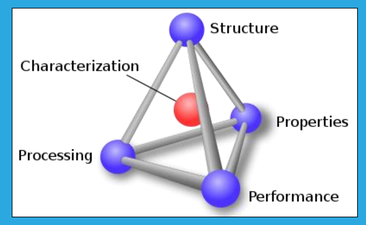
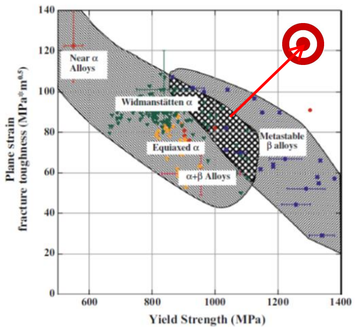
PRESENTER

Thomas Mason

Defense Systems
National & Homeland Security

Are the microstructural features contributing to good performance making characterization harder?



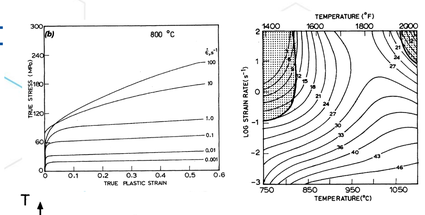


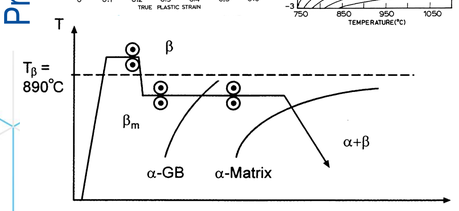
Seeking materials with high strength and high fracture toughness.

These two properties are often at odds.

Multi-phase titanium alloys have potential to exhibit both high strength and high fracture toughness if the microstructure can be tailored appropriately through thermomechanical processing.

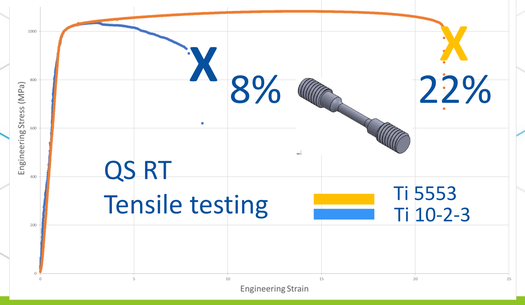
Process mapping

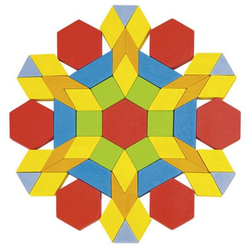




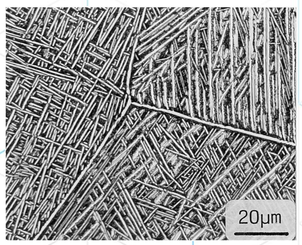
Solution-ize, Deformation and Age

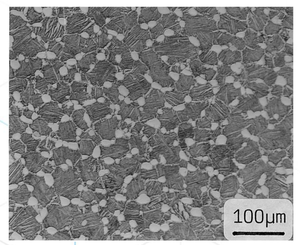
Serendipity





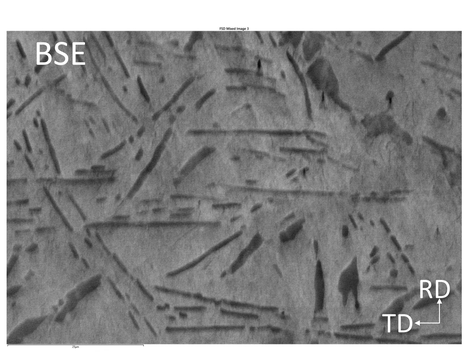
Knowledge of constituents versus arrangements

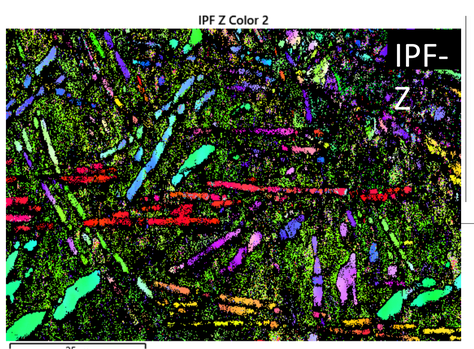


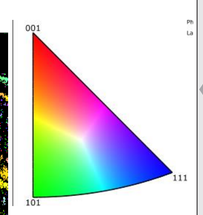


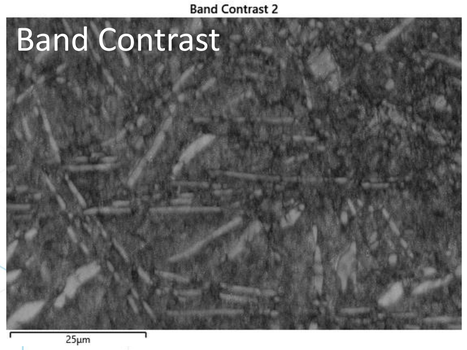
Examples of possible microstructures

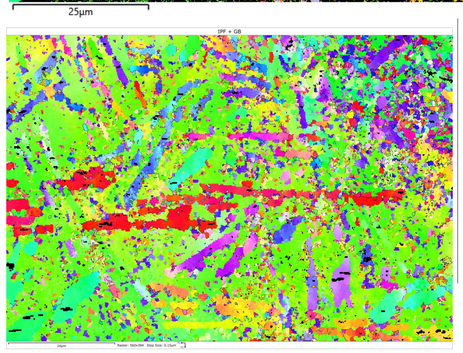
Identification of processing steps for beneficial microstructure arrangement would expand the application space and provide targets for AM processing routes

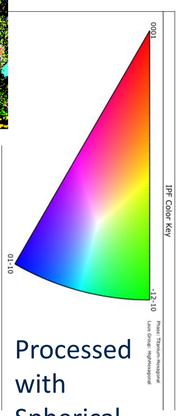












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Thomas A Mason, Colin D Merriman, Jason K Walleser and Cody J Gibson

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