Project 47A-L: Quantifying Defects in Metallic Builds using Magnetic Levitation

Fall Meeting

October 13th – 15th 2020

- Student: Alana Pauls (ISU)
- Faculty: Martin Thuo (ISU) and Peter Collins (ISU)
- Industrial Mentors:

About Me

Education

- Concurrent BS/MS in Materials Engineering at Iowa State University
  - Finishing UG coursework this spring
  - Projected graduation, Spring 2022

Personal Interests

- Outdoor Activities
  - Exploring New Places
  - Swimming
- Card Games

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CANFSA
CENTER FOR ADVANCED NON-FERROUS STRUCTURAL ALLOYS

- Student: Alana Pauls (ISU)
- Advisor(s): Martin Thuo (ISU) & Peter Collins (ISU)

Project Duration
Masters: Fall 2020-Spring 2021

- Problem: While systems for calculating density of titanium alloys exist, the current systems are not as precise as desired for calculating change in densities due to small defects like dislocations and voids.
- Objective: Develop systems for quantifying defects in metallic builds specifically Ti_6AlV.
- Benefit: Cost effective, high sensitivity and scalable for use with large builds.

Recent Progress

- Magnet housing built and secured. Tested with polymeric materials and paramagnetic salts
- Identification of relevant density standards to develop a calibration curve. These standards have been ordered.

Metrics		
Description	**% Complete**	**Status**
1. Background literature on magnetic levitation	75%	●
2. Establishing a calibration curve using known densities of pure compounds	0%	●
3. Assess effectiveness of buoyancy due to ferrofluid or saturated solution of $GdCl_3$	0%	●
4. Evaluate unknown densities based on flotation heights	0%	●
5. Use secondary method to verify accuracy of densities	0%	●

Thank you!

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