Project 45-L: Processing and Properties of Multi-Principal Element Alloys

Fall Meeting

October 13th – 15th 2020

- Student: Abby Miklas (Mines)
- Faculty: Amy Clarke, Kester Clarke (Mines)
- Industrial Mentors: (TBD)

About Me

- I graduated with a B.S. in Metallurgical and Materials Engineering in 2017 from the Colorado School of Mines MME department
- I worked for three years at Honeywell Aerospace in the Materials and Process Engineering group where I worked with:
  - Linear friction welding
  - Cold spray
  - Single crystal castings
  - Additive manufacturing
  - Nitriding
- Hobbies:
  - Hike
  - Paddle Board
  - Ski/Snowboard
  - Aussie Rules Football

Project 45-L: Processing and Properties of Multi-Principal Element Alloys

- Student: Abby Miklas (Mines)
- Advisor(s): Amy Clarke (Mines)

Project Duration
Masters: August 2020 to August 2022

- Problem: Opportunity exists to discover MPEAs and design microstructures for performance in extreme environments (e.g., elevated temperatures and high strain rate deformation).
- Objective: Understand microstructure and property evolution in MPEAs during processing.
- Benefit: Strategies for alloying and microstructure development by processing (e.g., deformation thermomechanical processing, additive manufacturing) to achieve tailored properties.

Recent Progress

- CoCrNi MPEAs designed with toughness enhancing deformation mechanisms (TRIP/TWIP) tested at high strain rates at the Advanced Photon Source.
- Microstructure characterization is underway.

Metrics		
Description	**% Complete**	**Status**
1. Literature review	0%	●
2. Microstructure characterization by EBSD	0%	●
3. Microstructure characterization by XRD	0%	●
4. MPEA design and processing	0%	●
5. Characterization of MPEA properties	0%	●

Thank you!

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