Project 46: Influence of Microstructure on the Oxidation Behaviors of Refractory Complex Concentrated Alloys (RCCAs)

Fall Meeting

October 13th – 15th 2010

- Student: Noah Welch (ISU)
- Faculty: Peter Collins (ISU)
- Industrial Mentors: Todd Butler, Eric Payton (AFRL), Daira Legzdina (Honeywell)

About Me

Education

- Concurrent BS/MS in Materials Engineering at Iowa State University
  - Finishing UG coursework this spring, transferring to PhD.
  - Projected graduation, Fall 2023

Personal Interests

- Camping, Fishing
- Fitness
- Playing music

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- Student: Noah Welch (ISU)
- Advisor(s): Peter Collins (ISU)

Project Duration
PhD: Fall 2020-Spring 2023

- Problem: The oxidation mechanisms in RCCAs are poorly understood and the influence of microstructure on oxide formation has not been thoroughly explored.
- Objective: Investigate microstructural effects of RCCAs, specifically TaTiCr/NbTiCr, and their potential to increase oxidation properties.
- Benefit: RCCAs show great promise for future use in advanced, high-temp structural applications.

Recent Progress
- Identified materials sources
- CALPHAD for finding desired composition ranges

Metrics		
Description	**% Complete**	**Status**
1. Literature review	65%	●
2. Fabricate specimens at desired composition for oxidation/ductility assessment	0%	●
3. Modify microstructure using TMP	0%	●
4. Assess oxidation and mechanical properties	0%	●
5. Evaluate microstructure morphology vs. oxidation behavior	0%	●

Thank you!

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