Problem
Large difference in C concentration + large C potential difference + O diffusion for chemical potential of C

Approach
Reduce carbon diffusion by minimizing carbon potential gradient through the following steps:
1. Plot C potential for a linear composition profile
2. Calculate C potential for all locations. Output Cr concentration profile
3. Build transition joint with minimized C potential gradient

How is chemical composition adjusted?
Genetic Algorithm Optimization

Fabrication of compositionally graded test specimens
Numerical modeling: Heat transfer and fluid flow analysis

Comparison between 2.25 Cr-1 Mo steel and 800H

Probability of alloys during additive manufacturing

Evolution of the solidification texture in additive manufacturing

Collaborations

Publications

Task Outline
1. Minimization of Carbon Chemical Potential
2. Introduction of Carbon Diffusion Barrier
4. Transition Joint Fabrication
5. Creep Testing
6. Characterization
7. Scale-Up
8. Data Collection Preparations for Code Case