

## PROJECT OBJECTIVES

**Goal:** Characterize corrosion and investigate corrosion mitigation strategies that will enable operation above 850°C with a molten salt Heat Transfer Fluid.

➤ *Not many corrosion characterizations for molten salt systems above 850°C have not been detailed in the literature*

**Innovation:** Developing detailed corrosion mechanism studies and modeling will allow better design of molten salt heat transfer systems

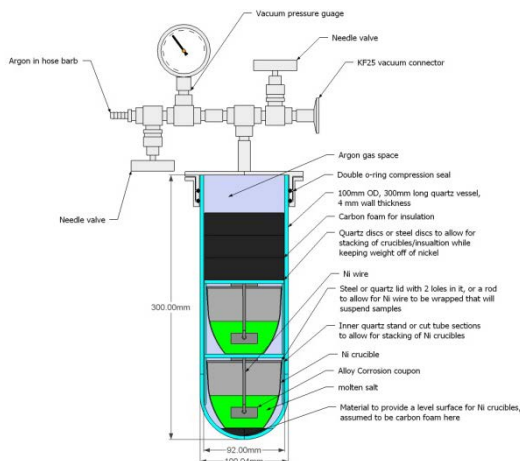
➤ *This work will develop a fundamental understanding of corrosion in molten salts in a temperature region where not much data is available*

**Milestones:** Plan experimental research, place subcontracts, order supplies

## APPROACH

- The overall project approach will combine corrosion rate and mechanism characterization, together with thermodynamic and fluid dynamic modeling, and service lifetime prediction.
- The results from these efforts will be used to quantify corrosion rates, propose and model corrosion mechanisms, and correlate these measurements with service lifetime.
- Experimental efforts will focus on molten salt systems above 800°C.
- Modeling will include thermodynamic minimization of Gibbs energy, electrochemical kinetics modeling and prediction of local electrochemical environment
- A diverse team has been assembled to accomplish these tasks including Savannah River National Laboratory, the University of Alabama and United Technologies Research Center.

## KEY RESULTS AND OUTCOMES



- Cells have been designed to expedite both long term immersion testing and electrochemical corrosion testing.
- Cells have construction characteristics that will allow operation to 1000°C to test to relevant temperatures for high temperature power cycles.

## NEXT MILESTONES

- 1/31 - Finalize subcontracts with partners
- 3/1 – Finish construction of gas delivery and vacuum system
- 3/15 – Begin 3-D corrosion model development
- 4/1 – Begin service lifetime testing
- 6/30 – Milestone 1.1.1 – Commission High Temperature Corrosion System
- Risks
- Design of high temperature testing vessels requires special materials and time-intensive fabrication
- Fabrication of molten salts done in batches and takes significant time for processing