

## Full Loop Thermodynamic Corrosion Inhibition and Sensing in Molten Chloride Systems (33871)

# Novel Self-Healing Coatings and Sensing Methods Developed for Molten Chloride CSP Systems

### 1. Impact

Ability to achieve 30 year lifetime with CSP molten chloride heat transfer systems.

### 2. Project Goal

Develop novel methods of distributed redox control along with methods to monitor redox control in CSP systems.

### 3. Method(s)

Alloys were coated galvanically with active metals to prevent corrosion and exposed to air and molten salt. Electroanalytical methods were used to monitor caused by impurities.

### 4. Outcome(s)

Demonstrated self-healing Zr and Ti coatings that could eliminate corrosion of the base alloy (e.g. Haynes 230). Sensing methods were identified.

### 5. Conclusion/Risks

Galvanic self-healing coatings prevented corrosion, but coating thickness was harder to control. Worked with NREL and ORNL to adapt techniques for Mg-based redox control.

### 6. Team

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## Visuals

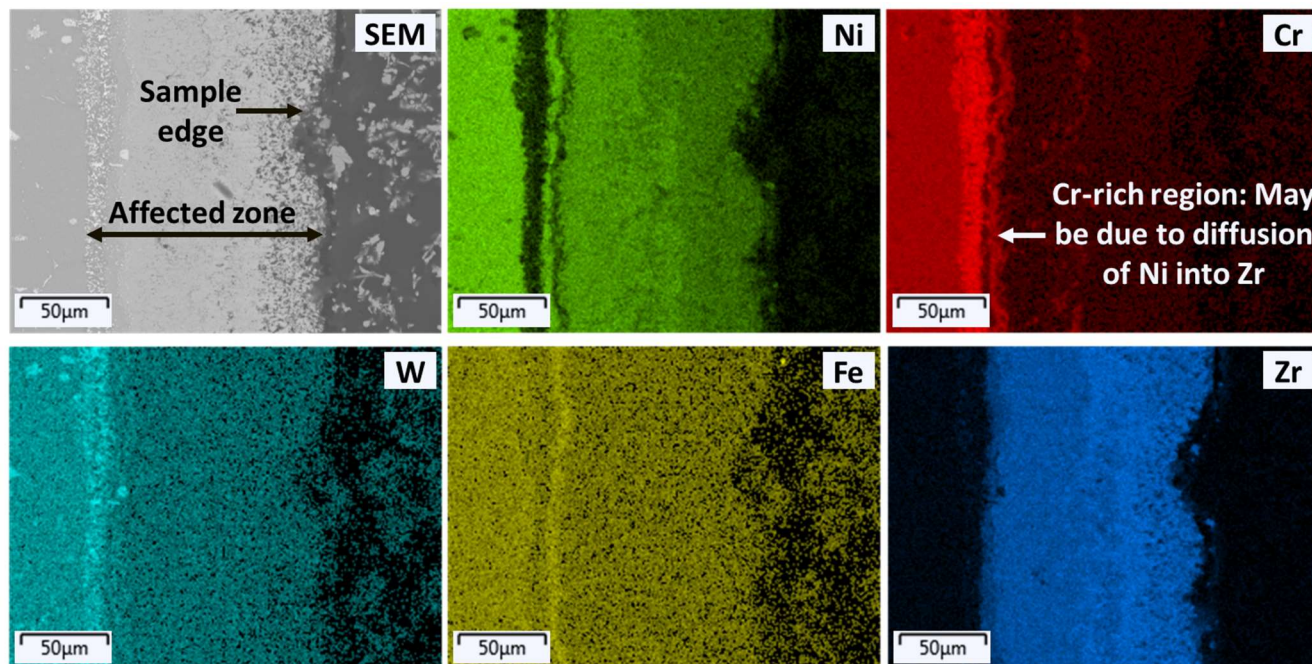


Figure 1. Galvanic Active Metal Coating for Redox Control