



*"Predict, Prevent and Manage"*

Materials Testing



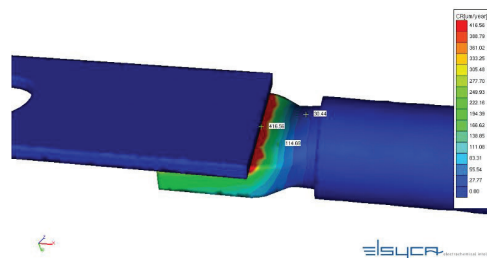
The University of Akron  
**NCERCAMP**

The National Center for Education and Research  
on Corrosion and Materials Performance

## MODELING & SIMULATION

NCERCAMP researchers combine scientific concepts and empirical input to develop, validate, and apply mathematical models to predict, prevent, and manage corrosion. Models and simulations are used to develop analytical solutions for new or existing designs to elucidate the interaction between the environment and the dynamic response of the system.

Galvanic Corrosion Rate  
Copper/Aluminum Electrode Junction



## MICROBIOLOGIALLY INFLUENCED CORROSION

Researchers at NCERCAMP are working on characterizing the influences of a range of microbiological processes on the corrosion of a variety of alloys. Our experts apply a unique combination of innovative electrochemical and microbiological techniques to determine mechanisms and early indicators of microbially influenced corrosion (MIC).

Using Zero-Resistance Ammetry (ZRA), our researchers determine mechanisms of MIC, develop robust rate formulations, and sensitively monitor MIC in real time.

**Resources and Expertise  
to meet your corrosion and  
materials performance needs.**

**The National Center for Education and  
Research on Corrosion and Materials  
Performance (NCERCAMP)**

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**The  
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of Akron**

## MATERIALS TESTING

The National Center for Education and Research on Corrosion and Materials Performance (NCERCAMP) was established in 2010 with a \$15M Grant from the Department of Defense, Office of Corrosion Policy and Oversight (DoD/CPO). The Center works with industry to provide research and testing on a wide range of materials, including alloys, polymers, composites, coatings, and biomaterials.

NCERCAMP provides materials testing for a number of industries, including oil and gas, aerospace, water and wastewater, biomedical, and infrastructure.

Areas of expertise include:

- Materials Performance
- Materials Characterization
- Materials Development
- Modeling & Simulation
- Microbially Influenced Corrosion



## MATERIALS PERFORMANCE

### Accelerated Testing

- Accelerate damage and predict material performance
- Corrosion processes accelerated significantly under extreme environmental conditions
- Performance of metals, polymers, composites, biomaterials, and coatings

### Mechanical Testing

- Test for fatigue crack growth, high and low-cycle fatigue, fracture toughness, tension, and compression
- New techniques for testing reliability of commercial alloys
- Highly localized determination of dynamic mechanical properties in blends, composites, nanocomposites, functional materials, and hierarchical materials

### High Temperature Testing

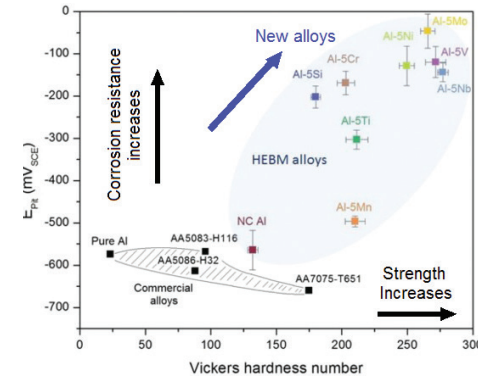
- Understand influence of temperature on structure of metal
- Heat treatments of materials in wide range of atmospheres and temperatures
- High temperature, high velocity burner rig with capability for sand ingestion

## MATERIALS CHARACTERIZATION

Materials Characterization labs offer analytical instrumentation for liquid, powder, surface and bulk materials analysis and characterization.

### Capabilities include:

- Elemental analysis
- 3D Imaging
- In air and in liquid imaging
- Thermal processing and analysis
- Chemical composition
- Crystal structure



## MATERIALS DEVELOPMENT

NCERCAMP works with industry to develop advanced materials with excellent corrosion resistance and mechanical properties. Development and testing includes:

### Alloys and Composites

- Metastable/nanostructured materials via high-energy ball milling
- Synthesis of advanced metallic materials
- Processing technologies to improve the properties of commercial alloys
- Novel, ultra-strong, lightweight corrosion resistant materials for auto, marine, and aerospace
- Casting of various alloys and composites

### Coatings

- Synthesis of organic and inorganic coatings
- Pigments for UV resistance
- Metallic and ceramic coatings development
- Modification of polymer's structure and performance
- Development of novel functional coatings with improved anti-corrosion properties and extended service lifetime