

# Prediction of Material Performance

Southwest Research Institute® (SwRI) is developing a broad array of tools and databases for predicting the performance of materials in complex environments.

## *Experimental Database Development*

SwRI developed a database of corrosion rates in various acid and salt mixtures that is being used by the chemical process industry to determine the performance of equipment and design new equipment to withstand the aggressive

conditions in chemical plants. Predicting the localized corrosion of process equipment is a major challenge because the environments in the process industry are complex and change over time. SwRI helped a client in New Jersey develop a model to predict the localized corrosion of a broad range of alloys given a combination of chemical species. SwRI is currently extending this capability under a DOE program to predict the corrosion of advanced materials and fabricated components through correlations of the microchemistry of alloys and localized corrosion parameters.

### KEYWORDS

Localized  
Corrosion

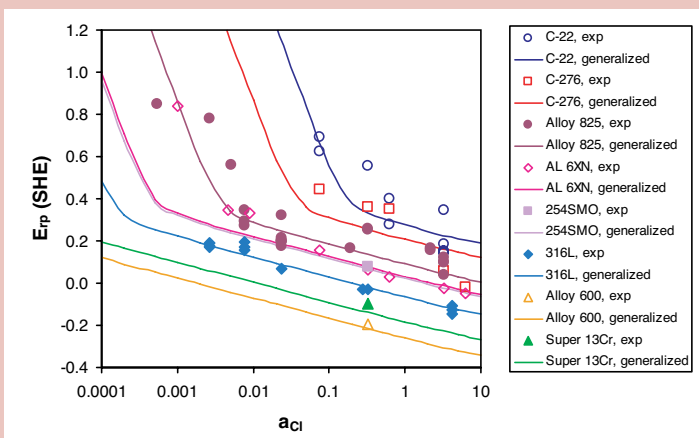
Life Prediction

Corrosion  
Monitoring

Fabricated  
Components



DOI14536\_7351



DOI14877

*Electrochemical and corrosion test methods developed at SwRI enable evaluation and prediction of localized corrosion resistance in chemical process streams.*

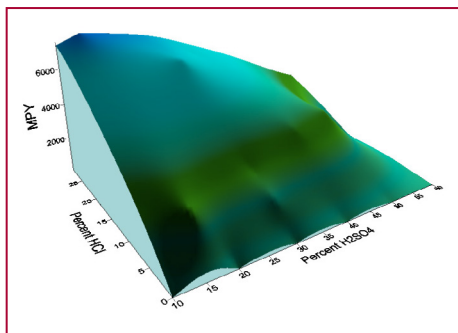
## Health Maintenance of Chemical Plants

Health monitoring involves a combination of real-time corrosion sensing, prognostication of remaining life, and mitigation activities. SwRI has developed a suite of sensors that can be used to monitor corrosion in real time. These include the multi-electrode array sensor (MAS) probes and fluidized sensors that can be introduced in process streams for remote monitoring.



D012056

SwRI developed and implemented multi-electrode array sensor (MAS) probes to monitor localized corrosion of chemical process system components in real time.



D014878

SwRI developed a corrosion database in various acid mixtures for the Materials Technology Institute of the chemical process industry.



Southwest Research Institute is an independent, nonprofit, applied engineering and physical sciences research and development organization using multidisciplinary approaches to problem solving. The Institute occupies 1,200 acres in San Antonio, Texas, and provides more than 2 million square feet of laboratories, test facilities, workshops and offices for more than 3,200 employees who perform contract work for industry and government clients.

We welcome your inquiries. For additional information, please contact:

James F. Dante  
 Manager  
 (210) 522-5458  
 jdante@swri.org

Environmental Performance of Materials  
 Materials Engineering Department  
 Mechanical Engineering Division

Southwest Research Institute  
 6220 Culebra Road • P.O. Drawer 28510  
 San Antonio, Texas (78228-0510)



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