Fracture Mechanics in Highly Controlled Environments

• Elevated temperature static exposures and cyclic and crack growth testing in applicable environments
• Evaluation of degradation and failure mechanisms under exacting conditions

Creep-fatigue, fatigue, and stress relaxation

Gas bottles
Servo-hydraulic controlled environment
Servo-hydraulic frame
Gas control & analyzers
Induction heater

Load frame gas chemistry control
The gas delivery system combined with a gas chromatograph and two solid-state hygrometers allows precise analysis of the test environment and feedback control of the water level.

Characterization
SEM image of an oxidized surface crack formed during creep-fatigue deformation of a nickel alloy at 950 °C.

Data collection
Hysteresis loop of from several strain-controlled creep-fatigue cycles of a nickel alloy at 950 °C.

Static Exposures in Specified Chemistry
The ability to mix gas chemistry in a flow loop and enable exposure to highly-controlled environments for extended periods.

Extreme temperatures
Cyclic testing up to 1000 °C using inductive or resistance heat.

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NQA-1:2008/2009a integral to the culture for advanced testing.

Analysis

CO

H₂O

Hydrogen inlet (ppm)  Test End
Hydrogen outlet (ppm)

Load frame gas chemistry control

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