**Abstract**

This project is aimed to develop and test a corrosion sensor system to monitor the high temperature corrosion in coal-based power system. The high temperature corrosion in coal-fired power plants could cause localized high temperature corrosion on the waterwalls, leading to the waterwall failure. The waterwall failure will result in high maintenance cost, low efficiency and low reliability. The waterwall failure could also cause the plant to shut down, resulting in high economic losses.

**Introduction**

1. High temperature corrosion in coal-fired power plants could cause localized high temperature corrosion on the waterwalls, leading to the waterwall failure. The waterwall failure will result in high maintenance cost, low efficiency and low reliability. The waterwall failure could also cause the plant to shut down, resulting in high economic losses.

**Basics and Approach**

- **Our previous work**
  - Sensor tests conducted in Industrial USC Boiler in Western Research Institute, Laramie WY
  - Funded by DoE-Coal Utilization Science Program (2010-2015), we previously developed an in-situ high temperature corrosion sensor system for corrosion monitoring.

- **Methods**
  - Electrochemical and corrosion monitoring validation
  - Corrosion potential and current signals based on a 3-electrode configuration: a. Metal coupon in air at 450 °C, while ER changes could reflect the corrosion potential and current signals. b. Alloy specimen Waterwall section: high temperature corrosion monitoring in coal-based boiler system.

- **Sensor tests**
  - WVU high temperature corrosion sensor
  - High temperature corrosion monitoring in coal-based boiler system.
  - Schematic diagram of WVU high temperature corrosion sensor.

- **Research progress**
  - Modules of the sensor system: a. Working electrodes 1, 2 & 3; b. Data process and analysis; c. Corrosion sensor testing @ WVU, Laramie, WY.

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- **Summary**
  - WVU high temperature corrosion sensor.