



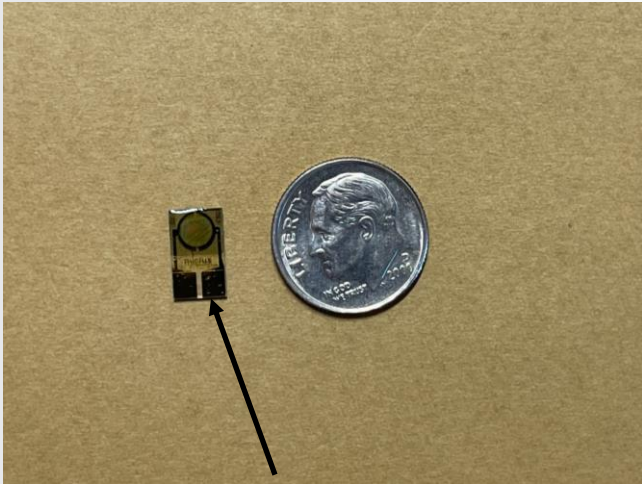
VERY LOW-COST WIRELESS HYDROGEN LEAK DETECTION FOR HYDROGEN INFRASTRUCTURE

Julie Bannantine, Bill Hoagland, Rodney Smith





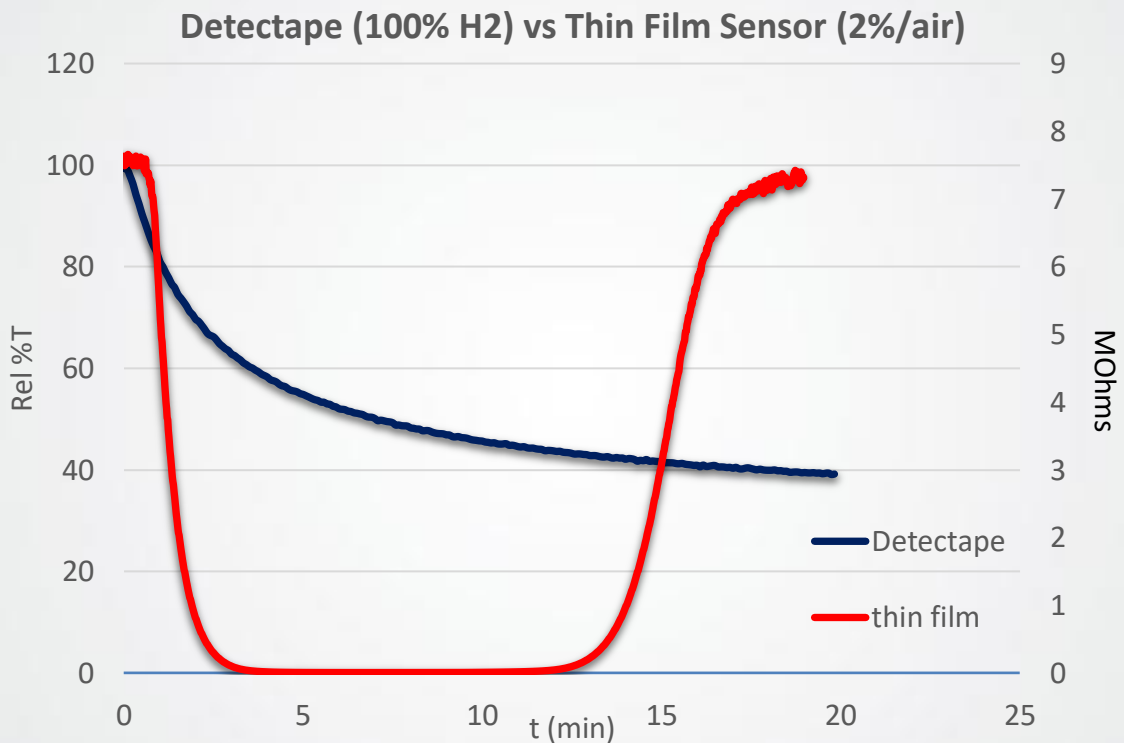
Element One Hydrogen Leak Detection Technologies



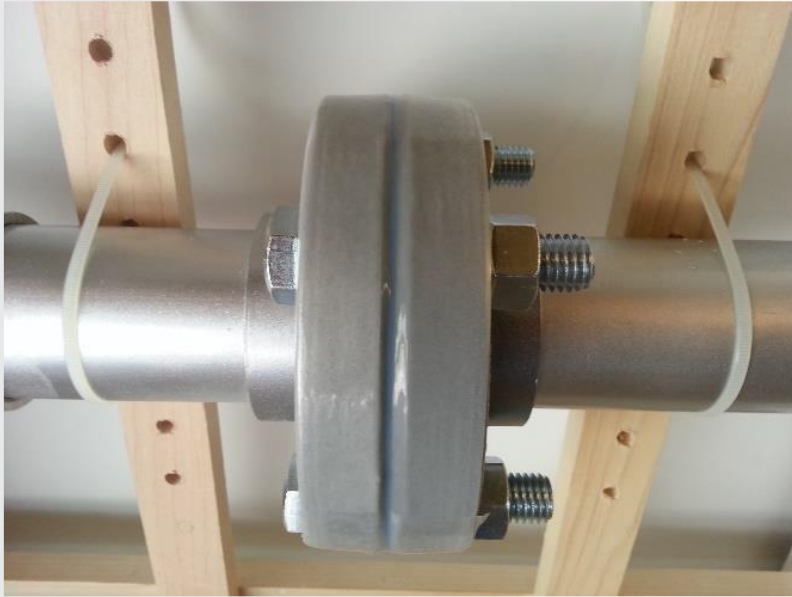
Element One Thin Film Hydrogen Sensor



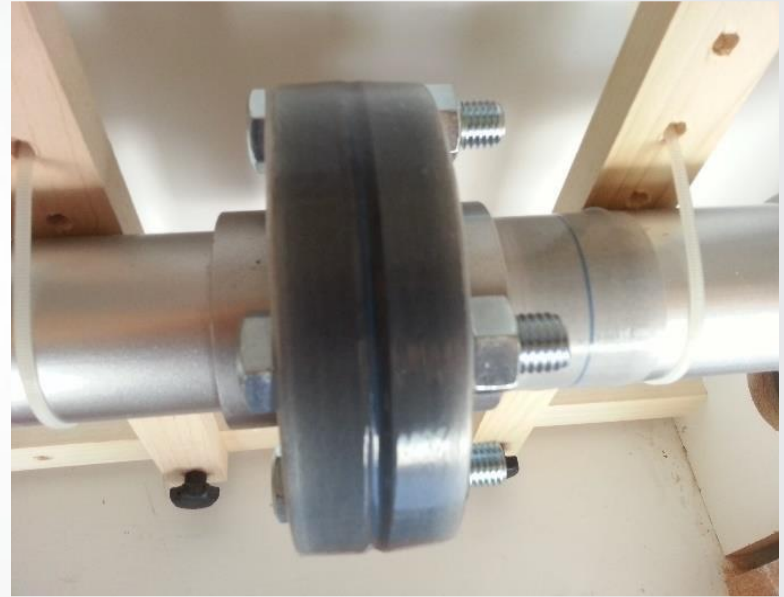
Self-fusing Tape -- Changes Color in Presence of Hydrogen



Color Change of DetecTape Sensing Hydrogen Leak from Flange



DetecTape Before Hydrogen



DetecTape After Hydrogen



Hydrogen Sensor in Test Chamber Connected Wirelessly--Zigbee



Benchtop Flammable Gas Testing System

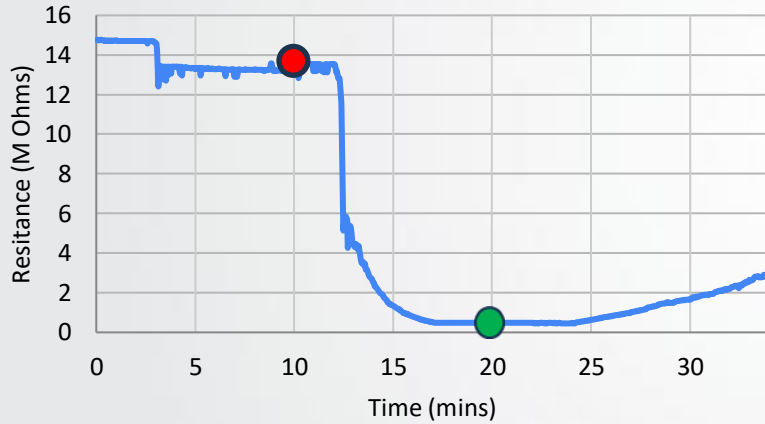




Hydrogen Sensor Connected Wirelessly-- Zigbee

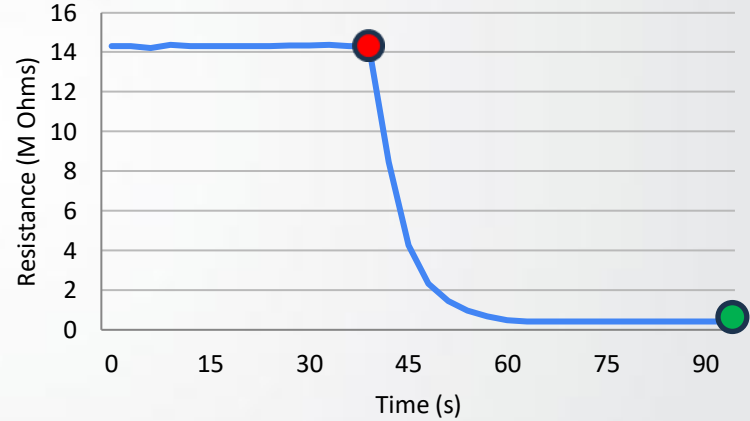
W020722 M42 --2% H2 in Air in SSTA
Resistance (M Ohms) Vs. Time (mins)

Zigbee in SSTA



W020722 M42 --100% H2 in Benchtop
Resistance (M Ohms) Vs. Time (s)

Zigbee in Benchtop



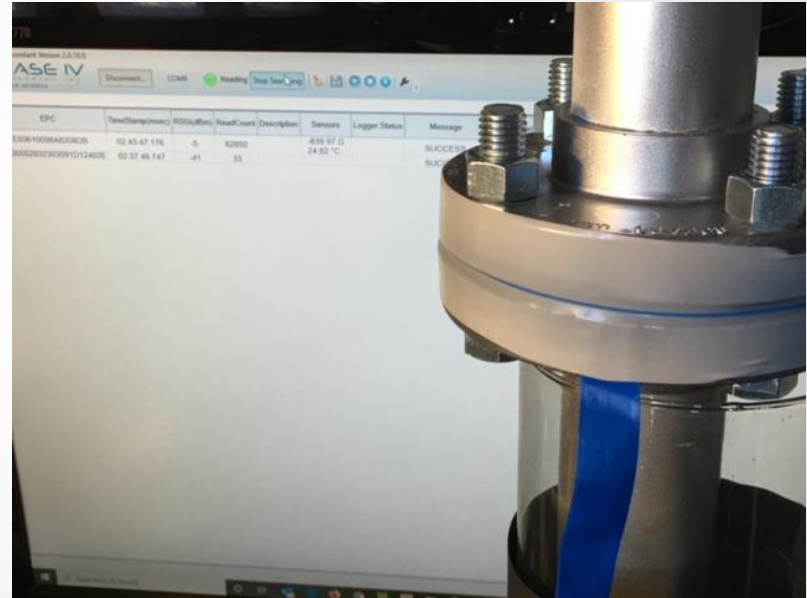
Hydrogen On



Hydrogen Off



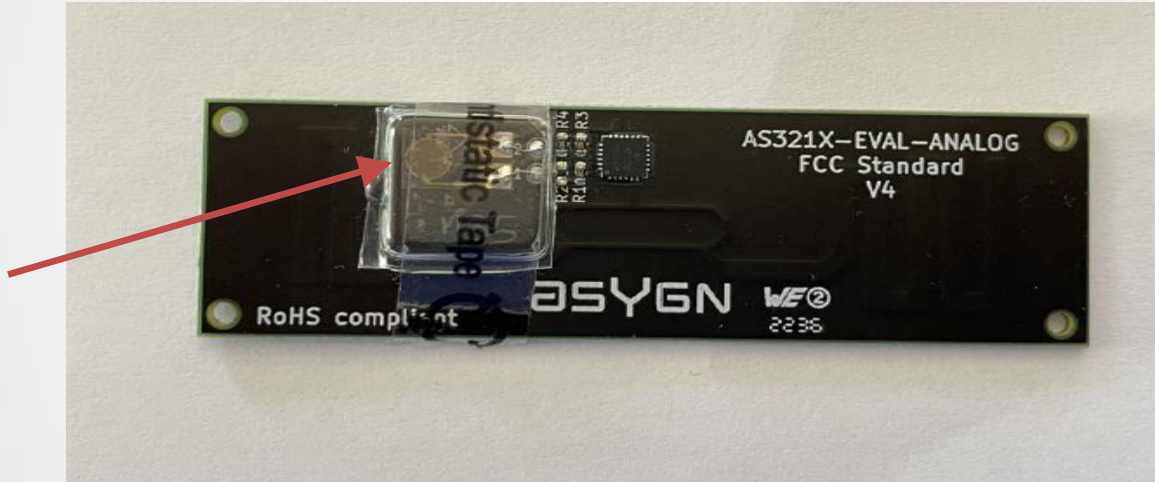
Hydrogen Sensor Interrogated Wirelessly RFID






Hydrogen Sensor on RFID Tag

Hydrogen
Sensor




Future Work

Field Testing of Multiple Sensors Meshed in Single Network planned by First Quarter 2024 Incorporating:

- User Interface for Ease of Monitoring
 - Data Collection and Cloud Storage
 - Both Mobile (Cell Phone) and Control Room Alerts Identifying Leak Location
- 

Summary

- Element One's DetecTape and Wireless Thin Film Sensors can be used together for low-cost hydrogen leak detection at multiple potential leak sources
 - Both Zigbee and RFID can be used for remote interrogation and monitoring
 - Widely deployed low-cost Thin Film Sensors and DetecTape rapidly identify location of hydrogen leaks for safety, cost-savings, and reduction of potentially harmful effect on green house gases
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Thank you



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