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PORTABLE ANALYZERS

**24TH ANNUAL MIDWEST SECTION
AIR AND WASTE MANAGEMENT
ASSOCIATION ENVIRONMENTAL
TECHNICAL CONFERENCE
KANSAS CITY, KANSAS
FEBRUARY 23-24, 2016**

ics



Portable Analyzer in Regulations

System Components

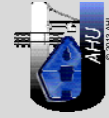
Electrochemical Cells

Analysis Technologies

Diluent Measurements

Quality Assurance

Portable Analyzer in Regulations



State Guidance Documents

40 CFR 60, Subpart JJJJ

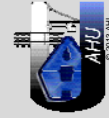
40 CFR 63, Subpart ZZZZ

40 CFR 60, App B, PS 16 (PEMS)

EPA Conditional Test Methods

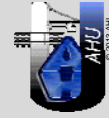
ASTM Standards

System Components



- Probe
- Sample Line
- Sample Conditioner
- Analysis Mechanism
- Data Recorder
- What's Portable

System Components

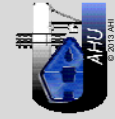


Size

Portability



System Components



360° Virtual Tour - Google Chrome

newspin360.com/tour/ok/brokenarrow/airhygiene/trailer218/



SHARE +

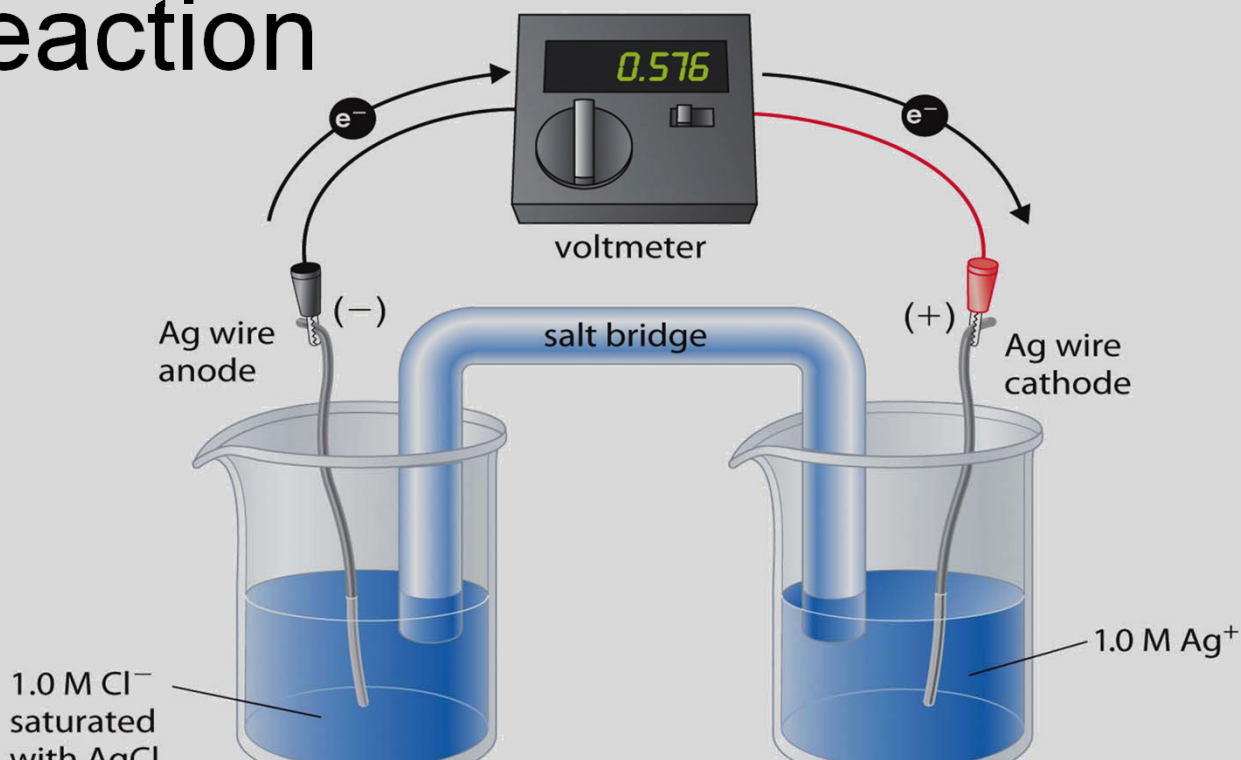
FULL



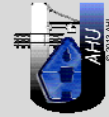
Electrochemical Cells



A device capable of facilitating electron movement through chemical reaction



Electrochemical Cells



Small (portable)



Slave to application (could be large)

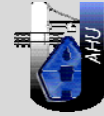
Sacrificial (lifetime)

Stable

Linear

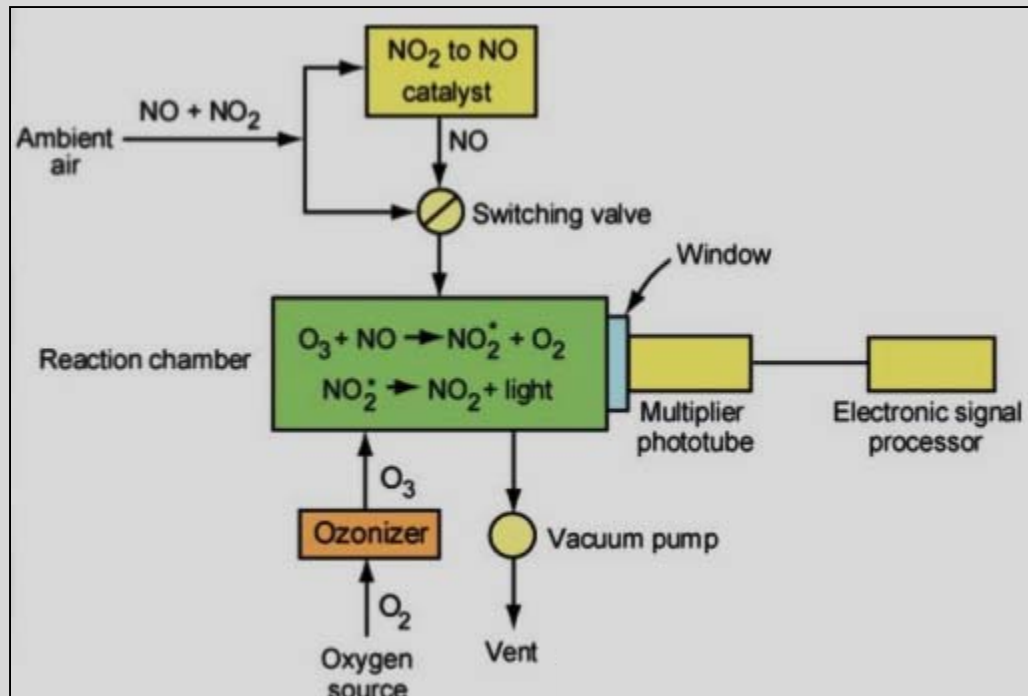
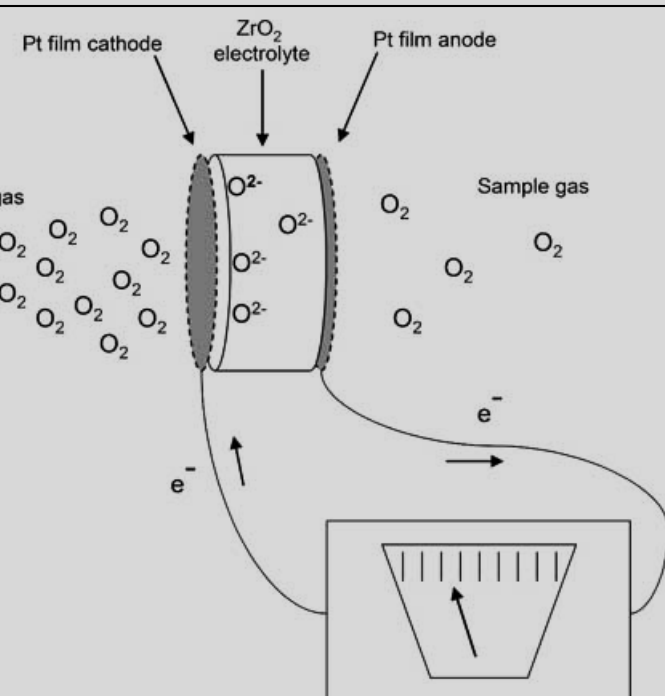


Competing Technologies



Measurements of NOx

$$\text{NOx} = \text{NO} + \text{NO}_2$$



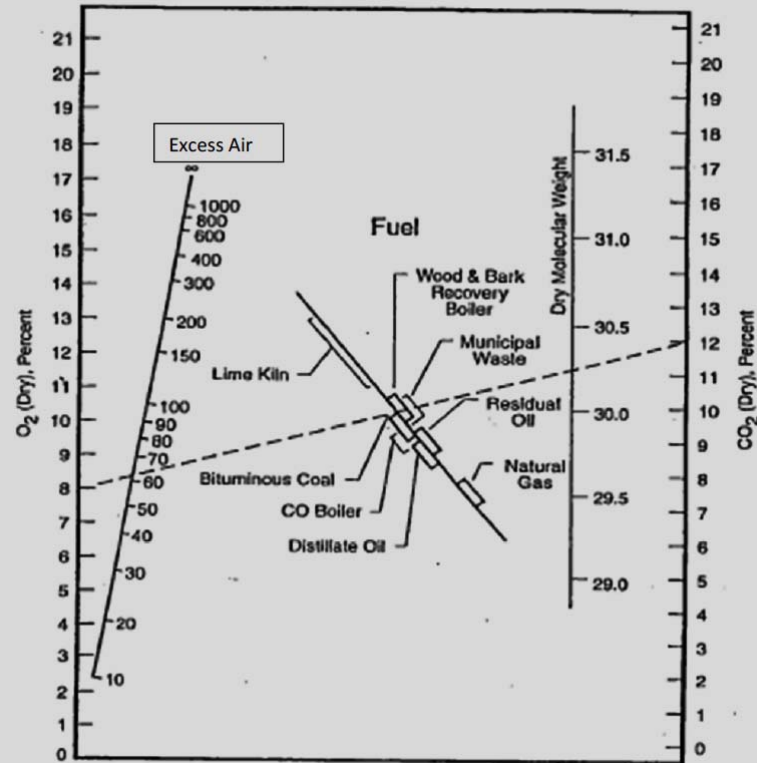
Exhaust Gas Measurements



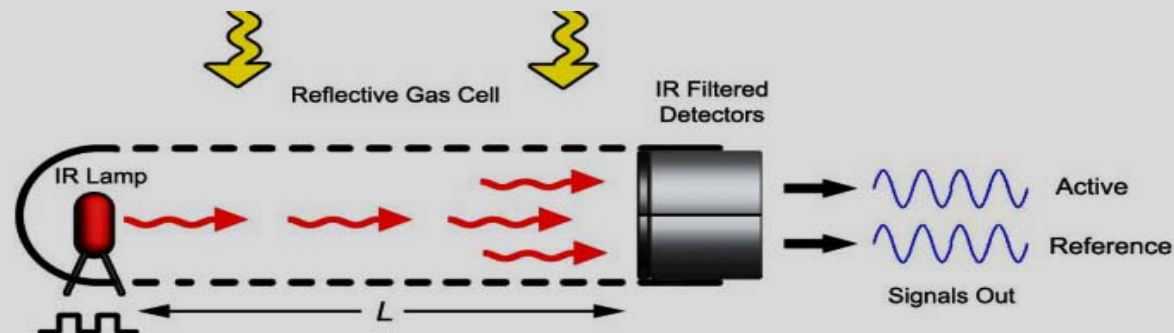
Carbon Dioxide

$$= \frac{20.9 - \%O_2}{\%CO_2}$$

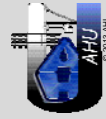
Eq. 3B-2



Use an
Infrared
bench



Quality Assurance



Calibration

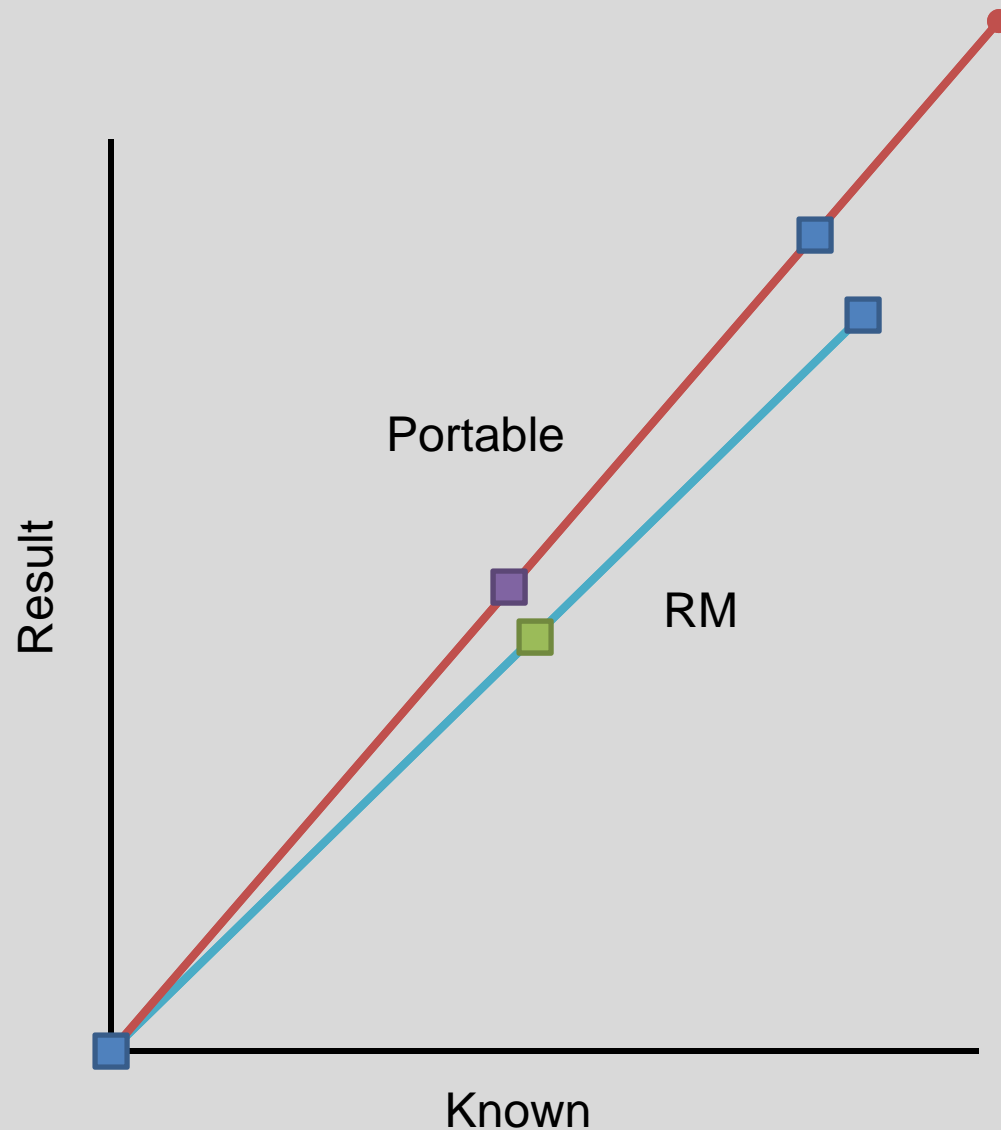
Linearity

Stability

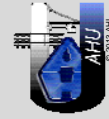
Sensitivity

Bias

Drift

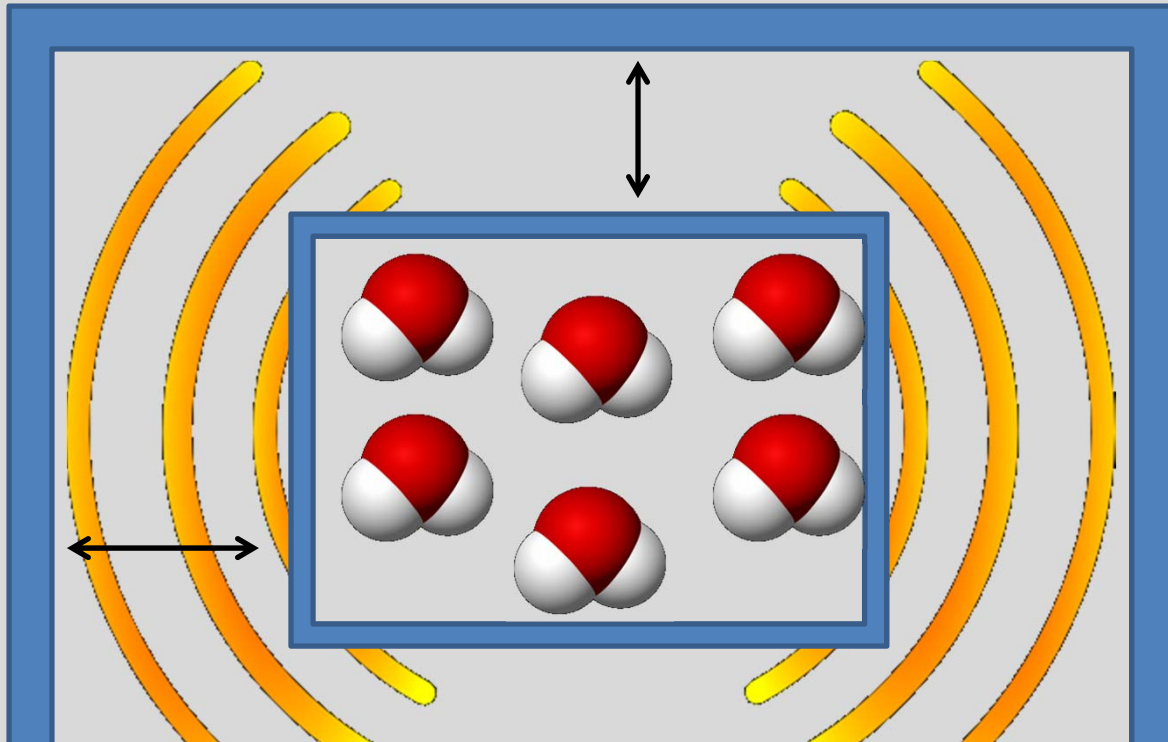


Quality Assurance



Pressure

Temperature





Conclusion

Advantages – portability, linearity

Disadvantages – concentration/time
exposure, thermal buffer limitations

QUESTIONS?