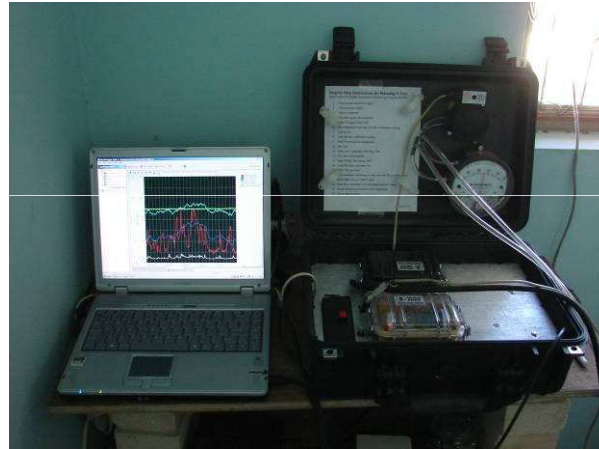


Aprovecho Emissions Equipment

PEMS



Portable Emissions Measuring System

IAP Meter

Indoor Air Pollution Meter

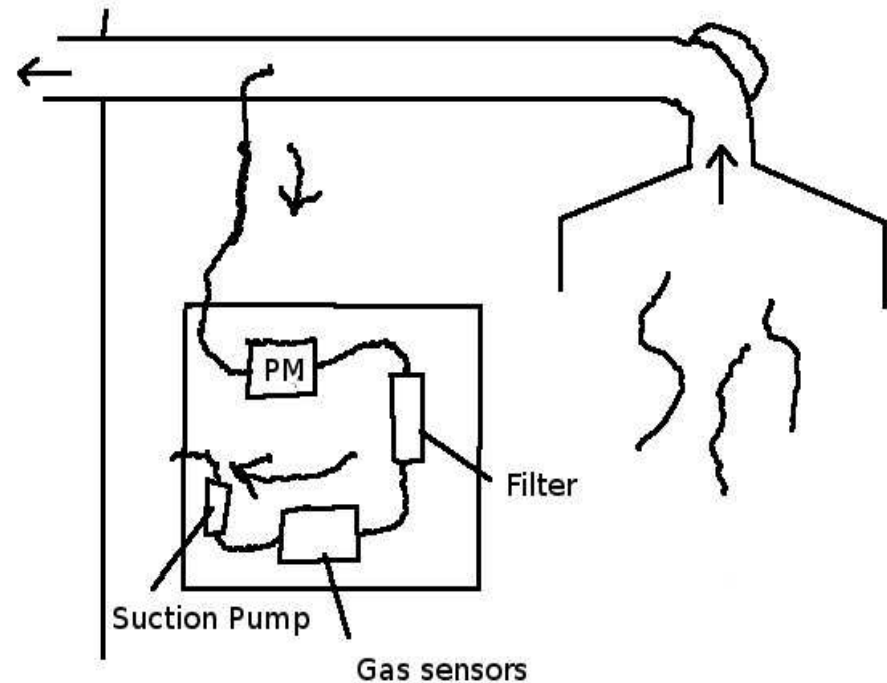


PEMS

- Collection hood collects stove emissions

- Sample box measures:

1. CO
2. CO₂
3. PM
4. Flow rate in duct
5. Temp in duct
6. Pot temp



- Uses:

1. Measure total stove emissions (WBT, CCT)
2. Stove design tool

PEMS

CO Sensor: Electrochemical Cell

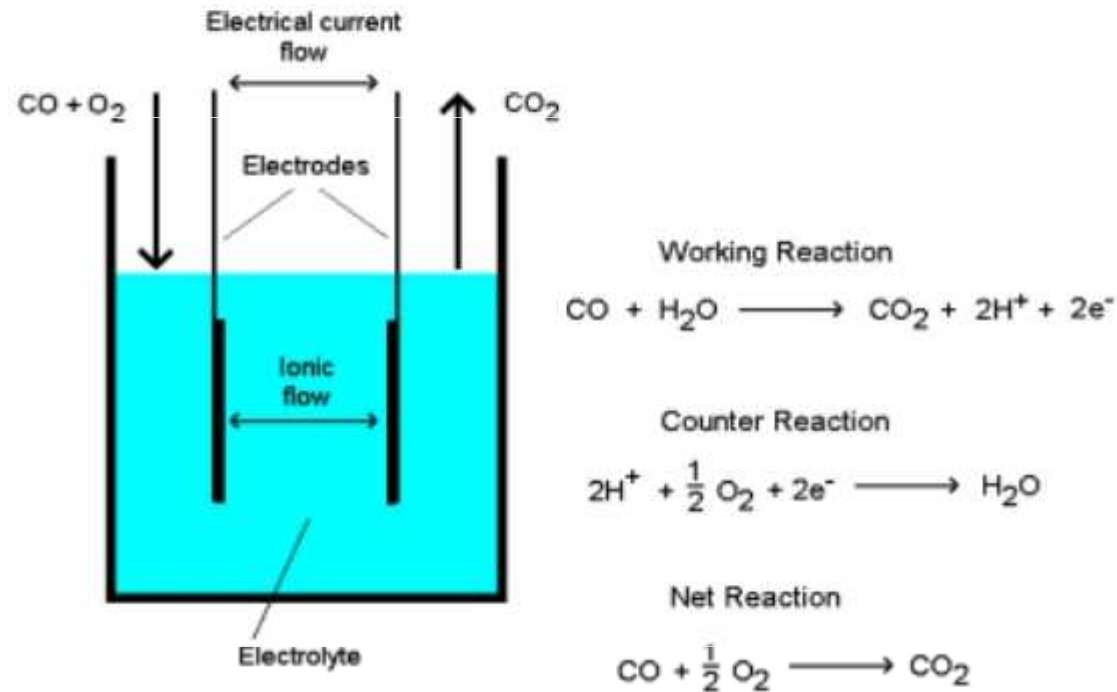
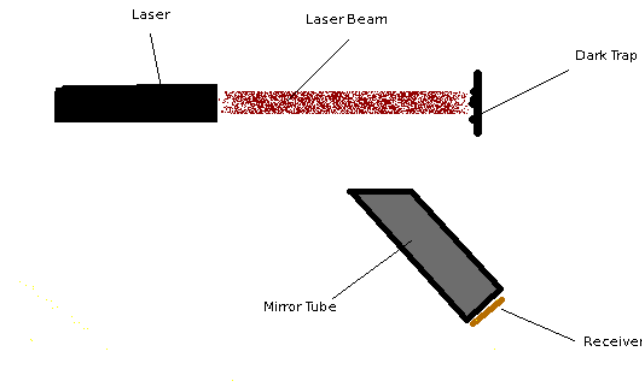


Diagram Courtesy Monox

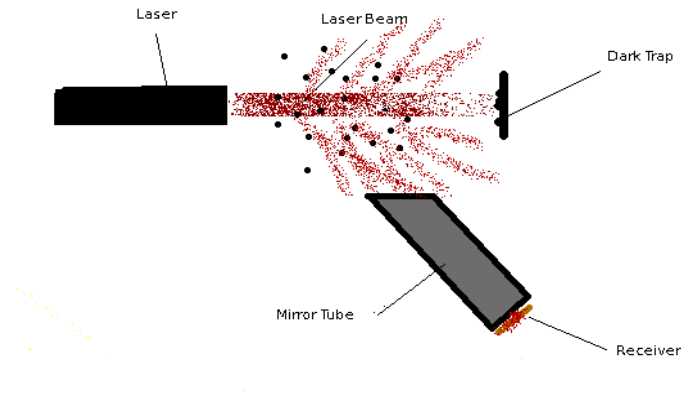
PEMS

PM Sensor: Scattering Photometer

No Smoke



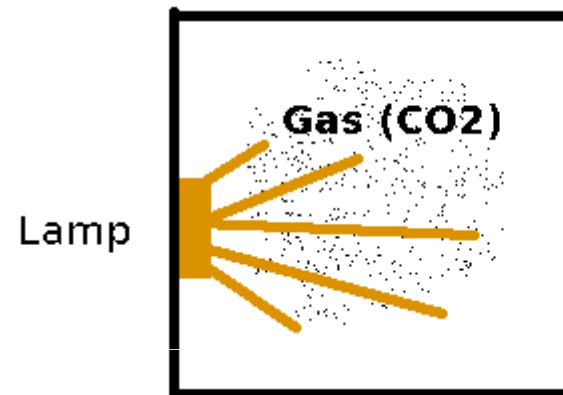
Smoke



PEMS

CO2 Sensor: NDIR

Non Disperive Infrared



Temp change of gas is proportional to CO2 concentration

PEMS

PEMS Data Processing Software

- Outputs include:
 - Graph of emissions vs. time
 - Standard performance measures
 - Specific fuel consumption (grams/liter)
 - Total emissions
 - Specific Emissions (grams/liter)
 - Emissions Factors (grams/kg fuel)
 - Efficiency and Firepower

PEMS

Future Improvements

- 2 models:
 1. Portable hood
 2. Permanent lab hood
- Gravimetric and particle size separator for more accurate PM measurement

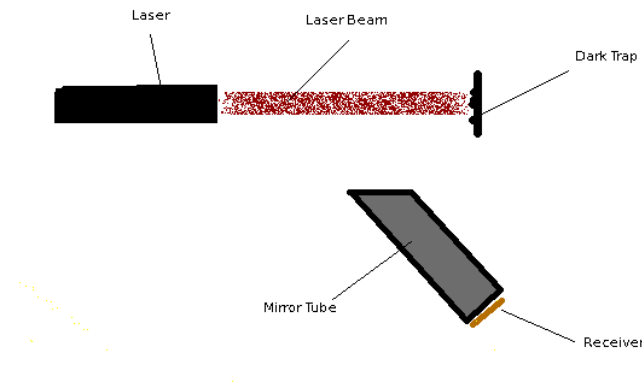
Indoor Air Pollution Meter

- Measures concentrations of:
 - CO (Carbon Monoxide)
 - PM (Particulate Matter)
- Uses:
 - Measure room concentration
 - Measure personal exposure
 - wear meter in backpack with sample tube
 - CCT, KPT, other comparative tests
- Stores data on SD Memory Card

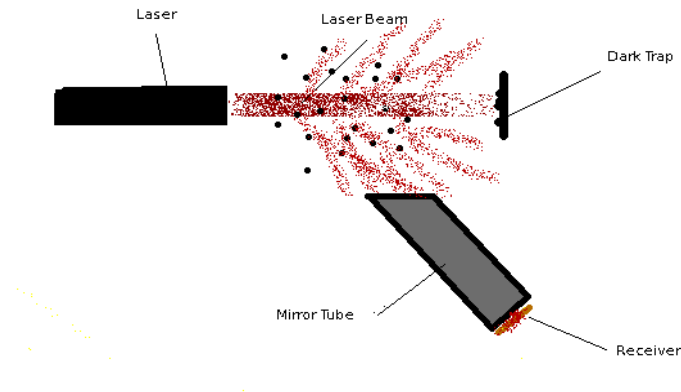


Indoor Air Pollution Meter PM Sensor: Scattering Photometer (same as PEMS)

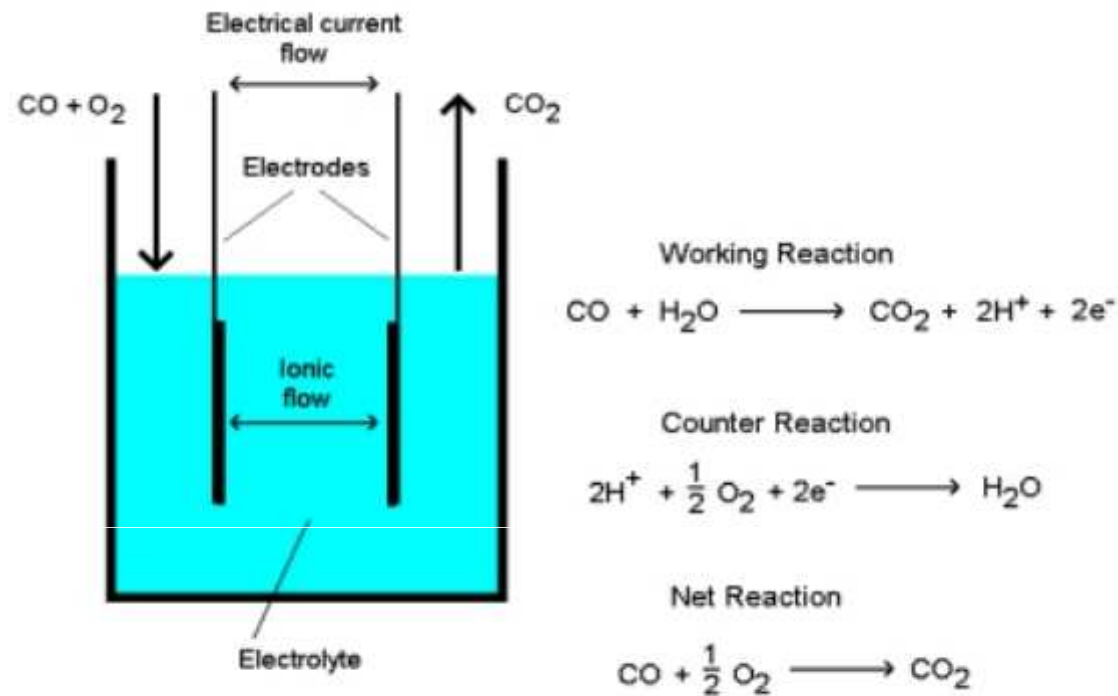
No Smoke



Smoke



Indoor Air Pollution Meter CO Sensor: Electrochemical Cell (same as PEMs)



Indoor Air Pollution Meter Features

- Sample speed selection
 - ★ Fast: Every 10 seconds
Battery life: 3 days
 - ★ Medium: Every 1 minute
Battery life: 2 weeks
 - ★ Slow: Every 10 minutes
Battery life: 1 month
- LED indicates meter is on
- Serial port for live graphing

IAP Meter

Data Processing Software

- Outputs include:
 - Graph of emissions vs time
 - Average concentrations
 - Maximum and minimum concentrations
 - 15 minute average concentrations

IAP Meter

Future Improvements

- Add CO2 sensor

Summary

PEMS

- measures emissions: CO, PM, and CO₂
- measures flue temp and flow rate to calculate total emissions
- measures pot temp for WBT
- Cost: \$10,000 USD

IAP Meter

- measures emissions: CO and PM
- measures room concentrations and personal exposure
- Cost:\$2,400 USD

More Information

www.aprovecho.org

- Spec sheets
- Brochures
- Manuals
- Data processing spreadsheets