Case study

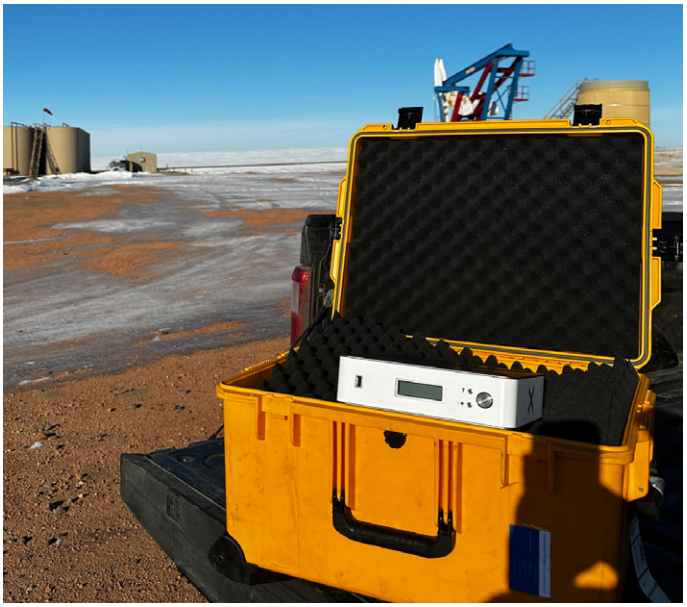
Process Raman spectroscopy

For carbon capture applications

Optimizing carbon capture with Raman spectroscopy

As the world continues to face the urgent challenge of climate change, the need to reduce carbon emissions has become more critical than ever. Carbon capture technology plays a crucial role in mitigating these emissions by capturing and storing CO and CO_2 from industrial processes and power generation.

Raman spectroscopy is a powerful analytical technique that has gained increasing attention in recent years for its applications in carbon capture. Raman spectroscopy enables the identification and quantification of molecular species, making it a valuable tool for monitoring and optimizing carbon capture processes. By providing detailed insights into the molecular composition of gas mixtures, Raman spectroscopy enables carbon capture companies to transform emissions into new materials, from fuel to food.



A solid-state Raman spectroscopy system, the Ramina Process Analyzer has no moving parts, making it ideal for continuous process monitoring, including in-line, at-line, or off-line and routine laboratory analysis.

Ramina Process Analyzer

Benefits

- Small, rugged, stable process analyzer
- Complementary analysis to: chromatography and mass spectrometry
- Raman measurements are easily and regularly correlated to the relevant EPA emission requirements

With a small footprint and no moving parts, the Ramina Process Analyzer makes analysis portable and puts decision-makers at the point of measurement.

Industry uses

A US-based carbon capture company is using the Thermo Scientific™ Ramina™ Process Analyzer to monitor several stages of its carbon capture process. With real-time compositional information, the company is expediting the creation of new chemical building blocks from carbon emissions.

Selected carbon capture applications

The Ramina Process Analyzer allows carbon capture companies to:

- Convert ethanol to aviation fuel
- Manufacture carbon-neutral refined fuels
- Analyze CO, CO_2, O_2 and H_2 concentrations

Specialty probes for in-line process applications

BioReactor Ballprobe®

Engineered for repeatable measurements

- Off-line autoclaving for repeatable measurement
- Durable design, resistant to sterilization (CIP/SIP)
- Available in single-use

FlowCell™

Built for continuous flow processes

- In-line gas or liquid phase analysis
- Constructed for high pressure applications
- Available in single-use

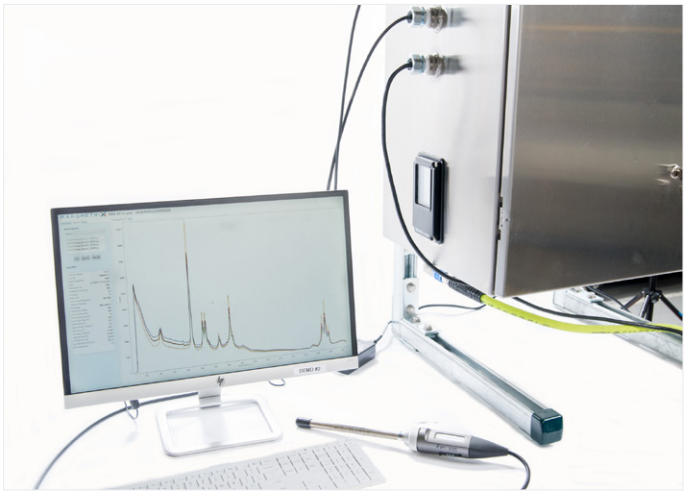
Process BallProbe®

Designed for harsh environments

- Measure fluids in the process piping
- Wide range of chemical compatibility and resistance to high temperatures

Additional accessories

- Hazardous location enclosures for additional protection



Learn more at **thermofisher.com/ramina**