Thermo Fisher
S C I E N T I F I C

Process Raman spectroscopy for energy
An affordable, data-rich complement to existing analytical tools

What is Raman spectroscopy

Raman spectroscopy is an optical analysis technique that measures the vibrational properties of molecules. Raman spectroscopy has improved process analysis with its high-resolution compositional data, linear response to concentration, non-destructive nature, ability to measure samples in real-time, without requiring a sampling system or carrier gasses.

Raman spectroscopy for the energy industry

The Energy industry has relied on analytical equipment such as knock engines, vapor pressure analyzers, and gas chromatography to ensure product quality. A solid-state Raman spectroscopy system like the Thermo Scientific™ Ramina™ Process Analyzer can speed up analyses required by relevant ASTM standards, and offer flexibility by measuring liquids and gases.

Benefits of Raman spectroscopy	
	Raman spectroscopy
Analysis time	15 seconds
Sample conditioning	None
Calibration	No; factory calibrated
Install time	15 minutes
Phases measured	Liquid, solid, gas
Cost of ownership	$
Consumables	None

thermo scientific

The Ramina Process Analyzer with a Proximal BallProbe®, a non-contact sampling optic for in-motion sampling through physical barriers and air gaps.

Expediting blend certification and QA with Raman

A U.S.-based refinery is using a Ramina Process Analyzer to certify rack batches while the knock engine is running in the background to produce the custody transfer documentation. By doing this, the refinery is bringing gasoline to the market faster.

Requirements

- Improve laboratory efficiency and expedite logistics
- Continuous online measurement to eliminate a potential safety risk when taking samples from the processing line to lab
- Octane model built to meet ASTM requirements

Results

The Ramina Process Analyzer and a Proximal BallProbe® were used to collect samples of gasoline blends through the sample container. The onsite lab is now using the Ramina Process Analyzer to analyze naphtha pretreats to identify various compositions on the front end before it goes through the reforming process. They are also using the Ramina Process Analyzer to measure the net difference conversion as those molecules get reformed.

As a solid-state Raman spectroscopy system, the Ramina Process Analyzer produces identical and repeatable results from unit to unit, and common chemometric models can be applied across systems to produce consistent results. Additional models can be created to identify concentrations of carbon dioxide, carbon monoxide, oxygen level, and hydrogen sulfide ratios.
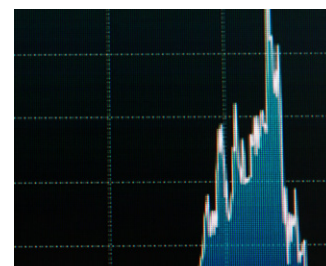
Selected applications for refineries

Certifying gasoline blends

Naptha pretreats analysis

CO, CO_2 and oxygen level concentration analysis

Sulfur peak identification

Simulated distillation

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

thermo scientific