CSUVENTURES
Innovation at Work

Colorado State University

Real-Time Fuel Gas Composition Sensor

Natural gas is a rapidly expanding technology, and can come from a variety of sources. A large amount of natural gas exists in “unconventional” reserves—shale gas, coalbed methane, and biogas. The problem, though, is that the composition of the gas from these reserves varies widely. Unconventional gas often contains dangerous contaminants and heavy metals, so there is a need to measure the composition of the gas before burning it.

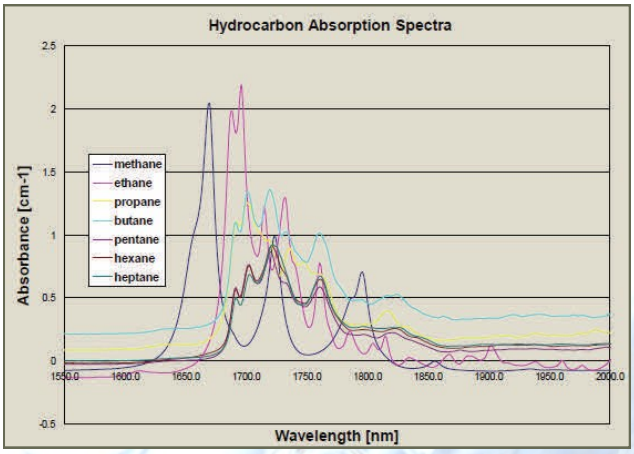
The current composition sensing technology is micro gas chromatography. Chromatography is expensive, needs frequent maintenance, and samples sometimes take up to an hour to test. It is also not entirely accurate and cannot identify every substance in the gas.

Researchers at Colorado State University have designed a new system to measure gas composition with spectroscopy. The technology uses near-infrared Fourier transform spectroscopy (FT-NIR) enabled by miniaturized microelectromechanical system-based spectrometers. The system can detect the makeup of natural gas by exposing a sample to near-infrared radiation.

When unconventional natural gas is used as a fuel for an internal combustion engine to produce heat or power, the air-to-fuel ratio must be adjusted with the composition of the gas. Certain contaminants can damage the engine, so those must be detected as well. With fiber optic technology, gas composition can be monitored in real time and the information can be instantaneously interpreted by a computer. Once interpreted, the information is sent on to the engine system, which adjusts its air intake according to the gas makeup.

Patent Information
Provisional patent application has been filed

Inventor Information
Dr. Christopher L. Hagen



Features and Benefits

- Gas composition can be monitored in real time.
- Improves efficiency of natural gas engines
- Near-infrared spectroscopy allows every component to be identified
- Use of fiber optic

Contact Information:
Jeremy Nelson
Phone: 970.491.7100
Email: jeremy.nelson@colostate.edu
www.csuventures.org