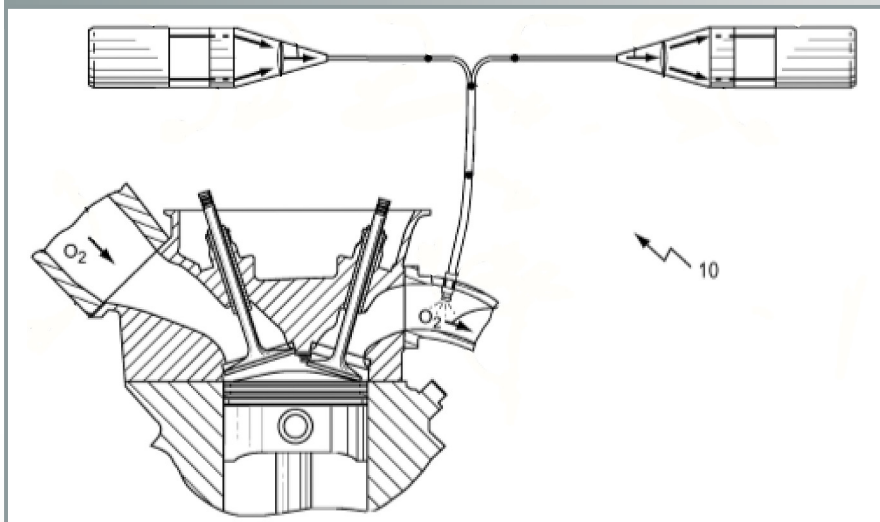


Sensor Rapidly Measures the Concentration of Oxygen in Fluids

UT-B ID 200701962



Technology Summary

To provide rapid measurement of oxygen concentrations in fluids, ORNL researchers developed a sensor that measures oxygen in temperatures from 0 degrees Celsius up to the 200 degrees Celsius commonly found in intake manifolds. The sensor can be used in a variety of applications to quickly and inexpensively detect oxygen levels, including internal combustion engines, medical monitors, and marine biology measurement technologies.

Compared to current sensor technology, such as universal exhaust gas oxygen sensors and paramagnetic oxygen analyzers, the invention supports more rapid measurements over a broader temperature range. The timing can also be controlled to measure a specific oxygen concentration at any point in the engine cycle.

The invention features an excitation light source, which could be a light emitting diode or a fluorescent device. The source transmits light inside a fluid, such as a gasoline/air mixture inside the intake manifold of an engine, to a transducer via a fiber optic cable. The transducer is a material that emits light as it transitions between energy states. A spectrometer light detector is also attached, via another fiber optic cable, to the transducer. The detector receives the transducer signals and processes them to determine the concentration of oxygen in the fluid.

Advantages

- Rapid O₂ measurement
- Can measure over a broad temperature range (0-200 C)
- Inexpensive and minimally invasive
- Functions in an engine manifold (soot, hydrocarbons, H₂O, etc.)
- Timing can be synchronized with points in the engine cycle

Potential Applications

- Engine manufacturers and engineering research
- Engine performance testing for fuel efficiency, and emissions, including on-board diagnostics
- Installation in engines or vehicle systems
- Broader application to other engine types and fuel cells
- Medical and marine biology measurement technologies

Patent

James E. Parks. *Oxygen Concentration Sensors and Methods for Rapidly Measuring the Concentration of Oxygen in Fluids*, U.S. Patent Application 12/843,121, filed July 126, 2011.

Inventor Point of Contact

James E. Parks
Engineering Science and
Technology Division
Oak Ridge National Laboratory

Licensing Contact

David L. Sims
Technology Commercialization Manager,
Building, Computational, and
Transportation Sciences
UT-Battelle, LLC
Oak Ridge National Laboratory
Office Phone: 865. 241.3808
E-mail: simsdl@ornl.gov

