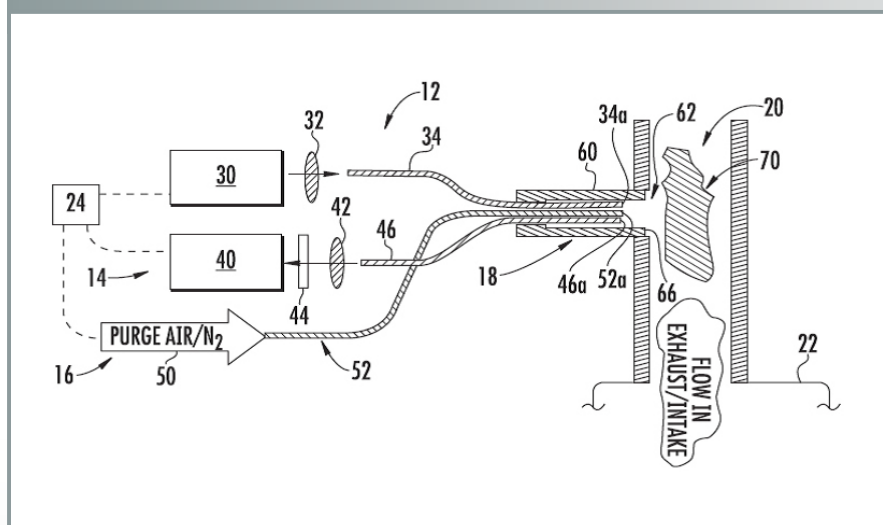


Optical Backscatter Probe for Sensing Particulate Matter

UT-B ID 200802130



Technology Summary

To provide emissions information for automotive engines, ORNL researchers developed a technology that enables very rapid measurement of particulate matter in gas emissions. This fiber optic-based probe can be used in engine locations that are typically inaccessible to existing measurement tools. The automotive industry values particulate information to support long-term objectives to reduce emissions, while auto technicians rely on these measurements to diagnose engine problems.

Conventional methods for emissions measurements are difficult to incorporate into the small access areas of engines and do not provide information on individual cylinders of a multi-cylinder engine. This technology offers a more durable and economical option, with specific measurements from individual cylinders.

By supplying light from the fiber optic probe into specific engine locations, the device detects light scattered back by particulate matter. The particulate concentration is then determined by measuring the amount of backscattered light transmitted by particulate matter contained in a sample of engine exhaust. The speed and accessibility of this technology enable the relative amount of particulate matter from individual cylinders of a multi-cylinder engine to be determined.

Advantages

- Economical, fast, durable, and very simple to implement in engine systems
- Reduces the time required for analysis of particulate matter concentration in the development and testing of multi-cylinder engines

Potential Applications

- R&D tool for diesel engine manufacturers, automotive companies, and automotive sensor supply companies
- Diagnosis or control of engines and exhaust systems to optimize engine performance
- On-board diagnostics required by regulatory agencies

Patent

James E. Parks and William P. Partridge. *Optical Backscatter Probe for Sensing Particulate in a Combustion Gas Stream*, U.S. Patent Application 12/491,781, filed June 25, 2009.

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