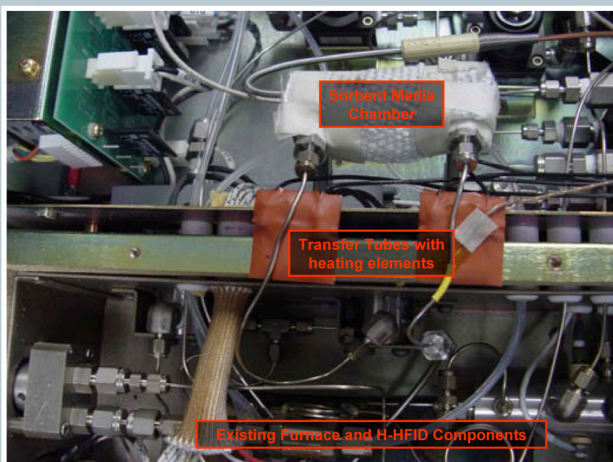


# Rapid Separation and Detection of Hydrocarbon Fractions in an Exhaust Stream

UT-B ID 200701929



## Technology Summary

To meet increasingly strict efficiency and emission standards, current vehicle engines rely on exhaust gas recirculation to reduce nitrogen oxide production. Heat exchangers, acting as coolers, must lower exhaust stream temperatures without becoming fouled with particulate matter and hydrocarbon deposits. This ORNL technology is for rapid fractionation and analysis of volatile and semivolatile organic compounds in the exhaust stream to help avoid the conditions that can foul these coolers.

This invention offers rapid determination of the fraction of total hydrocarbons in an exhaust stream. The device allows for faster, simpler hydrocarbon capture and analysis in real time. This can be especially useful in vehicle testing facilities, where direct feedback can assist with engine calibration and assessment of the impact of hydrocarbons on engine components.

The invention uses filtration and a sorbent medium to capture various species of semivolatile hydrocarbons and separate them from the fluid stream. A detection device calculates the hydrocarbons. This allows rapid determination of the fraction of the total hydrocarbons that exist in the particulate matter phase, the semivolatile gas phase, and the volatile gas phase.

## Advantages

- Can be retrofitted into existing emissions-testing facilities
- Can be used as a feedback mechanism to the calibration process
- Minimal requirements for operation
- Uses aggregated fractionation, which is both simpler and faster for many applications

## Potential Applications

- Analysis of diesel exhaust and industrial processes
- Calibrating engines and vehicles to stricter emission standards

## Patent

C. Scott Sluder, John M. E. Storey, and Samuel A. Lewis, *A Concept for Rapid Determination of Volatile, Semi-Volatile, and Particulate-Phase Hydrocarbon Fractions in Diesel Exhaust*, U.S. Patent Application 12/840,341, filed July 21, 2010.

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