Real-Time Airborne Particle Analyzer

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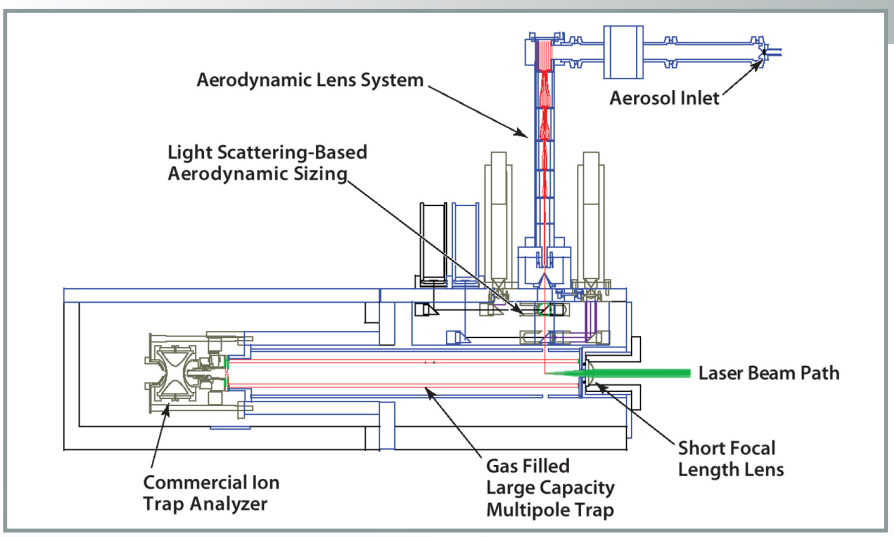

Technology Summary

Particle analysis is useful for determining chemical compositions in a wide range of disciplines, from ascertaining the source of a petroleum sample to duplicating a fragrance. The technique is appealing to a broad cross section of analytical sciences, but its applications are limited because, for existing equipment, sample size is limited and the testing is carried out under a high vacuum.

The real-time particle analyzer developed at ORNL overcomes these limitations and is so sensitive that in addition to identifying the elemental composition of a compound, it can determine the ratios of isotopes for each element within a sample. The system features a scaled-up laser and containment system for processing larger particles. It transports the atomized samples in a low-pressure stream of inert gas rather than in a vacuum. The inert gas provides a medium in which the sample retains a homogeneous mixture that is representative of the original particle's composition. The gas also supports multiple analyses, thus providing enough information to discriminate between isotopes as well as elements.

The invention is designed to be self-contained and portable, so it can carry out analyses in the field. Its unique features make it particularly useful wherever screening is done for chemical and nuclear hazards, including environmental monitoring, first response to emergencies, and homeland security.

Advantages

- Real-time method for measuring elemental composition
- Precise isotope ratios of individual elements
- On-site process; no need for a specialized laboratory

Potential Applications

- Process engineering for raw material quality
- Geology, biology, and environmental science
- HAZMAT
- Weapons inspection

Patent

Peter T. Reilly, *Real-Time Airborne Particle Analyzer*, U.S. Patent Application 12/418,891, filed April 6, 2009.

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