Innovative Ion Mobility Spectrometry with Open-Air Assembly

Simplified system prioritizes easy setup while facilitating rapid and high-throughput demonstration for security applications

This technology enables ambient ionization and ion analysis without a vacuum system using a new, open-air ion mobility spectrometer (IMS) method. It injects ions from an ambient ion source into an atmospheric-pressure IMS using a novel device that potentially helps protect the technician from the instrument setup components that have a high electric potential applied to them. Hydrodynamically focusing a gas plume onto the sample, the device minimizes ion loss by keeping the sampling system on a moveable assembly.

The Georgia Tech research team has demonstrated the practical success of this technology via direct analysis in real time (DART) combined with IMS. However, their innovation could be applied to any system that requires the injection of ions from a low to high electrical field region.

Summary Bullets

- **Protective:** Potentially helps protect the technician against contact with ionic hazards
- **Rapid:** Separates ions through fast detection of differences in their mass, charge, and cross-section
- **Convenient:** Leverages an open-air arrangement that significantly reduces time for experiment setup and sample preparation

Solution Advantages

- **Protective:** Potentially helps protect the technician against contact with ionic hazards
- **Rapid:** Separates ions through fast detection of differences in their mass, charge, and cross-section
- **Convenient:** Leverages an open-air arrangement that significantly reduces time for experiment setup and sample preparation

Potential Commercial Applications

- Military/Security: Detection of narcotics, explosives, toxins, etc.
- Public Health: Detection of counterfeit pharmaceuticals

Background and More Information

Atmospheric-pressure IMS is a widely used analytical detection tool for ionized compounds, often used in security settings like airports to screen for potentially hazardous materials. This novel Georgia Tech method and device provide an improved means of leveraging IMS without the complex equipment that accompanies methods using radiation, lasers, or spray. Using DART—a plasma-based ambient ion source—this technology leverages the simplicity and cost efficiency of an open-air IMS system while potentially helping protect the user from the hazards of the equipment.

Inventors

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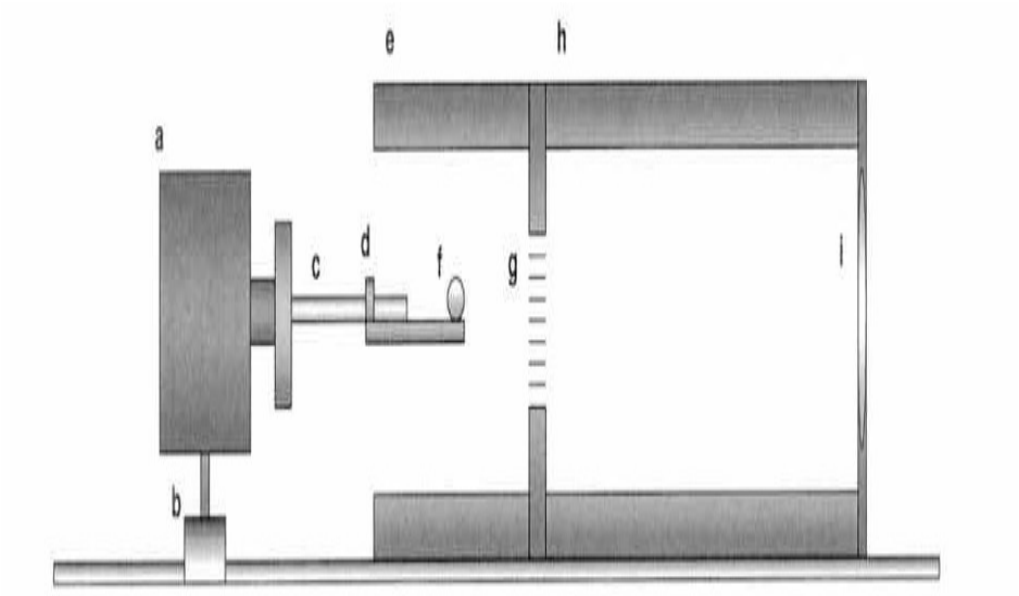
IP Status

The following patent has issued along with an additional international patent : US8487245

Publications

Using Scientific Tools in an International War on Fake Drugs, The New York Times - July 20, 2009

Images



Cross-sectional depiction of Georgia Tech’s DART-IMS, including its key components: its ion source (a), a hydrodynamic gas transfer tube (c), the IMS reaction chamber (e), the pulsed ion gate (g), and ion detector (i).

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