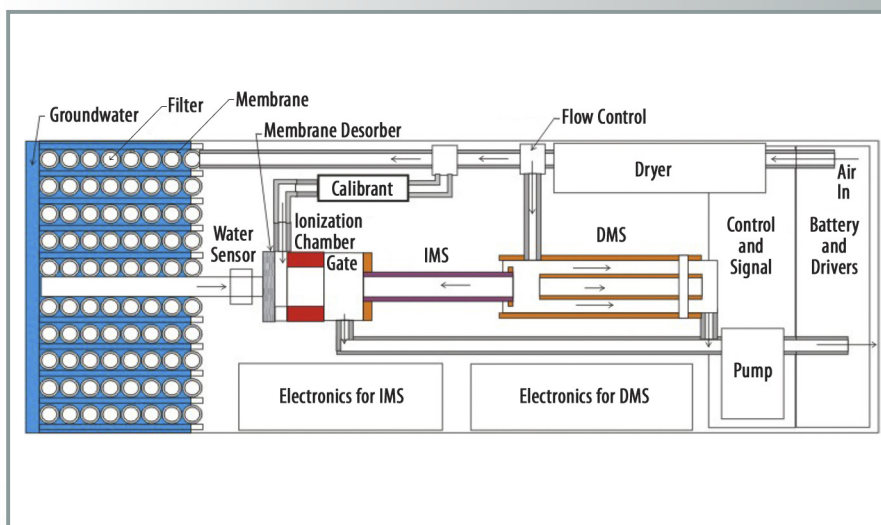


Real-Time Ion Mobility Sensor System

UT-B ID 200701985



Technology Summary

ORNL's real-time ion mobility sensor for detecting contaminants and explosives is reliable, sensitive, robust, and inexpensive. The technology improves sensitivity and reduces false alarms for threat agents, and can identify chemicals with a sensitivity of five parts per billion. Government agencies that could benefit from this invention include the Transportation Security Administration (trace explosives), the U.S. Coast Guard (drugs), and the military (chemical warfare agents).

The device solves problems of long-term monitoring by combining ion mobility spectrometry and differential mobility spectrometry with membrane separation. Current methods for long-term monitoring are complex, expensive, and time-consuming. Ion mobility spectrometry cannot identify chlorinated hydrocarbons, has high false alarm rates, and is vulnerable to interference. It is also easily affected by moisture, resulting in false alarms. Similarly, differential mobility spectrometry alone cannot monitor chlorinated hydrocarbons.

By coupling the two methods, ORNL researchers reduce false alarms, separate interferences from chlorinated hydrocarbons, and can successfully identify contaminants such as chlorinated hydrocarbons, perchlorates, and explosives. In brief, ion mobility spectrometry filters the safe species while differential mobility spectrometry separates the contaminants and explosives.

Advantages

- Micro-fabrication for compact size
- Ambient atmosphere for operation
- No vacuum
- Remote reporting and control
- Reducing false alarms

Potential Applications

- Monitoring air and drinking water
- Monitoring contaminants in soil
- Detecting indoor air contaminants
- Monitoring outdoor air at industrial facilities
- Detecting trace explosives, chlorinated hydrocarbons, and perchlorate

Patent

Jun Xu, David B. Watson, and William B. Whitten, *Ion Mobility Sensor System*, U.S. Patent Application 12/586,619, filed September 23, 2009.

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