



OPINION // Innovations in sensor detection technologies: Benefits of HF-QCM detection method in homeland security

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The inspection capabilities of homeland security operations can be significantly upgraded by utilizing the non-radioactive and proven HF-QCM detection method. HF-QCM offers a complementary or alternative detection method to traditional analytical chemistry instruments currently used in many homeland security inspection activities by providing important operational advantages in sensitivity, selectivity, durability and reliable field operations.

The new method utilizes a chemical sensor process called "High-Frequency Quartz Crystal Microbalance," or HF-QCM. The main advantage of HF-QCM as a detection method is the ability to determine the presence or absence of contaminants and related chemicals within seconds, even in field operations. The HF-QCM detection method also provides real-time analysis, quick recovery and exceptionally high sensitivity to a wide range of target substances. HF-QCM identifies current and future threatening substances by maintaining the unique ability to form an upgradeable database of materials and their detection algorithms.

Because of the ability to identify thousands of unique substances -- from chemical threats to food borne pathogens -- HF-QCM detection is an extremely useful method for identifying threatening substances that cannot be seen or smelled.

HF-QCM-based technology has recently been awarded bi-national research and development funding to support the creation of lab and field instruments for various inspection applications.

The application of HF-QCM requires minimal maintenance and training, which can result in operational cost savings compared to existing HPLC, GC-MS and IMS based instruments. The application of the HF-QCM detection methods can assist a wide range of homeland security activities and government agencies in strengthening surveillance and enforcement efforts. For example, HF-QCM-based detection can improve the response efforts of the President's recently formed Food Safety Working Group in case of widespread food contamination or disease endemic. Food safety and inspection personnel using HF-QCM detection methods can minimize public health threats and the economic damage on food production and distribution systems by providing immediate and accurate detection capabilities in the field at the outbreak of an attack.

Currently, applications of HF-QCM detection showing promise at different levels of the food safety and protection include the inspection of meat processing plants, dairy farms, storage

facilities and grocery stores monitoring for early detection of food borne illness outbreaks.

Further innovation for HF-QCM includes the integration of the detection method into handheld detectors with wireless and GPS transmission capabilities. The integration of these technologies would speed the coordination efforts between mission critical field operations and government command and control centers. The results will be increased overall public confidence and safety.

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