Science and Technology

TRANSPORTATION SECURITY & EXPLOSIVES CHARACTERIZATION

TRACE EXPLOSIVE DEPOSITION AND DETECTION VERIFICATION SYSTEM

METHODS AND DEVICES FOR DRY DEPOSITION OF TRACE EXPLOSIVE RESIDUES

Researchers at the U.S. Department of Homeland Security Transportation Security Laboratory have developed a trace explosive detection verification system leveraging methods to produce standardized solutions of authentic explosive compounds and devices to dispense residues of these compounds onto surfaces at known concentrations. The combined technology leverages specialized solvent systems that dissipate instantaneously upon being dispensed to prevent solvent-substrate interactions and enable more-versatile just-in-time preparations of dry explosive samples for testing. This system can be used to verify that explosive detection equipment is operating properly and to detect specific explosives that it is rated to detect. The DHS technology avoids time and labor associated with traditional dry transfer techniques and results in more-accurate test samples.

KEY BENEFITS

+ Faster sample preparation
+ Lower sample preparation costs
+ Improved sample accuracy
+ Specific explosive detection
+ Multi-substrate compatible

STAGE OF DEVELOPMENT

Prototype

PARTNERSHIP SOUGHT

License

INVENTORS

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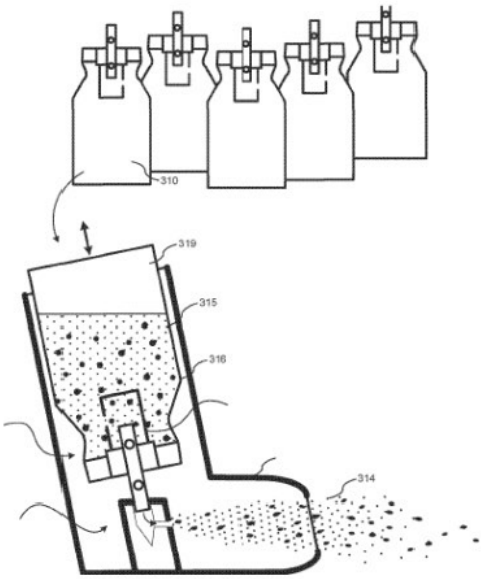
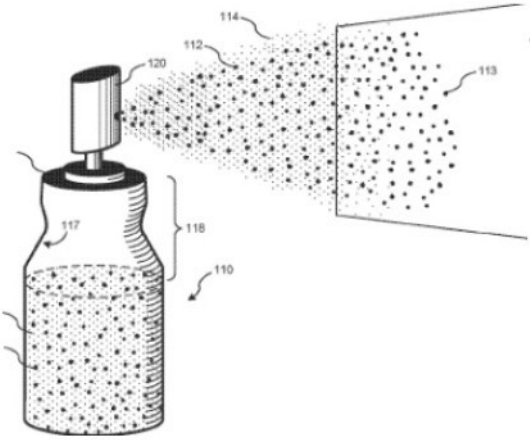
THE TECHNOLOGY

Explosive standards are created using propellants like hydrofluoroalkanes that are inert and have low boiling points. Standard solutions of threat materials (i.e., RDX, PETN, TNT) are stored in oxygen-free canisters. Delivery devices, such as pressurized metered dose inhalers and 3-D printed actuators, deposit specific quantities of explosive compounds on vendor sampling media. These devices enable just-in-time deposition of dry explosive residues allowing for high-throughput test samples. The trace explosive detection verification system uses these solutions and devices to ensure the explosives detection systems is operating properly.



System of interchange solution canisters and the metered dose inhaler for canister interchangeable Photo credit: USPTO Patent 11,402,365.



System of interchange solution canisters and the metered dose inhaler for canister interchangeable from figure 1 of US Patent 11,402,365.

APPLICATIONS

The technology has several potential end users:

+ **Explosive detection specialist training**
+ **Explosive detection canine training**
+ **Explosive detection equipment testing**
+ **Explosive detection system R&D**

PATENT INFORMATION

US Patent numbers 11,402,365 and 11,079,369

CONTACT INFORMATION

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TECHNOLOGY SOLUTION

FOR MORE INFORMATION ABOUT THE DHS TECHNOLOGY TRANSFER & COMMERCIALIZATION BRANCH:

https://www.dhs.gov/science-and-technology/technology-transfer-program