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Savannah River National Laboratory
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Benefits

- Increased ionization efficiency
- Expansion of capabilities for thermal ionization mass spectrometry
- Increased detection capability
- Could be fabricated into different filament shapes

Applications

- Mass spectrometry
- Thermal ionization
- Nuclear nonproliferation
- Environmental monitoring

Contact Information

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Graphene/Graphite-Based Filament for Thermal Ionization

Technology Overview

Savannah River National Laboratory (SRNL) has developed the use of graphene/graphite-based filaments for thermal ionization mass spectrometry (TIMS).

Description

Thermal ionization mass spectrometry (TIMS) is an analytical technique that sees widespread use in nuclear nonproliferation and environmental monitoring applications for the measurement and characteristics of actinide species. TIMS has one disadvantage–low ionization efficiency between 0.1- 5 % for most elements. If a TIMS filament is loaded with 100 ng of an element, the maximum ions generated would be 5 ng of that element. SRNL has researched different ionization efficiency approaches over the years. SRNL has recently studied different types of filament materials to increase TIMS ionization efficiency. Graphene/graphite-based filaments can reach temperatures in excess of 1,500 K, and the work function of such filaments is tunable. SRNL has demonstrated that graphene/graphite-based filaments can be loaded with collected environmental samples and produce ions by thermal ionization with such filaments.

Intellectual Property

This technology and methods for its use have been granted U.S. Patent No. 10,056,218 B2 (August 21, 2018), “Graphene/Graphite-Based Filament for Thermal Ionization” and is available for licensing.

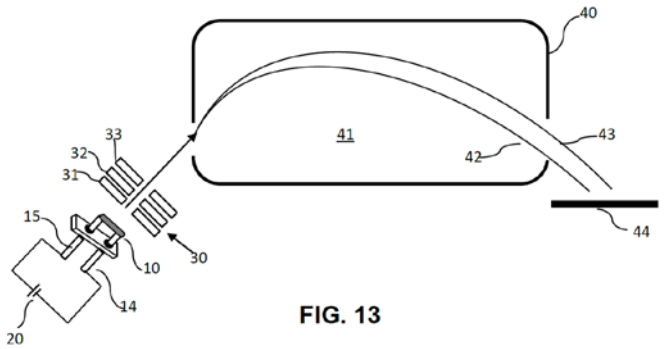

FIG. 13

Technology transfer

The Savannah River National Laboratory (SRNL) is the U.S. Department of Energy's (DOE) applied research and development laboratory at the Savannah River Site (SRS).

With its wide spectrum of expertise in areas such as homeland security, hydrogen technology, materials, sensors, and environmental science, SRNL's cutting edge technology delivers high dividends to its customers.

The management and operating contractor for SRNL is Battelle Savannah River Alliance, LLC. BSRA is responsible for transferring its technologies to the private sector so that these technologies may have the collateral benefit of enhancing U.S. economic competitiveness.

Partnering opportunities

SRNL invites interested companies with proven capabilities in this area of expertise to develop commercial applications for this process under a cooperative research and development agreement (CRADA) or licensing agreement. Interested companies will be requested to submit a business plan setting forth company qualifications, strategies, activities, and milestones for commercializing this invention. Qualifications should include past experience at bringing similar products to market, reasonable schedule for product launch, sufficient manufacturing capacity, established distribution networks, and evidence of sufficient financial resources for product development and launch.

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