

Hybrid Mass-Alpha Spectrometry for High Resolution Spectroscopy

Track Code: 2022-TALE-69717

Categories:

- Chemistry and Chemical Analysis

Keywords:

- Alpha radiation
- Background rejection
- Chemistry and Chemical Analysis
- Energy-Safeguards-Security
- High sensitivity
- High-resolution
- Neutron radiation
- Radiochemistry
- Spectrometry

Researchers at Purdue University have developed a new spectroscopic method for detecting trace amounts of alpha emitting radionuclides. Traditionally, detecting closely-spaced energetic alpha radiation-emitting isotopes at trace concentrations needing mass spectrometry has taken weeks. On the other hand, the Purdue hybrid technology rapidly and spectroscopically detects alpha radiation with ~100% sensitivity, less than 10 keV resolution, and an accuracy within 5% when evaluated against standards. This technology also maintains its sensitivity to weak alpha radiation in an intense field of gamma-beta radiation; the same apparatus also can be deployed for high-fidelity neutron spectroscopy.

Technology Validation: The Purdue researchers identified the ratio between two plutonium isotopes ranging from 1:0 to 0:1 to an accuracy within 12% and under 10 keV energy resolution.

Advantages

- accurate
- high-energy resolution and sensitivity
- alpha and neutron radiation detection
- 100% background gamma-beta rejection
- rapid (<1 hr)

Applications

- spectroscopic detection of alpha and neutron radiation

People:

- Taleyarkhan, Rusi P (Project leader)

Intellectual Property:

Application Date: January 20, 2022

Type: Provisional-Gov. Funding

Country of Filing: United States

Patent Number: (None)

Issue Date: (None)

Contact OTC:

Purdue Office of Technology Commercialization

The Convergence Center

101 Foundry Drive, Suite 2500

West Lafayette, IN 47906

Phone: (765) 588-3475

Fax: (765) 463-3486

Email: otcip@prf.org