

Development of a Field Portable Ar-37 Monitoring Capability

Since ^{37}Ar is produced in significant quantities when neutrons from a nuclear explosion activate calcium in the ground, measurements of ^{37}Ar are among the most important made for nuclear explosion monitoring applications, including on-site inspections (OSI) under the Comprehensive Nuclear-Test-Ban Treaty (CTBT). Measurement of ^{37}Ar is also among the more difficult measurements to make in field conditions for a number of reasons, such as the need for portability and ease of operation, the difficulty in the separation of bulk argon from air, and the difficulty in measuring the low energy decay Auger electron. In addition, the throughput and detection sensitivity of an effective field portable ^{37}Ar collection and measurement system must meet the needs of the nuclear explosion monitoring community. After decades of experience with the sensitive collection and measurement of noble gases for nuclear explosion monitoring, and more recently the sensitive measurement of ^{37}Ar in a laboratory environment, PNNL is developing an ^{37}Ar field system that could be used for applications such as CTBT OSI. This presentation will explain the basic operating principles of the U.S. system, as well

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