

T2.1-O4. Latest Development on MARDS — An Argon-37 Detection System

For On-Site Inspection under the Comprehensive Nuclear Test Ban Treaty, measurement of Argon-37 is considered an important technique, as it is a definitive and unambiguous indicator of an underground nuclear explosion. A new Argon-37 detection system for OSI purposes named MARDS-II was developed by the Institute of Nuclear Physics and Chemistry in 2013, on the basis of the MARDS-IA system and lessons learnt from its field deployment in the IFE08 and NG09. The new system was designed to have the capability of separating Argon from 400 liters gas sample at room temperature without liquid nitrogen as coolant. The system uses a new optimized modular and automatic design for simplified field deployment. The system is capable of processing four samples per day. The MARDS-II was deployed in the IFE14 and fully operated by the trained surrogate inspector. During the exercise, about ten samples were processed by the MARDS system and in one sample Argon-37 300mBq/m³ in radioactivity concentration was detected. Meanwhile fruitful lessons were learnt from the exercise, which could take as the input for further development, such as state of health monitoring, Argon-37 background investigation, and strategies on the deployment of noble gas system in the OSI.

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