

Technical Meeting on Nuclear Forensics: From National Foundations to Global Impact

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Investigation of the lanthanites pattern for uranium attribution in nuclear forensics environment

Illicit trafficking of nuclear material has been a subject of concern since the first seizures of nuclear material were reported to the International Atomic Energy Agency in the beginning of the 1990s. In South Africa cases of illegal trafficking of nuclear materials has been reported to the South African Police Services (SAPS). The aim of this study was to determine whether the lanthanides patterns measured in a particular sample can be used to attribute the uranium sample to the production or reprocessing plant. In this work, twenty samples selected for investigation originate from South Africa and Namibia uranium mines. Measurements were carried out using an inductively coupled plasma mass spectrometer (ICP-MS) PerkinElmer NexION 2000. Both measured results from different mines show significant variation within mine and thus provide valuable information about the geochemical formation and origin. This finding can be used to link the seized sample to particular reprocessing plant making possible for the authorities to narrow their search to the origin of the sample.

Primary author: Mr KUPI, Tebogo (North-West University)

Co-authors: Prof. MATHUTHU, Manny (North-West University); Dr UUSHONA, Vera (North-West University)

Presenter: Mr KUPI, Tebogo (North-West University)

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