

During the last decade the BNLNF has participated in several international nuclear forensics exercises.

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**THE USE OF LASER ABLATION SECTOR FIELD INDUCTIVELY COUPLED PLASMA MASS SPECTROMETRY FOR SWIPE SAMPLES ANALYSIS: A VIEWPOINT FROM SAFEGUARD AND NUCLEAR FORENSICS**

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This work describes the utilization of laser ablation sector field inductively coupled plasma mass spectrometry (LA-SF-ICP-MS) for determining uranium isotopic composition in a simulated swipe sample by deposition of  $U_3O_8$  powder with natural enrichment level. This method is useful to measure  $^{234}U/^{238}U$  and  $^{235}U/^{238}U$  isotopic ratios. The measurements were performed on a continuous ablation with low energy density and defocusing, which improved the signal stability, in a cluster of uranium particles. Optimization of measurements was achieved by adjusting the following parameters: RF power, laser beam diameter, defocusing of laser beam, laser energy, laser energy-density, auxiliary gas and sample gas. The  $^{235}U/^{238}U$  isotope ratio was  $0.00719 \pm 0.00020$  and its precision was 1.2 % RSD (relative standard deviation). Uncertainties were estimated following the International Organization for Standardization – Guide to the Expression of Uncertainty in Measurement (ISO – GUM), with a confidence level of 95.45% ( $k = 2.00$ ). The results indicate that the Laser Ablation ICP-MS technique offers a rapid and accurate alternative for the measurement of uranium isotope ratios in uranium particle. The technique has the added advantage of allowing measurements straight on the sample (without further preparation), preserving the testimony which is very important for safeguards and nuclear forensics purposes.

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