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Rapid determination of U-236 in the soil contaminated by the fukushima daiichi nuclear power plant accident using single extraction chromatography combined with triple-quadrupole inductively coupled plasma-mass spectrometry

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Method Development for 236U in Soil

Based on use of the new generation of triple-quadrupole ICP-MS (ICP-MS/MS), a novel technique for measuring ^{236U} activities and $^{236}U/^{238}U$ ratios in soil has been developed. This simple method incoporated two procedures: a total dissolution with HF + HNO_3 + HClO4 followed by single DGA chromatographic separation (Figure 1). The analytical accuracy and precision of $^{236}U/^{238U}$ ratios, measured as $^{236}U^{16}O+/^{238}U^{16}O+$, were validated by using the reference materials IAEA-135, IAEA-385, IAEA-447, and JSAC 0471[1].

U Isotope in the Soil Contaminated by the FDNPP Accident

For 46 soil samples lightly and heavily contaminated as ^{134}Cs by the FDNPP accident, the $^{236}U/^{238}U$ isotopic ratio ((0.99–13.5)×10-8) was comparable with those of global fallout values found in surface soil in Japan [2, 3], indicating the release of radioactive U from the FDNPP accident was a trace amount.

References

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[2]Sakaguchi *et al. (2009) Sci. Total Environ.* 407, 4238–4242.

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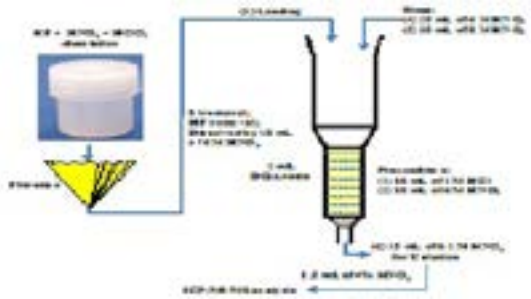

Biography

Guosheng Yang obtained his PhD from Institute of Chinese Academy of Sciences (CAS) in 2012. After working in the National Institutes for Quantum and Radiological Science and Technology, Japan (2012-2014) and CAS, China (2014-2015), he is working in the Institute of Radiation Emergency Medicine, Hirosaki University, Japan mainly to develop novel mass-spectrometric methods to measure trace radioisotopes (^{135}Cs, ^{236}U, ^{129}I, ^{90}Sr, Pu isotopes).

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