福島県土壌試料における高精度ウラン同位体比測定
Uranium isotope ratio in Fukushima soil samples

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There were huge amounts of radionuclides such as fission products released into atmosphere due to accident of Fukushima Daiichi nuclear power plant (FDNPP). A few studies have been reported about actinide elements released from FDNPP accident as fingerprint of isotope ratio using accelerator mass spectrometry (AMS). Levels of actinides were at much less concentration than ^{134}Cs, ^{137}Cs and ^{90}Sr. However, we need to consider the influence of alpha ray particles on a long-term contamination in environment. We have focused on 236U isotope, and its measurement using a thermal ionization mass spectrometry (TIMS), which may be used as an index of a nuclear accident. We measured highly precise uranium isotope ratios in the soil samples from Fukushima prefecture with high Cs concentration using Isotopx Ltd. Phoenix TIMS.
We also measured Kobe and Okinawa soil samples before the accident as Global Fallout and geological standard sample as JSd-2 and NIST 4350b. Chernobyl and Kosovo samples were measured to notice artificial radioactive materials.
Soil samples were decomposed by a microwave (ETHOS one) digestion method with mixed acids after ashing. Uranium fraction from the dissolved sample was chemically separated by UTEVA-UTEVA resin chromatography to minimize interferences of Fe and Pb prior to isotope ratio measurement using TIMS and MC-ICP-MS.
Results of ^{235}U/^{238}U and ^{234}U/^{238}U ratio by TIMS and MC-ICP-MS couldn't reveal any significant difference between Fukushima soil samples and Global Fallout samples.
^{236}U/^{238}U detection limit of TIMS were considered by a standard solution from U ore and could be considered that was not under the influence of Global Fallout. We could measure ^{236}U/^{238}U ratio in U ore samples from 10^{-10}~1.5×10^{-9} range. The yield for JSd-2 and NIST 4350b were noticed to be $4.2\text{-}7.8\times10^{-8}$ and Kobe and Okinawa as an index of global atomic fallout were $6.5\text{-}9.8\times10^{-9}$. The detailed results will be presented.

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