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Accelerator mass spectrometry of uranium: comparison of U_3O_8 and UF_4 target matrices

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For determination of $^{236}U/^{238}U$ ratios in environmental samples by accelerator mass spectrometry, the U_3O_8 targets are usually used for the UO_2 beam production. Uranium fluoride targets containing no oxygen and hydrogen may offer higher molecular isobar suppression together with a higher accuracy and sensitivity of uranium isotope analysis¹. However, the preparation of anhydrous UF_4 targets is more complicated than the preparation of U_3O_8 targets. When introducing inert atmosphere into the dehydration step of the preparation the only partial reduction of oxygen and hydrogen content in the final product of the preparation method was assured. In this work, several U_3O_8 and UF_4 targets were tested in the CENTA laboratory using the MC-SNICS ion source and double focusing injection magnet and the targets were prepared using the Vienna KGU standard with $^{236}U/^{238}U$ isotopic ratio of 10^{-11} . The detailed study of anhydrous UF_4 preparation method will be performed in CTU laboratories. The ion current from only one UF_2 sample was in average higher by about 50 % than the UO_2 current from the U_3O_8 samples. The targets were completely sputtered away, and the estimated ionization yields of UO_2 and UF_2 were of the order of 10^{-3} . However, with the improved procedure of the UF_4 targets production, we expect that even higher ionization yields could be obtained.

REFERENCES

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