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Analysis of 234U/238U Ratio by ICP-MS

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ICP - MS method has been used for analyses [1] of the elemental and isotope composition (64 elements) of bones of dinosaurs, South mammoths, prehistoric bear and archanthropus as well as the samples of surrounding soils; everything collected in different parts of Uzbekistan. A high concentration of uranium we detected in the bones of dinosaurs (122mg/kg), South mammoth (220mg/kg), prehistoric bear (24mg/kg) and archanthropus (1.5mg/kg) compared to surrounding soils (3.7-7.8 mg/kg) and standard bones (<0.01mg/kg) was established. The standart ratio ${}^{235}U/{}^{238}U = 0.007$ was detected for all samples. It was also observed that the ${}^{234}U/{}^{238}U$ ratio (Table) differ from ${}^{234}U/{}^{238}U = 5.4 \times 10^{-5}$ secular equilibrium value. In this report the various mechanisms responsible for this difference are discussed.

Table. Data on uranium isotope ratios, detected by ICP - MS with 1 - SD errors in prehistoric bones, standard bone, and soils collected around these bones.

Sample	$^{234}U/^{238}U \times 10^{-5}$	$^{235}U/^{238}U \times 10^{-3}$
MB1	16.0±0.6	7.4±0.2
SMB1	11±1	7.5±0.2
MB2	9.5±0.2	7.5±0.2
SMB2	8.4±0.4	7.6±0.2
BA	8.1±0.2	7.2±0.2
BB	7.7±0.3	7.4±0.2
DB	7.1±0.4	7.2±0.2
SDB	7.2±0.3	7.5±0.2
STB	7.2±0.5	7.5±0.2
SSTB	10.6±0.3	7.4±0.2

MB1& & SMB1 –South mammoth bone found in Angren and soil collected near this bone respectively; MB2& SMB2 - South mammoth bone found in Kashkadari and soil collected near this bone respectively; BA-arhantrope bone; BB –bone of bear from Selungur cave; DB& SDB –Dinosaur bone and soil collected near this bone respectively; STB & SSTB –standard bone and soil collected near the standard bone. The natural abundance ratio of the isotopes ${}^{235}U/{}^{238}U$ is 0.007257, secular equilibrium ratio ${}^{234}U/{}^{238}U$ is 5.4×10^{-5} .

[1] I.N. Izosimov, et al., Czech Chemical Society Symposium Series, 20, 116(2022).

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