

Based on the data of the present work, it is possible to suggest the following order of the stability fluoride complexes of group IV and V elements: Nb (Pa) > Zr > Hf > Ta. The order of the complex formation is in agreement with theoretical predictions. Moreover, the radiochemical technique for the coprecipitation of group IV elements and Pa with LaF₃ followed by the anion exchange separation of Nb and Ta was developed.

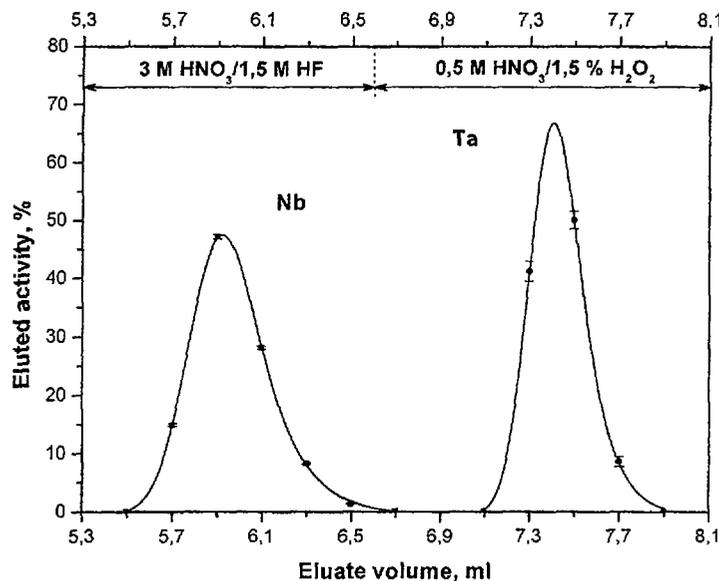


Fig. 3. Separation of Nb and Ta by anion exchange. (Dowex 1x8, 200-400 mesh, 6x10 mm)

This analytical procedure may be used in future heavy nuclei synthesis experiments for the separation of dubnium (Db) from other reactions products and for the study of its chemical properties.



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SCANDIUM – PROBLEM OF ULTRA-TRACE-ELEMENT ESSENTIALITY

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Role of constitutional and essential elements in Life is known quite well. It is also well known that all chemical elements present in the living matter. Nevertheless essentiality of at least 55 chemical elements (more than a half of number of natural elements) is still not accepted. In many cases these elements presumably play important role in the Life. On the other hand their essentiality is still under doubt. One of the "strange" elements in this connection is scandium.

Scandium is an element which is very "simple" for instrumental neutron activation analysis (INAA). For many years in our laboratory were carried out studies on animals and human tissues and fluids elemental composition using INAA in which data for scandium were obtained as "redundant" information.



Essentiality of scandium was newer proven using accepted criteria of elements. Nevertheless in our studies were found various regularities, statistically significant inter-elemental correlations and correlations between elements in tissues and fluids versus clinic and biochemical data. There are some examples. There were found correlations of scandium hair concentration and blood glucose ($r=0.68 \pm 0.13$), body mass index ($r=0.86 \pm 0.07$), leukocyte with phagocytic activity migration inhibition test ($r=0.68 \pm 0.18$), size of cavity of the left heart auricle ($r=-0.65 \pm 0.16$), final systolic bulk ($r=0.80 \pm 0.12$), stroke output of heart ($r=-0.79 \pm 0.12$), final diastolic bulk (0.88 ± 0.0080) etc. In addition using gel filtration in rat liver cytosol was found peak of scandium in elution curve.

Examples and correlations given in the paper say in favor that scandium may play quite important role in biological processes and that the biological role of scandium should be studied more intensive.

The most important criterion is an appearance of the organism dysfunction in case of removal of the studied elements from the diet (intake) which in all other sides remains completely valuable and disappearance of all manifestations of the dysfunction after addition of deficient element. This is very convincing criterion but hardly acceptable for ultra trace elements as follows from the model given in the present paper. It is very simple to prepare diet with decreased level for constitutional essential and some trace-elements according to this criterion. It is enough to reduce some constitutional elements uptake for 50% to observe the organism dysfunction. For such trace elements like Mn, Cu, Zn it is enough to reduce its intake 1.5 – 5 times to reach the same effect. For Sc the factor of removal for humans should be about 500-1000. It is clear that preparation of nutrition which removal of ultra-trace elements with a purification factor of hundreds and thousands is practically impossible and there is a necessity to elaborate additional criteria for ultra-trace elements.



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GAMMA-RADIATION OF SOME BUILDING MATERIALS

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Introduction. In environment samples both natural, and artificial radionuclides can be found out. However the population of Globe receives the basic part of irradiation from natural radioactive elements [1]. Radioactive elements in organism can pass a biological chain: ground-water-air-plant-food products-persons and can become a sources of internal irradiation. Accumulation of radioactive elements in tissues of alive organisms in quantities more than limiting admissible concentration can cause in an organism pathological processes, in the form of malignant formations and other changes.

For many years radioactivity of environments are researched in the Department of nuclear physics of Samarkand State University. Such researches have begun by the founder of the Samarkand school of nuclear physics, professor Muso Muminovich Muminov. This direction of science at the radiating control and protection from radioactive radiations are actual problem for all mankind for present today. The researches proceed pupils Muso Muminov with application of modern experimental techniques [2-3]. The semi-conductor gamma-spectrometer method of definition of small quantities natural and artificial radionuclides in samples of an environment on