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First experiments on the spontaneous fission of Pb have been performed in 1947 simultaneously with the measurements of the spontaneous fission half-life of thorium using the technique of multilayer ionization chambers which was the most developed one for that time/1/.

In these experiments single pulses per long time intervals were registered in chambers loaded with Pb ; their origin, however, was not established unambiguously and one may only conclude that the spontaneous fission half-life of Pb ($T_{1/2} = 10^{19}$ years) is at least by a factor of 10^3 longer than that of uranium. Later on, the application of proportional counters improved considerably the sensitivity and the reliability of such measurements and it allowed to set a new lower limit of thorium spontaneous fission $T_{1/2} \geq 10^{21}$ years/2/. Thus spontaneous fission half-life for Pb could be quite naturally supposed to be many orders of magnitude longer than that for thorium and therefore experiments on search for Pb spontaneous fission were not performed.

At the moment, however, new circumstances force us to turn to the problem of Pb spontaneous fission again.

For the last years some theoretical papers have been published in which the existence of rather stable nuclei in the region of closed shells of protons ($Z = 114$) and neutrons ($N = 184$) was predicted/3-7/. These nuclei would have a form close to a spherical one; according to these calculations, their potential barrier against spontaneous fission has a complicated configuration and extends 10 MeV. Hence the half-lives of these nuclei against spontaneous fission may reach 10^{10} years [7].

These predictions were supported in Fowler et al. experiments on the investigation of the composition of a very heavy component of cosmic rays [8]. These indicated that in the spectrum of the primary cosmic radiation there are particles producing an ionization which corresponds to a nucleus with $Z \approx 106$. The low limit of a lifetime for such nuclei is determined, apparently, by the age of a primary cosmic radiation of 10^6-10^8 years. Since the formation of elements incorporated into material of planets of solar system occured in processes analogous to these of the primary cosmic radiation generating, one cannot now exclude the hypothesis about the presence of primary transuranium elements in the rock material of the Earth, among which element with $Z=114$ is proposed to be the most stable one against spontaneous fission. The study of chemical properties of a recently discovered element 104-kurchatovium indicated that element 103 is a closing one in the actinide family and that kurchatovium is a chemical analogue of hafnium [9]. Hence due to the Mendeleev periodic law regularities element 114 has chemical properties similar to those of lead.

Due to the above the experiments on the search for the spontaneous fission effect in lead with the use of dielectric particle detectors seem to be advisable [10,11].

In the first experiments layers of metallic Pb with an area of 1 m^2, were placed in contact with Mylar foil and then exposed for 100 days at a depth of 40 meters underground to reduce possible background due to fission of Pb by cosmic particles [12]. Seven events of nuclear fission were recorded in this experiments. In scanning the Mylar foil area twice as large ("background experiment") only two tracks were found.

According to these data a seemed spontaneous fission half-life of Pb was found to be equal to $T_{1/2}=(2+1)\times10^{21}$ years. It should be noted that the uranium content in Pb was found to be equal to 2.10^{-9} g/g and, subsequently, it could cause not more than 10^{-4} part of the effect being observed.

Since the experiments with Pb foils needed too much time and efforts ,we had to turn to samples in which fission of nuclei being contained in Pb has been recorded for a long time. First, glass which has been contacting with metallic Pb for many years, second, glass containing Pb compounds in its composition may serve as such samples. In scanning 10 cm^2 of a stained-glass panel of XIV century being in contact with Pb and 80 cm^2 of glass surface of Leiden cup with Pb covering which has been made at the end of the XIX century no one fragment track was found. This result provides us with a lower limit of the spontaneous fission half-life for lead $T_{1/2} \geq 2.10^{22}$ years for the XIV century stained-glass panel and $T_{1/2} \geq 10^{22}$ years for the Leiden cup.

It may be pointed out for comparison that the effect of fission of thorium nuclei by cosmic rays at sea-level results in the seemed low limit of a thorium spontaneous fission half-life of 1.5×10^{19} years/1/. The absence of fragment tracks on the glass detectors being in contact with Pb , probably, provides evidence to the fact that the effect of the Pb nuclear fission induced by cosmic rays is extremely small.

Another series of experiments was undertaken with glass containing Pb , consecutive etching was used to reveal the fission fragment tracks in the glass volume. Every time in etching a glass layer up to 20 m thick was removed. Special check experiments indicated that the fragment tracks strongly differ from occasional defects of glass.

In the experiments with Pb glass prepared in 1958 (Pb concentration being about 40%) in the glass volume of about 0.7 cm^3 27 tracks of fission fragments were registered. The effect observed corresponds to the seemed spontaneous fission half-life contained in glass $T_{1/2} = (2 \pm 0.7) \times 10^{20}$ years for lead.

In the experiments with a cut-glass vase made at the end of the XVIII century (Pb concentration ≈ 10%) in the volume of 0.27cm^3.

there were detected 31 fission fragment tracks, which correspond to the seemed spontaneous fission half-life $T_{1/2} = (3 \pm 1) \times 10^{20}$ years for lead. Note, that the contribution of fission of thorium contained in glass by cosmic rays is negligibly small. According to the data from ref.2 the thorium concentration on the level 1% by weight is dangerous. The check experiments on fission of nuclei contained in the lead glass with 14 MeV neutrons indicated that the thorium content in both speciments does not exceed 10^{-5} g/g. The background caused by the spontaneous fission of uranium contained in the lead glass (less than 10^{-7} g/g) could not exceed 3% of the effect being observed.

Thus, in the experiments with the lead glass and Pb foil placed in contact with Mylar foil nuclear fission effect was registered which cannot be caused neither by the spontaneous fission of uranium contained in these samples nor by fission of thorium with cosmic rays.

The results obtained in experiments with the lead glass could not be apparently caused by the background due to fission of Pb nuclei by cosmic rays. The absence of the effect in some samples investigated as well as the extrapolation of the experimental data on the determination of fission probability of bismuth and thorium nuclei by cosmic rays at a height of about 4km support this conclusion/12/ However, because of the absence of experimental data on fission of lead by cosmic rays at sea-level this effect could not be completely excluded at present.

The analysis of the experimental data on spontaneous fission half-lives available at the moment indicates that the spontaneous fission of lead isotopes cannot cause the effect being supervised. However, one cannot completely exclude the possible effect of the spontaneous fission of the deformation isomer/13, 14/ one of Pb isotopes with a half-life of more than 10^8 years and being contained in Pb from the moment of formation of solar system. But the cases of the deformation isomer formation after the beta-decay of nuclei have not been observed as yet. The probability of appearance of such great deformations after the series of nuclear beta-decays seems to be very small.

Another possible explanation of the effect observed is connected with the assumption of existence of a very heavy element chemically analogous to lead or of an element accompanying lead with a half-life more than 10^8 years which is contained in samples in a very small amount of 10^{-12}-10^{-13}g/g.

The difference between the effects observed on the lead glass and on the detectors contacted with metallic lead may be caused by the distinction in chemical technology at the production of metallic lead and its compound introduced into the glass during preparation.

Further on, simultaneously with the treatment and scanning of new samples of Pb glass it is useful to search for the spontaneous fission effect in lead minerals which have been protected from cosmic ray radiation by thick rocks' layers and whose geological age is of the order of tens of million years.

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