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INVESTIGATION OF PLUTONIUM NITRIC ACID SOLUTIONS WITH UNKNOWN ISOTOPIC COMPOSITION BY ALPHA AND GAMMA SPECTROSCOPY

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In the laboratory for the reprocessing of spent nuclear fuel (SNF, Radium Institute) a solutions of ^{238}Pu - ^{239}Pu with unknown concentration and relation of nuclides were studied. The research was carried out both on the laboratory equipment and the equipment of the metrological service of the Radium Institute. For alpha spectroscopy we used an ionization chamber and a PIPS detector, for gamma spectroscopy NaI and HPGe detectors were used. At last to compare the results we carried a gravimetric analysis.

This study allowed us to make sure that in the solution of ^{238}Pu - ^{239}Pu also ^{240}Pu and ^{241}Am present in valuable quantities. The relative concentration for each isotope was calculated twice: by alpha-particle spectroscopy (the fitting of experimental alpha-particle spectra was done with Gaussian and two left-sided tails peak shape) and with HPGe gamma measurements. The measurement results correspond to each other with a good agreement.

Also the metrological service suggests a number of recommendations about the preparation of counting samples in the SNF laboratory.

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