

MULTIPARAMETRIC REGISTRATION SYSTEMS IN RADIOCHEMISTRY

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This paper discusses aspects of the application of multiparametric ionizing radiation detection systems (MPSR) for the analysis of the composition of liquid radiochemical samples. Liquid active samples may occur, for example, in experiments or production processes of hydrometallurgy or activation analysis.

Currently, MPSR are not widely used in radiochemistry, but such systems are successfully applied in nuclear physics, high-energy physics, biology, medicine. This is due not only to the high cost of such systems, but also for historical reasons. According to the authors, using of MPSR is becoming relevant for online monitoring at hydrometallurgical plants of a new generation, in experiments on radiochemical stands, activation analysis. By MPSR we mean multi-detector registration systems in which signals coming from detectors are either continuously recorded on a data carrier and/or processed online. An important feature of such systems is the availability of temporary information. Devices called digitizers have become widespread for such systems, which record the signal coming from the detectors in the form of a continuous time series to the storage device, then processed offline. Another common method is to work in "list mode" for each channel, when the signal is pre-processed by classical methods of nuclear electronics and then only the signal amplitude and timestamp are recorded. In both cases, the signal can be represented as a set of amplitude spectra, as well as various coincidences. The paper proposes to use for these purposes the following set of scintillation detectors: beta-, two gamma-, X-ray detector, as well as an immersion silicon alpha detector. Mathematical data processing is supposed to be supplemented by digital filters. The paper discusses the decay schemes of various radionuclides, appropriate choice of detectors, the choice of methods of registration and mathematical processing. The exposure times estimated in trial experiments.

The speaker is a student or young scientist

No

Section

1. Applications of nuclear methods in science and technology

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