

RAPID COUNTING SOURCE PREPARATION METHOD FOR ALPHA SPECTROMETRY

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In-vitro radiobioassays are used to assess the internal radiological exposure to a worker's biological systems. The goal of a radiobioassay procedure is to quantify any radioactivity present in a given sample. Urine samples are collected from individuals and chemically separated for different radioactive elements. The final step of the procedure is the measurement of radioactivity. In many cases, this is done by preparing a counting source for alpha spectrometry, which can be done in several ways. The method currently used in the Oak Ridge Radiobioassay Laboratory is to electroplate the final fraction of the sample for a specific actinide onto a stainless steel disk. However, this is time consuming because the samples must first be ashed down and reconstituted in a given matrix and then electroplated over a length of time. Another widely used method is microprecipitation of the radioactive elements with fluoride. This approach has the advantages of a quick turnaround time and applicability to a wide range of radioactive elements with little to no modifications needed. However, it calls for the regular use of hydrofluoric acid. In this study, we began looking for an alternative method to produce the precipitate without the use of fluorides. In our approach, we prepared the source by precipitating the nuclide as a hydroxide with a neodymium carrier added.

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