PRECONCENTRATION OF URANIUM AND THORIUM BY CHELATEFORMING SORBENTS IN VARIOUS ENVIRONMENTAL OBJECTS

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The problem of determination in water of small amounts of toxic ions, radioactive metals belonging to one of the most environmentally hazardous pollutants, is still relevant for environmental monitoring. Despite the great success of modern instrumentation, there remains a need pre-concentration. The main methods for this are the sorption. The need to develop highly selective methods for the isolation and separation of radioactive elements is associated with the growing interest in methods for their determination both in technological solutions for the processing of environmental objects. The most dangerous are long-lived thorium and uranium radionuclides, which can be contained in various environmental objects, waste and technological solutions. To determine and isolate thorium from natural and industrial objects by preconcentration, natural and synthetic sorbents are often used. Currently, chelating sorbents are mainly used as a synthetic sorbent for preconcentration and determination of thorium and uranium. In this paper, we discuss the results of studies on the extraction and concentration of trace uranium and thorium by chelateforming polymer sorbent with the amine fragments. Solution of uranium and thorium, prepared by dissolving accurately weighed their salts in distilled water. Work solutions were prepared by dissolving of initial solution. For making of needed acidity we used phycsanal HCl, NaOH and ammonium-acetate buffer solution. To create a constant ionic force, we used KCl. We applied a new polymer chelateforming sorbent with amine fragments. pH of solutions we measured by ionometr PHS-25 with glass electrod. Concentrations of solutions were measured using photometric method. Investigated the dependence sorption capacity from the acidity of the solution. Sorption of uranium and thorium was made of the volume of 25 ml. The sorption capacity is maximal at pH 4–6. The sorption capacity of the sorbent increases with increasing of concentration of uranium and thorium in solution and the sorption capacity is maximal when concentration of metals equals to $6 \cdot 10^{-3}$ mol/l. It is known that the ionic strength of the solution affects the flexibility of solid-state matrix and functional groups of the analytical reagent. Therefore, studied the dependence of analytical signal on the concentration of KCl solution in the range of 0,1–1,2 M. Noted the negative effect of increasing ionic strength on the properties of the sorbent, which is explained by shielding of the coordination-active groups of ions of the electrolyte. All further experiments were carried out in solutions with ionic strength 0.8 (KCl). Sorption equilibrium is reached within 2.5 hour of contact solution with the sorbent. The influence of some mineral acids and their concentrations on desorption of uranium and thorium from the sorbent was studied. The experiment shows that the maximal desorption of uranium and thorium goes on in $HClO_4$. The technique apply to determine of uranium and thorium In the waste waters.