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BOOK OF ABSTRACTS

IN 7 VOLUMES

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of D.I. Mendeleev and the 300th anniversary
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IMMOBILIZATION OF ANIONIC FORMS OF LONG-LIVED RADIONUCLIDES IN RADIOACTIVE WASTE REPOSITORY

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In modern nuclear energy, the problem of radioactive waste management (RW) is acute. In accordance with the strategy of the Rosatom State Corporation, it is planned to create an underground repository for final disposal[1]. During construction, it is planned to use bentonite clays as an engineering barrier material, which have high sorption characteristics with respect to the cationic forms of the main radionuclides that make up the radioactive waste. However, this material is not able to confine the anionic forms of long-lived radionuclides, such as ^{79}Se and ^{99}Tc. It is proposed to use sulfide minerals as a sorbent for the immobilization of selenium[2] and technetium[3] by reducing them to low soluble forms

The purpose of this work was to study the sorption characteristics of various sulfide minerals toward selenite ions and pertechnetate ions in aqueous solutions.

The following sulfide minerals were selected as the studied materials: chalcopyrite, sphalerite, stibnite, pyrite, bornite, cinnabar, pyrrhotite, galena, marcasite, orpiment, molybdenum and pentlandite. It was found that stibnite, bornite, pyrrhotite, marcasite and pentlandite have the best sorption characteristics toward selenite ion, and stibnite, marcasite, auripigment and pentlandite toward pertenechate ion. When these minerals were added to bentonite clays and subsequent sorption of selenium and technetium from solutions of model waters, kinetic dependences of sorption processes under oxygen and oxygen-free conditions were established. It has been shown that stibnite is best suited for the immobilization of both ions, namely the selenite ion and the pertechnetate ion in the conditions of a radioactive waste storage.

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2. Naveau A. et al. *Environmental science & technology*, 2007, 41, 15, 5376.
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