PA4-3 PERTECNETATE SORPTION ON SULPHIDE MINERALS

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Technetium behavior in the environment is a relevant research topic due to its quite high solubility in the heptavalent form as well as long half-life period. To date, the main problems of technetium pollution in aquifers in Russia are listed in [1] and in the United States in [2]. Experimental studies investigating Tc behavior in the presence of some minerals and soils are of a great importance. One of the known immobilization mechanisms is the reduction by means of minerals containing sulfur [3], iron [4] and other metals. Moreover, the technetium immobilization is possible due to the activity of microorganisms such as sulfate-reducing bacteria, which form sulfide minerals.

The purpose of this work is to study the sorption properties of a large number of various sulfide minerals, including biogenic ones in both aerobic and anaerobic conditions as well as to evaluate the main mechanisms of technetium immobilization.

The results of the study will be used in geochemical models devoted to evaluate pertechnetate migration through polluted areas of aquifers along with the creation of promising materials for inclusion into immobilization barriers.

The adsorption experiments on various natural minerals and rocks such as: chalcopyrite, sphalerite, stibnite, bismuthin, bornite, cinnabar, pyrrhotite, pyrite, scutterudite, marcasite, orpiment, celestine, ZnS, PbS and biogenic sulfide were performed.

The study of samples sorption parameters revealed that stibnite, marcasite, sphalerite and orpiment possess the highest sorption capacity among others.

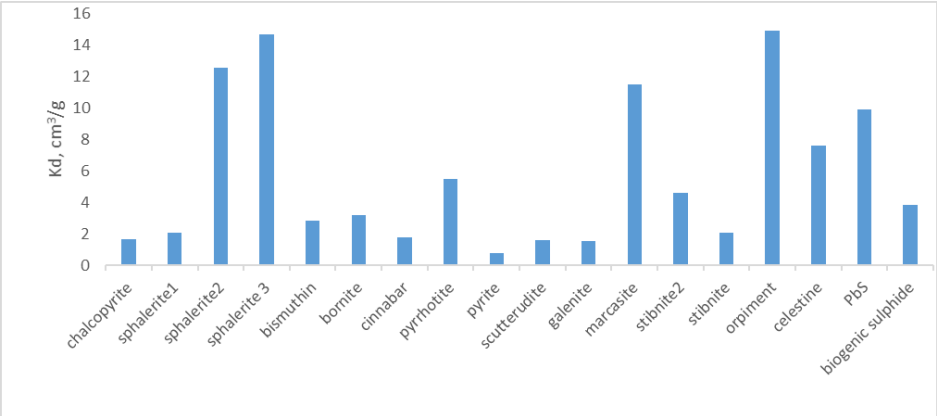

Fig1. Sorption capacity of sulphide minerals for pertechnetate ion

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This work is supported by RFBR project 19-03-00617