



APPLICATION OF VERMICULITE AND ZEOLITE ADDITIVES TO IMPROVE THE SORPTION PROPERTIES OF BENTONITE CLAY

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Long term safe disposal of radioactive waste is achieved by creating a multi-barrier approach.¹ Clays with good waterproof properties and high sorption capacity can be used in a construction of protective barriers. Clays containing montmorillonite are considered to be the most promising materials for this purpose.² In this study the sorption capacity towards Sr-90 and Np-237 by bentonite clay of the Saraybashskoe deposit was investigated.

The strontium sorption degree on the studied clay was sufficiently high – 85–90%, which corresponds to $(1,5-3) \cdot 10^2 \text{ cm}^3/\text{g}$ of distribution coefficient values. At the same time significant part of sorbed strontium was fixed in mobile (water-soluble and ion-exchange) forms. In order to increase the content of firmly fixed forms of Sr-90, the clay of the Saraybashskoe deposit with zeolite additive is proposed to be used.

Neptunium sorption on the studied clay was less effective than strontium and was equal to 50–60% and distribution coefficient value was $(2-3,5) \cdot 10 \text{ cm}^3/\text{g}$. As compared with Sr-90, the sorbed Np-237 had lower content of mobile forms. However, the content of firmly fixed forms on the clay wasn't sufficient as well. The efficient sorption capacity and high retention can be achieved by using the clay of the Saraybashskoe deposit with zeolite and vermiculite additives.

References

1. Igin I.M. et al. *Radioactive waste*, 2022, **3** (20), 50–60.
2. Pavlov D.I., Ilina O.A. *Radioactive waste*, 2020, **3** (12), 54–65.