**INTRODUCTION**

The bentonite buffer in EBS consists mainly of montmorillonite which, like other aluminosilicates is known to retain radionuclides, thus, contributing to the retention or immobilization of them. Long-lived Np-237 \((2.144 \times 10^6 \text{ a})\) in the pentavalent oxidation state forms a neptunyl cation \(\text{NpO}_2^+\), which is rather soluble, poorly sorbed and readily mobile making it highly relevant for research concerning SNF repository safety. The potential relevance of colloids for radionuclide transport is highly dependent on the formation of stable and mobile colloids in different environmental conditions and the interaction of radionuclides with the formed colloids. In this study we investigated the sorption of Np(V) on bentonite and montmorillonite colloids in batch sorption and the influence of mobile colloids on Np(V) transport in granite column experiments.

**Np(V) ADSORPTION**

Sorption studies as a function of pH were conducted for bentonite colloids, montmorillonite (5 g/l and 0.5 g/l) and crushed Kuru gray. Results are presented as sorption percentage in Figure 1 left and as log \(K_d\) in Figure 1 right.

**COLUMN EXPERIMENTS**

The flow properties of a column were determined by using a non-sorbing tracer. A constant flow rate through the column was achieved with a peristaltic pump. A tracer was injected into the system through an injection loop of known volume and the out flowing solution was collected with a fraction collector (Figure 3). Experiments were conducted in Kuru Gray drill core and Kuru Gray crushed granite column in 10 mM NaClO\(_4\).

To study the effect of colloids on Np-237 migration column experiments in the presence and absence of bentonite colloids were conducted. Np(V) break through curves without colloids (solid symbols) and with bentonite colloids (open symbols) are presented in Figure 4. The particle size and presence of colloids were analysed by photon correlation spectroscopy.

**CONCLUSIONS**

- Np(V) sorption on bentonite colloids was found to be independent on the pH, however, the Np(V) sorption on montmorillonite and Kuru gray was dependent on the pH.
- Regardless of the low solid concentration of bentonite colloids, they showed noteworthy sorption capacity for Np(V).
- The isotherm data indicated that the sorption of Np(V) remained constant regardless of the pH, as predicted by our sorption studies as a function of pH.
- The column experiments did not indicate that bentonite colloids would enhance the migration of Np(V) as expected based on the sorption data.

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