



Memorandum

Datum: 25. Juni 2015
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An: siehe Verteiler
cc:

Einladung zu einem ausserordentlichen LES Palaver

Ich lade Sie herzlich ein.

Referentin: Dr. Henar Rojo
KIT/INE, Karlsruhe

Thema: **The retention of Se under oxidizing and reducing conditions in the cementitious near-field of a repository for radioactive waste**

Zeit: Mittwoch, 8. Juli 2015, 15.30 Uhr

Ort: Sitzungszimmer OFLA/209

Abstract

Safety assessment analysis of a cement-based repository for low- and intermediate level nuclear waste (L/ILW) shows that selenium-79 is an important redox-sensitive, dose-determining radionuclide due to its long half-life and weak retardation by common near- and far-field minerals. It is generally accepted that, during operation, oxidizing conditions will prevail and Se(VI) and Se(IV) will be the dominant redox states. Once the repository is closed, the oxygen available in the repository will be depleted rapidly, and the redox conditions in the near field will become reducing. Under the latter conditions, Se(IV) and Se(-II) are expected to be the dominant redox states.

In this project, Se(IV) and Se(-II) sorption experiments have been carried out on hydrated calcium aluminates (AFm) and calcium silicate hydrates (C-S-H) phases, the principal host phases for radionuclides in cement paste. The experiments reveal that the selenium uptake by these cementitious materials is significant. The wet chemistry results are supported by EXAFS and XRD studies which suggest that Se(IV,-II) uptake is controlled by surface complexation and, in case of the AFm phases, additionally by Se(IV,-II) incorporation in the interlayers. Interaction with cement phases thus significantly retards the mobility of selenium under the reducing conditions prevailing in a L/ILW repository.

Freundliche Grüsse

Jan Tits