



Identifying safety-relevant knowledge gaps concerning radionuclide mobility – bringing together fundamental research and application in repository safety analysis

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Abstract. The mobility of radionuclides in a nuclear waste repository is strongly influenced by their chemical form (e.g. oxidation state and speciation), which determines their solubility and chemical interactions with mineral surfaces. To date, significant efforts have been made to investigate the mechanisms (e.g. sorption and diffusion) underlying radionuclide retention. However, knowledge gaps persist, especially under complex environmental conditions, as may be expected in a deep geological repository (e.g. the complexation of radionuclides with organic compounds, the influence of elevated temperature and the effects of high ionic strength). In order to make reliable predictions about radionuclide mobility and, consequently, about post-closure repository safety, it is necessary to identify, evaluate and, where necessary, close these knowledge gaps.

This workshop aims to bring together experts in both fundamental research and its applications to repository safety. It intends to facilitate knowledge exchange between the two fields, promoting more coordinated and goal-oriented safety research. Participants are invited to share their knowledge about the need for further experimental and computational investigations as well as their insight into the data requirements for reliable transport models and implications for safety assessment.

The preliminary agenda is as follows:

i. Introduction

ii. Impulse presentations

1. Vinzenz Brendler (Helmholtz-Zentrum Dresden-Rossendorf) – fundamental research on radionuclide chemistry, solubility, complexation and sorption using wet chemistry, spectroscopy and modelling
2. Jens Mibus (Federal Office for the Safety of Nuclear Waste Management) – conceptualisation of radionuclide transport in safety assessment

iii. Discussion

1. Topic 1 – identification, evaluation and prioritisation of knowledge gaps relevant for repository safety concerning radionuclide mobility
2. Topic 2 – interplay between fundamental research and application – how to enhance interconnectivity

iv. Wrap-up