EGU22-11557, updated on 18 Aug 2022
https://doi.org/10.5194/egusphere-egu22-11557
EGU General Assembly 2022

Modelling of carbon steel canister and Ca-Mg bentonite boundary development

Václava Havlová[1], Martin Klajmon[1,2], Angela Mendoza[1], David Dobrev[1], and Antonin Vokal[3]
[1]UJV Rez a.s., Department of Fuel Cycle Chemistry, Husinec, Czech Republic (vaclava.havlova@ujv.cz)
[2]University of Chemistry and Technology, Prague, Czech Republic
[3]SURAO, Prague, Czech Republic

The "**A**ssessment of the **C**hemical **E**volution of ILW and HLW **D**isposal **C**ells" (abbreviation ACED) Work Package of the EURAD EJP project concerns the assessment of chemical evolution at the disposal cell scale involving component/material interactions and thermal, hydraulic and/or chemical gradients via the consideration of ILW and HLW disposal concepts that are representative of the various approaches being followed in Europe. **The general objective of the modelling approach presented here is to create a geochemical and coupled reactive transport model for the assessment of the geochemical evolution along a carbon-steel canister/Ca-Mg bentonite boundary in terms of corrosion rates and geochemical alterations.**

The modelling, conducted in the PHREEQC geochemical code, focused on the representation of 3 completed corrosion experiments (temperatures of up to 90°C) that provided data on the corrosion trends of C-steel under compacted Ca-Mg bentonite conditions under both laboratory and in-situ conditions.

To date, the development of the geochemical modelling in the PHREEQC code includes:

- The modelling of the bentonite pore water chemistry
- The equilibrium modelling of the canister - bentonite boundary
- The kinetic modelling of corrosion processes at the canister - bentonite boundary

The final step will comprise the development of a complex reactive transport model, including the consideration of Fe migration into the bentonite.

It is planned that the model will also be used for the evaluation of experiments conducted at temperatures of up to 150°C which are currently underway as part of the ConCord WP of the EURAD EJP project.