



Contribution ID: 1054

Type: Poster

14C labelled organic molecules migration and interaction in/with the cement based materials

Monday, 16 May 2022 18:24 (3 minutes)

Introduction

Cements and concretes have been widely used in intermediate/low level waste (I/LLW) management in Czech Republic, being used namely as solidification material. Moreover, cement materials are considered also for disposal of high level waste (HLW) in deep geology repository (DGR), hereby being considered both for solidification and construction materials. ^{14}C was chosen as a relevant contaminant and also organic compounds are present in concrete as additives and plasticizers and their degradation products which may influence the migration and interaction of other contaminants.

Sorption and diffusion experiments

^{14}C acetate and ^{14}C formate were applied as tracers in the sorption and diffusion experiments on different cement based materials (cement pastes, mortars and concretes). The acetate and formate were also identified as the representatives of organics degradation product of plasticizers.

Sorption experiments were arranged in the form of batch reactors, where the crushed material is mixed with the liquid phase, pure portlandite water or synthetic granitic water (SGW). Diffusion experiments were applying through diffusion method. The tested solid phase materials are disc shape samples (50 mm in diameter, approx. 10 mm thick) which are placed into own designed and made diffusion cells using the portlandite water or synthetic granitic water (SGW) as the liquid phase.

Migration and interaction of ^{14}C labelled acetate and formate are also performed to describe the behaviour of organics degradation products in cement environment.

Structural, mechanical, chemical and mineralogical characterisation of cementitious materials is also provided to describe the properties of solid phase and their influence in migration properties.

Acknowledgement

This report/work/contribution/presentation/publication is partially result of SÚRAO project „Research support for Safety Evaluation of Deep Geological Repository“ and partially result of the EURAD CORI project that has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 847593 and part of the work has received funding from Technology Agency of the Czech Republic (TAČR) under grant agreement no. FW01010115.

Primary authors: VEČERNÍK, Petr (ÚJV Řež, a. s.); HYBÁŠKOVÁ, Marta (ÚJV Řež, a. s.); KISELOVÁ, Monika (ÚJV Řež, a. s.)

Presenter: VEČERNÍK, Petr (ÚJV Řež, a. s.)

Session Classification: Nuclear Fuel Cycle

Track Classification: Chemistry of Nuclear Fuel Cycle, Radiochemical Problems in Nuclear Waste Management