



Deliverable 3.3

CORI - Training Materials

Work Package 3, CORI

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 847593.



Document information

Project Acronym	EURAD
Project Title	European Joint Programme on Radioactive Waste Management
Project Type	European Joint Programme (EJP)
EC grant agreement No.	847593
Project starting / end date	1st June 2019 – 30 May 2024
Work Package No.	3
Work Package Title	Cement-Organic-Radionuclide-Interactions
Work Package Acronym	CORI
Deliverable No.	3.3
Deliverable Title	CORI - Training Materials
Lead Beneficiary	KIT
Contractual Delivery Date	Month 8
Actual Delivery Date	18/05/2021
Type	Documentation
Dissemination level	PU
Authors	Marcus Altmaier [KIT]

To be cited as:

(2021): **CORI - Training Materials**. Final version as of 18.05.2021 of deliverable D3.3 of the HORIZON 2020 project EURAD. EC Grant agreement no: 847593.

Disclaimer

All information in this document is provided "as is" and no guarantee or warranty is given that the information is fit for any particular purpose. The user, therefore, uses the information at its sole risk and liability. For the avoidance of all doubts, the European Commission has no liability in respect of this document, which is merely representing the authors' view.

Acknowledgement

This document is a deliverable of the European Joint Programme on Radioactive Waste Management (EURAD). EURAD has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 847593.

Status of deliverable		
	By	Date
Delivered (Lead Beneficiary)	KIT	18/12/2020
Verified (WP Leader)	M. Altmaier	18/12/2020
Approved (PMO)	B. Grambow	05/05/2021
Verified (WP 13 Leader)	N. Belmans	18/05/2021
Submitted to EC (Coordinator)	Andra	18/05/2021

Executive Summary

This document contains the Deliverable on CORI Training Materials D3.3.

The document is organised in such a way that in Section 1 a list of topics from CORI that can be used for Training Materials is given. This list of topics is drawing from the SOTA document D3.1 and also considers the specific expertise available at the CORI WP Board, at different CORI partners and with individual experts involved. In Section 2 an ANNEX is defined which will be populated with copies of the CORI Training Materials actually used in future Training Events or Training Actions. As such, D3.3 is a living document which requires updating. The need for updating will be identified and documented within the regular half-year reporting for CORI Subtask 1.3..

Table of content

Executive Summary.....	4
Table of content.....	5
List of Figures	5
1. Development of Training materials within WP3 - CORI	6
2. ANNEX – Documentation of Training Materials provided	8
References	9

List of Figures

No Figures are provided in this document.

1. Development of Training materials within WP3 - CORI

CORI is dedicated to contributing to the Training activities organised within EURAD.

The focus of CORI centres on the organic release issues which can accelerate the radionuclide migration in the context of the post closure phase of geological repositories for ILW and LLW/VLLW, including surface/shallow disposal. CORI is addressing topics in the context of cement-organic-radionuclide-interactions. Organic materials are present in some nuclear waste and as admixtures in cement-based materials, and can potentially influence the performance of a geological disposal system, especially in the context of low and intermediate level waste disposal. This potential effect of organic molecules is related to the formation of complexes in solution with some radionuclides of interest (actinides and lanthanides) which can increase the radionuclide solubility and decrease the radionuclide sorption. Organic substances require increased attention since a significant quantity exists in the waste and in the cementitious materials, with a large degree of chemical diversity. Cement-based materials will be degraded with time in the context of waste disposal inducing a large range of alkaline pH conditions according to their degradation state. Alkaline pH provides specific conditions under which the organics can degrade, which contributes to increasing their impact on repository performance.

Considering the particular scope of CORI summarized above, a rather large number of topics exist which can be addressed in the frame of Training Events or Actions within EURAD. The particular set of topics and the level of technical detail is depending in each case on the particular Training Events or Action and also the targeted audience.

An indicative list of topics from CORI which can be integrated in EURAD Training Events or Actions is listed in the following. This list of topics is drawing from the SOTA document D3.1 and also considers the specific expertise available at the CORI WP Board, at different CORI partners and with individual experts involved.

- General overview on WP CORI. Main project aims and results. Research highlights.
- Overview on individual Tasks in CORI. Scope and results. Research highlights.
- Organic degradation by hydrolytic and radiolytic processes (*linked to related chapter in SOTA 3.1 document*).
- Organic-cement-interactions (*linked to related chapter in SOTA 3.1 document*).
- Radionuclide-organic-cement-interactions (*linked to related chapter in SOTA 3.1 document*).
- Fundamental cement chemistry (*linked to related chapter in SOTA 3.1 document*).
- Use of cement-based materials in nuclear waste disposal applications.

EURAD Deliverable 3.3 – CORI – Training Materials

- Challenges arising from organic waste inventories in geological repositories for ILW and LLW/VLLW, including surface/shallow disposal.
- Sorption of contaminants on cement materials. Empirical findings and scientific process understanding. Thermodynamics and kinetics of the adsorption process.
- (Geo)chemical modelling of cement-based systems. Databases. Methodology.
- Speciation and thermodynamics of radionuclides in high pH environments.
- Speciation and thermodynamics of radionuclides with complexing organic ligands.
- Organics chemistry. Effects of cations (Ca, Fe, etc.) on their behaviour under cementitious environments.
- Analytical techniques to characterise organic degradation products in solution.
- Investigation of transport properties in cement-based systems.
- Overview on modern analytical and spectroscopic methods used in investigating cement-based materials, organics and radionuclide interactions in cement environments.

2. ANNEX – Documentation of Training Materials provided

Within this ANNEX, the Training Materials from CORI used for Training Events or Actions are documented and made available. This can contain text documents prepared to this end or copies of the slides developed for presentations. In each case, information on to the particular Training Event or Action and a short summary regarding the content of the provided material is given. Key literature used or cited in the documents are added to the references list of this Deliverable.

<p>Name of CORI Training Material</p> <p>Name of Training Event or Action: xxx</p> <p>Date of Meeting or document filename: xxx</p> <p>Responsible CORI partner: xxx</p> <p><i>- a short description of Training Even or Action is given here -</i></p>
<p>Description of Training Material</p> <p><i>- a summary of the main technical content of the Training Material is provided here -</i></p>

The text document prepared or the presentation slides used are provided below.

xxx

xxx

xxx

References

No references are cited in this document.

Once the ANNEX will be populated with Training Materials, in form of text documents or copies of presentation slides, the list of references will be developed according to the cited references therein.

[1] xxx

[2] xxx