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Project presentation

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RE	Restricted to a group specified by the partners of the CROCK project	
CO	Confidential, only for partners of the CROCK project	

CROCK

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Mr. Christophe Davies (European Commission)	One electronic copy submitted via participant portal	
All consortium members and European Commission	One electronic copy available on the restricted area of the CROCK webportal	

Introduction

The Collaborative Project Crystalline ROCK Retention Processes (CP CROCK) is established with the overall objective to develop a methodology for decreasing the uncertainty in the long-term prediction of the radionuclide migration in the crystalline rock repository far-field.

1. Nature and scope of the project

The present project responds to the problem of not having a defendable approach for decreasing the uncertainty with respect to crystalline host rock far-field radionuclide transport. The project is implemented by a consortium of 10 beneficiaries consisting on 5 large European Research Institutions, 2 Universities and 3 small and medium enterprises from six different countries with dedicated crystalline host-rock disposal programs and particular competence in this field. National Waste Management organizations also participate in the project contributing with co-funding to beneficiaries, infrastructures, knowledge and information. They also participate together with National Regulators to guidance with respect to application of the project to the disposal Safety Case. The Consortium has the background, skills, analytical techniques and the necessary infrastructures for conducting the highly advanced experimental, modeling, assessment and application program.

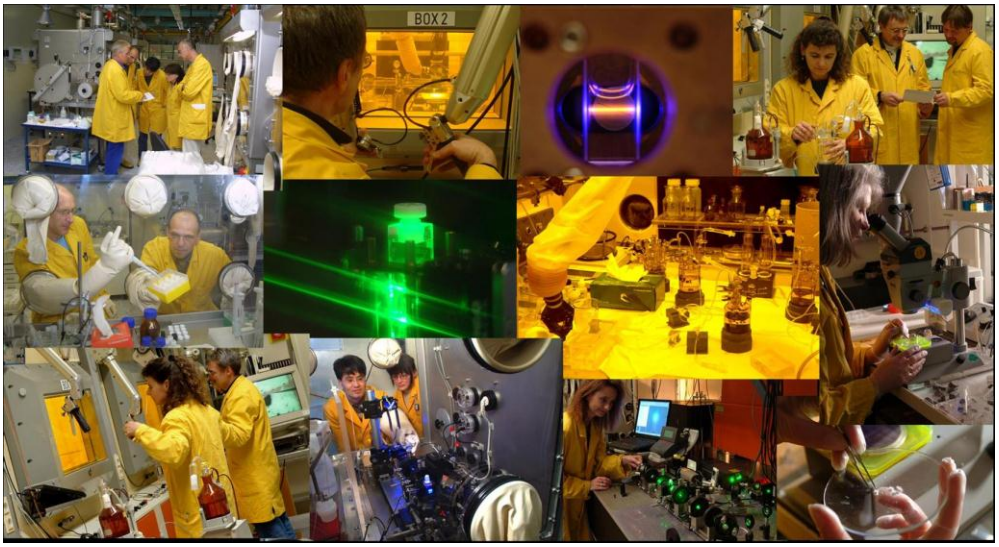
2. Activities

The key driver for initiation of the project, identified by national Waste Management Organizations, is the undesired high uncertainty and the associated conservatism with respect to the radionuclide transport in the crystalline host-rock far-field around geological disposal of high-level radioactive waste. The uncertainty may be divided into conceptual, modeling and experimental. Experimental uncertainties can be lowered by straightforward approaches. Conceptual uncertainties include lack in principle understanding on how scavenging processes in nature actually take place. Consequently, it is not clear if the picture used for these processes is sufficiently well related to reality and how coupling of different processes result in a bulk or average impact.
The project will ensure that the results generated are communicated within the project but also to a broader interested community. For this purpose, a large number of activities are included to help knowledge management dissemination and communication of the project such as establishing the WEB portal of the project, organizing project workshops, communicating the outcome of the project by participating at international conferences, workshops and other types of events where presentation of the project and its results will be exposed.

3. Expected results

The project started on 1st January 2011 and will last 2 years and a half (2011-2013). With respect to the retention of radionuclides in the crystalline host-rock far-field, and the application to the associated Safety Assessment and Safety Case, the work plan aims at (i) providing a set of fresh samples from Äspö URL obtained under anoxic conditions and characterize them thoroughly for subsequent interpretation of experimental results, (ii) conducting radionuclide transport and sorption experiments and identifying relevant processes from nano-meter range up to large block scale experiments, (iii) identifying sorption

processes by natural chemical homologue inventory analysis, (iv) interpreting existing and generating new data matrix diffusion, thereby combining observations from different scales, in particular using real system analysis, (v) bringing the results from the experimental program and analysis of existing data to a consistent set of model descriptions, including the different abstraction steps in the upscaling process, (vi) formulating the results based on its use for decreasing uncertainty in Safety Assessment and generate a tool for achieving a decrease in uncertainty in forthcoming site investigation programs, (vii) documenting the state-of-the-art at the beginning of the project and develop the resulting working document towards final reporting, (viii) providing for management of documentation, communication and dissemination of the results, and (ix) providing for overall project management.



Available analytical techniques and infrastructures of the project © KIT-INE

4. Societal impact

The key overall project objective is to provide Waste Management Organizations with a tool for improving the situation in forthcoming site investigation programs. The project will investigate to which extent the present uncertainty with respect to the radionuclide transport in the crystalline host-rock far-field can be lowered by the methodology generated within the project and how the outcome of the project can be used in the Safety Assessment.
Scientific-technical objectives are to increase scientific and process understanding in the transport simulations used to support Performance Assessment conclusions for the purpose of increasing confidence in the safety of nuclear waste disposal.
For this purpose advanced analytical methods are developed and applied for thorough characterization of the natural samples used in the experimental program and determination of spatial distribution and chemical state of radionuclides in the samples on the atomistic, nano and micrometer resolution scale, especially with respect to chemical and physical retention processes. Information and data are brought together from the different experiments and scales to a consistent systematic bottom-up description with different abstraction steps. Different tools and processes are tested for modelling sorption at a large scale.

5. Information about important public events

The CROCK Kick-Off meeting was held in Barcelona, Spain on 10th-11th February 2011. There will be two project Workshops. These workshops will be used to communicate the results obtained within the project. The 1st Project Workshop will be held in Stockholm, Sweden in June 2012. The 2nd Project Workshop will be held in Karlsruhe, Germany in April 2013.

Project information

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