

Carbon-14 Source Term 'CAST' Project - An Introduction

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CAST

- Aims to develop understanding of release mechanism of carbon-14 from radioactive waste under disposal conditions
- 33 participants
- 54 month project, started October 2013
- Coordinated by RWM and MCM International
- More information available at: www.projectcast.eu

Steel

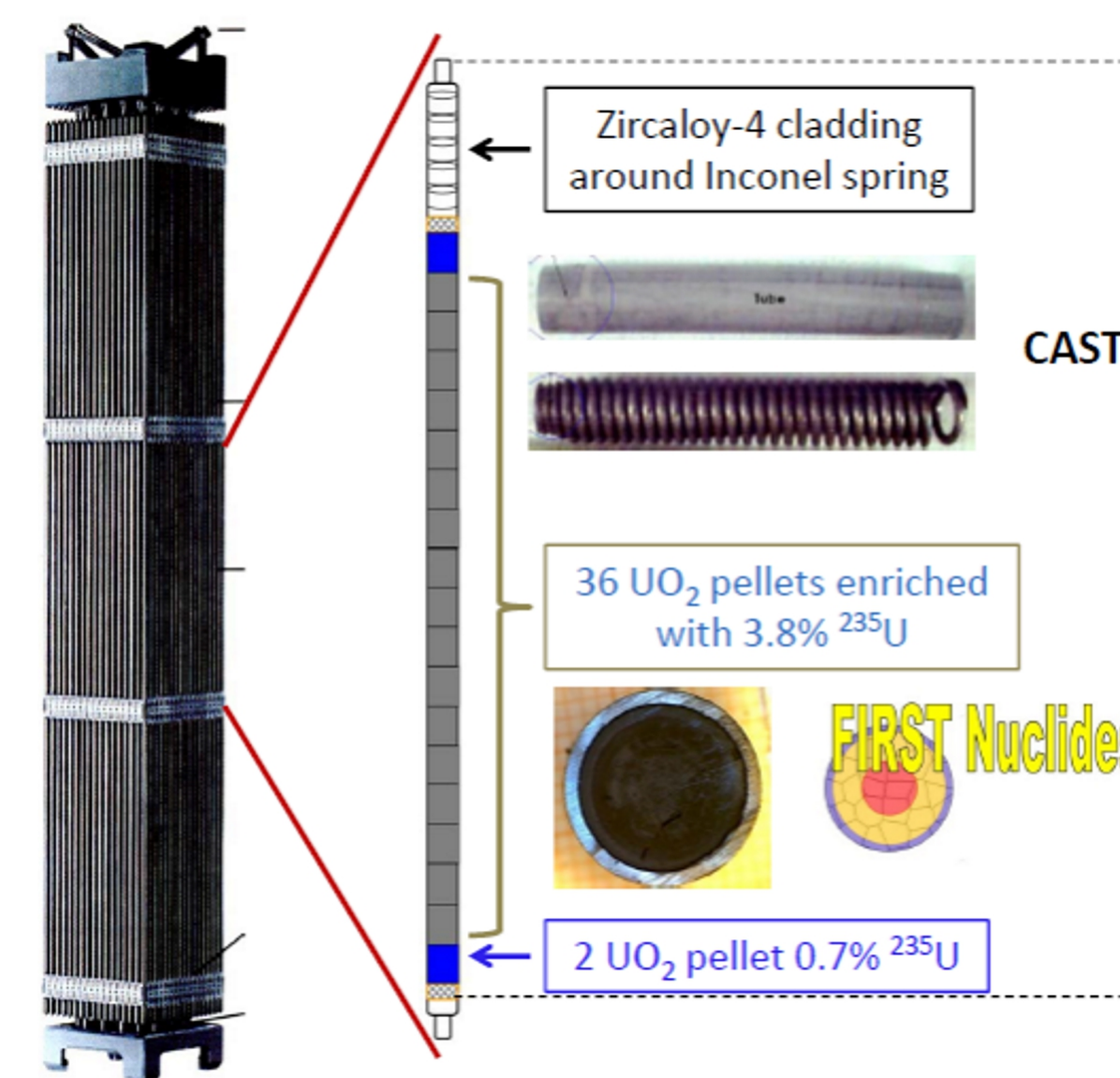
Work Package 2 'Steels' is led by Nagra, Switzerland. The main objectives are:

- to develop analytical techniques for identification and quantification of ¹⁴C species formed during corrosion of irradiated steels under conditions relevant to geological repositories;
- to validate existing activation models by measuring ¹⁴C inventories in irradiated steel;
- to carry out experiments and modelling to further understanding of the speciation and rate of ¹²C/¹³C and ¹⁴C release from corrosion of irradiated and unirradiated steels under conditions relevant to deep geological repositories;
- to incorporate information from existing and ongoing projects elsewhere on steel corrosion into this work package.



CEA Hot Cell

Zircaloy



KIT Experimental Zircaloy around Inconel

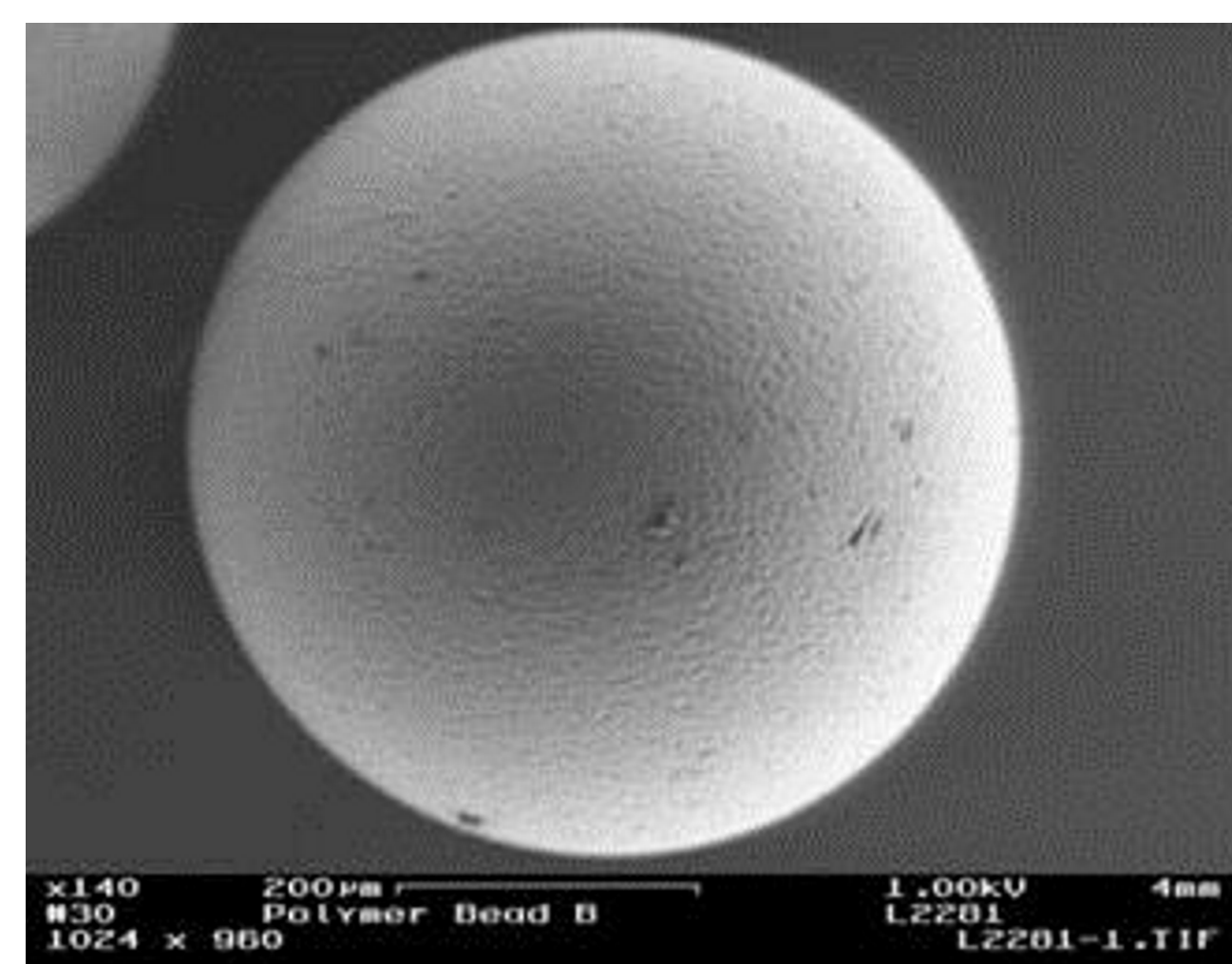
Work Package 3 'Zircaloy' is led by Andra, France. The main objective is to obtain a better understanding of ¹⁴C behaviour in waste Zr fuel claddings under disposal conditions with regard to ¹⁴C inventory (and origins), release from waste packages and speciation of released ¹⁴C. This will be achieved by

- assessing ¹⁴C inventories in zirconium alloy metals and oxides;
- characterising ¹⁴C release from Zr corrosion and Zr oxide dissolution; and
- determining ¹⁴C speciation under simulated disposal conditions.

Ion-Exchange Resin

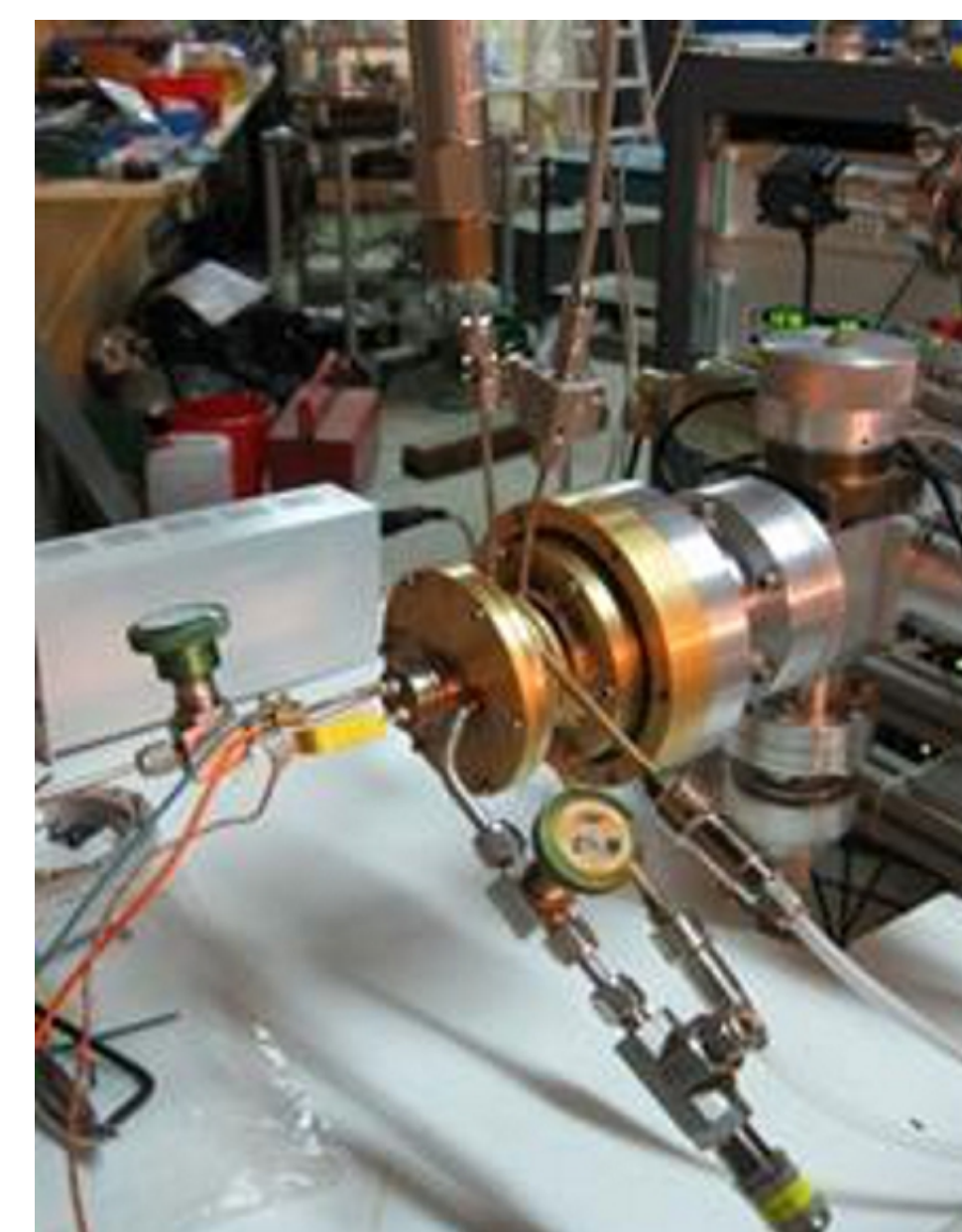
Work Package 4 'Ion-Exchange Resins' is led by CEA, France. The main objective is to obtain a better understanding of the ¹⁴C source term from Spent Ion Exchange Resins (SIERS) of different origins (BWR or PWR) and under different storage strategies and likely release and chemical species under geological disposal conditions. This will be achieved by:

- reviewing the current status of understanding;
- characterising the ¹⁴C inventory and its speciation;
- undertaking experiments to measure ¹⁴C release to gas and solution.



FZJ resins

Graphite



IPNL 4 MV Van de Graaff accelerator irradiation cell used for doping studies of graphite

Work Package 5 'Graphite' is led by Radioactive Waste Management Limited, UK. The objective of this work package is to understand the factors determining release of ¹⁴C from irradiated graphite (i-graphite) under geological disposal conditions. This will be achieved through:

- determining the ¹⁴C inventory and concentration distribution in i-graphites and factors that may control these;
- measuring the rate and speciation of ¹⁴C release to solution and gas from i-graphites in contact with aqueous solutions;
- determining the impact of selected waste treatment options on ¹⁴C release and relating this to the nature of ¹⁴C in i-graphite.

WP6 led by ONDRAF/NIRAS, regroups the Waste Management Organisations (WMOs) participating in CAST with the aim of:

- combining the results of WP 2 - 5 to deliver sound scientific basis and safety relevant information;
 - considering the CAST results in the context of safety cases;
 - identifying commonalities and differences between national programmes; and providing conclusions and recommendations over possible future studies and orientations to WMOs.
- WP6 will act as an integration exercise to ensure that the results from WP2 to 5 are as relevant to the safety cases for the end-users, the WMOs, as possible.

Dissemination is a key aspect of the project and throughout the duration of CAST there will be newsletters, training courses and workshops available to interested parties (WP7, led by COVRA). We will be disseminating information about CAST as widely as possible to a range of target groups. Please contact ellie.scourse@mcm-international.ch if you have any further questions.



CAST Kick-off meeting, London, October 2013

Acknowledgements:

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