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Newsletter #1

A word from the Coordinator

The PuMMA project is an exciting new initiative aimed at shaping the future of nuclear energy. This European project aims to explore the possibilities for Plutonium management in Generation IV nuclear reactors, with a focus on evaluating the impact of high Plutonium content on the fuel cycle, reactor safety and fuel performance.

he project has made significant progress, with three workshops taking place since its start. The results have been positive, demonstrating the project's success in bringing together a diverse group of experts from across the EU to work towards a common goal.

The PuMMA project is paving the way for sustainable and safe nuclear energy for future generations. We are proud to be a part of this innovative project and look forward to sharing updates on its progress.

Nathalie Chauvin,
Coordinator of PuMMA
International expert on fuels for advanced reactors at CEA

PROJECT'S OBJECTIVES

WORK PACKAGE UPDATES

Work Package 1 – Study of plutonium management in connection with the fuel cycle: scenario studies

WP1 is led by CIEMAT and aims to highlight the flexibility of the Generation-IV reactors on the Plutonium management (breeding, burning or iso-generation). This objective will be achieved by means of the study of the performances and impact of these PuM options on all the operations involved on the FC scenario (manufacturing, storage, transportation, reprocessing, core design, and fuel behaviour).

Work package 2 – Fuel Pin behavior in reactor with high PU content: nominal and transient

WP2 is led by CEA and is devoted to the behaviour of SFR fuel with high Pu content, including simulation and experimentations, and the sizing associated methodology. This goal will be achieved by doing Post Irradiation Examination (PIE) on 3 experimental fuel pins, comparing a large set of simulations of these experiments obtained with various fuel performance codes, and on the basis of the results comparisons, propose safety analysis methodology and recommendations.

Work package 3 – Fuel properties with high PU content: measurements and modelling

WP3 is led by EK and aims to evaluate the main properties of irradiated and non-irradiated MOX fuel in order to reduce the significant sources of uncertainty in the safety evaluation: in nominal conditions uncertainties of thermal and mechanical properties will be reviewed and the margin to melting of pellet will estimated; and in accidental conditions, incidents and accidents the effect of uncertainties of mechanical properties on cladding failure and the uncertainties of thermal properties on fuel melting fraction will be evaluated.

Work Package 4 – Comparison of irradiation results in fast spectrum VS thermal spectrum

WP4 is led by NRG and is intended to go further in the analysis on how MTR (Materials test reactor) fuel irradiations can be compared to irradiation in a fast reactor, i.e. to what extent are MTR irradiations representative for performance in a fast neutron spectrum. The main objectives are to study of the design differences of the irradiation devices in MTR vs FR; to interpret irradiation results in MTR and FR, starting at core characteristics and including experiment designs; to analyse the advantages / disadvantages of irradiations in FRs / MTRs for future programs; and for MTR and experimental FR irradiations to contribute to the fuel qualification (steady state and transients).

Work Package 5 – Impact of PU content on fuel dissolution

WP5 is led by NNL and aims to evaluate the impact of high Pu content on key issues that affect the reprocessing and multi-recycling of Pu from spent fuels. It is assumed that Pu contents will be in the range of 10-45%, that is typical fuels for Generation-IV fast reactors. The factors that will be investigated are Pu dissolution rate; Pu and FP distribution in solid residues; and impact of irradiation of high Pu content spent fuel in SFR on Pu dissolution behaviour.

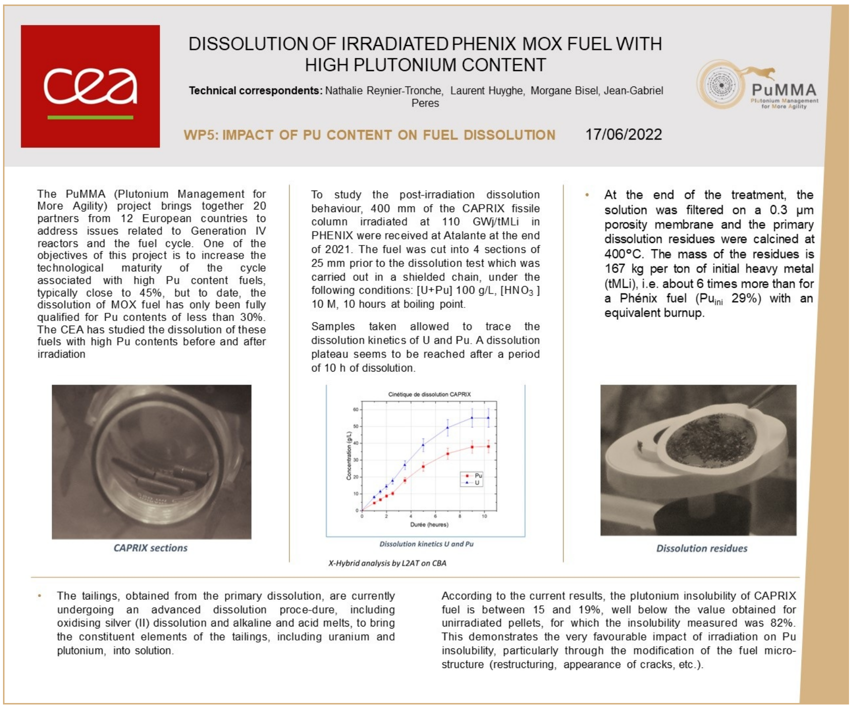
Work Package 6 – Education and training, dissemination and communication

WP6 is led by JRC and aims to encourage mobility of PhD students, post-doc; to organize workshops for PhD students, post-docs, designers, and stakeholders, highlighting the issues related to FC scenarios, fuel behavior and spent fuel reprocessing; to improve educational tools (MOOC and data base) and learning methodologies taking advantage of past workshops and seminars organized over the last 30 years in the various EU projects related to multi-recycling and closed FC; to communicate and disseminate the outcomes of PuMMA to a larger audience.

Learn more on the project

PROJECTS ACHIEVEMENTS

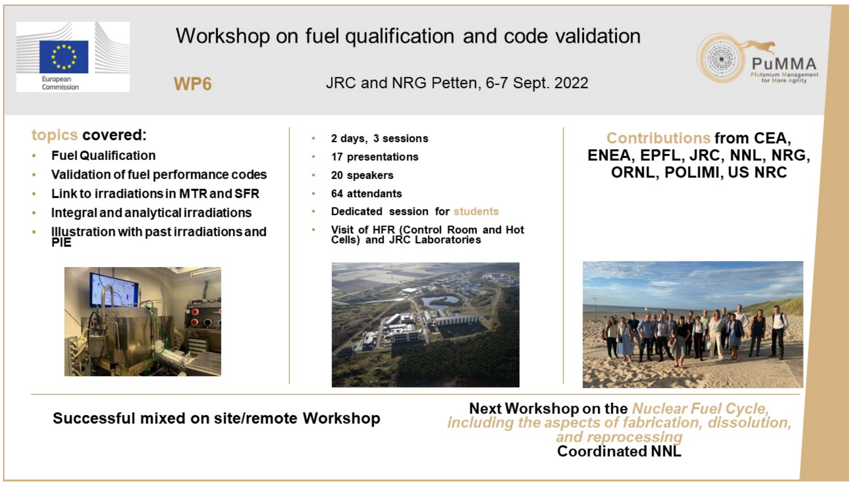
HIGHLIGHT ON DISSOLUTION OF IRRADIATED MOX FUEL



One of the objectives of the PuMMA project is to acquire the experimental data needed to reach technological maturity around TRL-4 for fuels containing up to 45% Pu. To this end, work has been carried out at the CEA to conduct dissolution tests in medium and high activity on fuels with high Pu contents before and after irradiation.

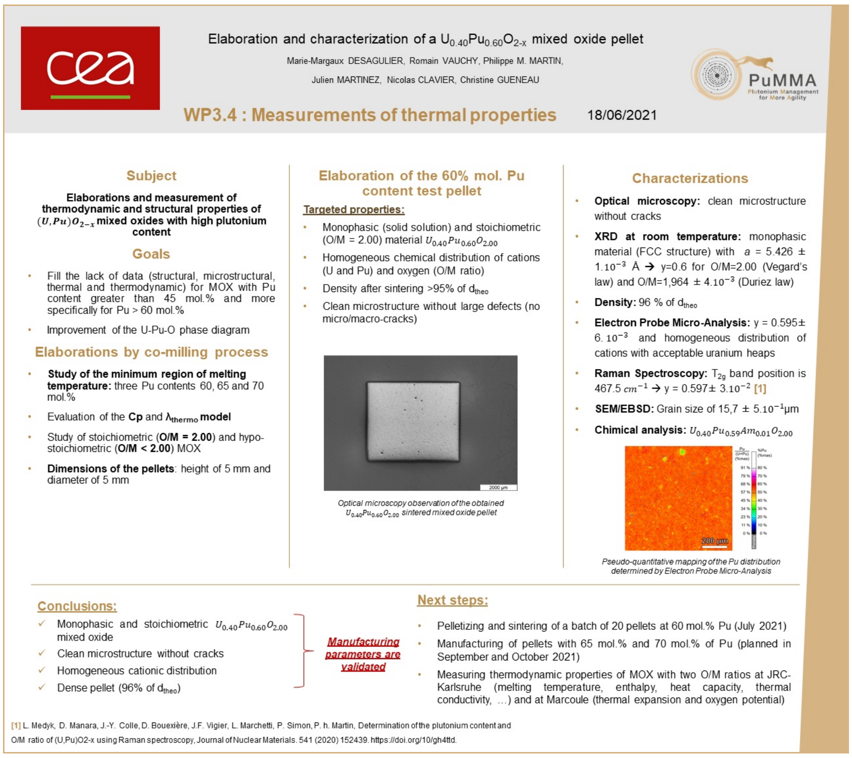
Read more

PuMMA WORKSHOP IN PETTEN



PuMMA's Workshop in Petten took place on September 6 and 7, tackling the subject of fuel qualification and code validation. A great opportunity for PhD students to present their work and get some feedback from nuclear scientists.

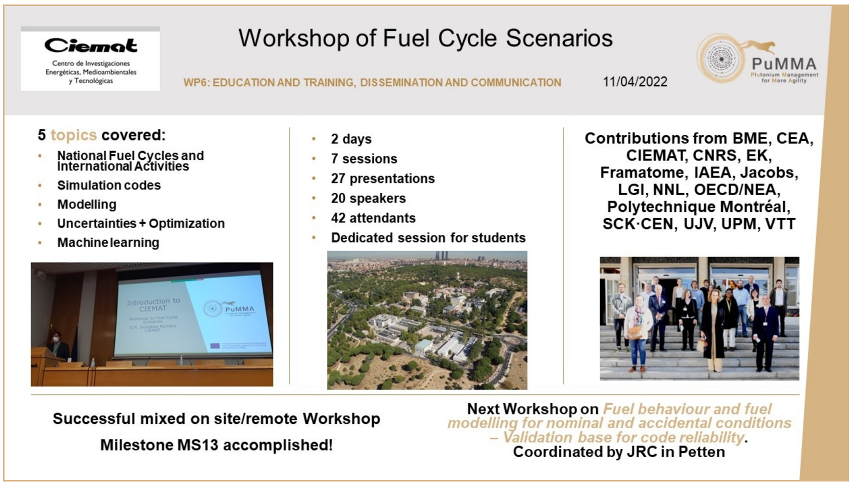
HIGHLIGHT ON MEASUREMENTS OF THERMAL PROPERTIES



A highlight in PuMMA project from the phD Marie-Margaux DESAGULIER at CEA-Marcoule working for the Work Package 3 on elaboration and characterization of a mixed oxide pellet. The experiments relates to the Measurements of thermal properties.

Read more

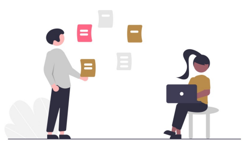
PuMMA WORKSHOP IN MADRID



The first wokrshop of PuMMA on Fuel Cycle Scenarios took place in Madrid.

PROJECT RESOURCES

Related events



- [Uranium Raw Material for the Nuclear Fuel Cycle (URAM-2023)] May 8-12, Vienna
- [World Nuclear Symposium], September 6-8, London
- [29th IAEA Fusion Energy Conference (FEC 2023)], October 16-21, London

- World Nuclear Exhibition, November 28-30, Paris

PuMMA on SNETP Platform

PuMMA is featured within SNETP portfolio‘s page which provides access to a factsheet describing the project.

Learn more

Project Partners

Discover an international consortium gathers research insitutes, universities, companies and public insitutions.

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