



# PREDIS

## **WP4: Innovations in metallic radioactive waste management Optimized characterization and decontamination and advanced conditioning of both ferrous and more reactive metallic wastes.**

**2<sup>ND</sup> PREDIS WEBINAR 16/02/2021**

**WP4 MANAGEMENT TEAM:**

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# Overview of WP4 Objectives

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- Develop innovative conditioning matrices for reactive metallic wastes.
- Develop innovative and optimised characterisation techniques for metallic wastes.
- Demonstrate innovative techniques to decontaminate metallic wastes to quantify the efficiency of decontamination processes and allow more effective application of the waste hierarchy/ classification and clearance.
- Develop treatment techniques for secondary waste streams after decontamination.

# Work Package 4 Structure

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- Task 4.1 WP management (IMTA)
- Task 4.2 GAP analyses (IMTA, all)
- Task 4.3 Defining Europe-wide Needs and Opportunities for Management of Metallic Waste Streams (GSL)
- Task 4.4 Development and optimisation of decontamination processes (IMTA)
- Task 4.5 Optimisation of metallic waste characterisation and procedures for waste minimisation and recycling (NCSR)
- Task 4.6 Encapsulation of reactive metals in magnesium phosphate cement-based matrices (CNRS)
- Task 4.7 Dissemination (IMTA)

# Partners of WP4 and Their Focus

- VTT – radiochemical DTM procedures
- NNL – Ni alloy decontamination, waste stream optimisation
- IMT/SUBATECH – WP management , tasks leader on decontamination, radiochemical DTM procedures, MPC irradiation
- CEA – Ni alloy decontamination, leaching of MPC
- SCK·CEN – Be corrosion in MPC
- CTU – Ni alloy decontamination, waste streams optimisation, radiochemical DTM procedures
- ÚJV Rez – decontamination Ni alloys, waste stream optimization
- CNRS –task leader on reactive metals in MPC, steel corrosion in MPC
- ORANO – Cost optimization of MPC formulation
- FZJ – Be corrosion in MPC
- NCSRD – task leader on optimizing characterization techniques, classification, characterization, sorting
- Nucleco – optimization of decontamination and characterization/sorting
- Polimi – MPC under irradiation
- FTMC – optimized characterization techniques, classification, characterization, sorting
- RATEN – Al and steel corrosion in MPC, strategic studies
- CSIC – AL corrosion in MPC
- ENRESA – metallic waste management routes, Al corrosion in MPC
- UAM – MPC formulations
- GSL – task lead and principal contributor on strategic studies (inventories, review of deco processes, metal melting, secondary wastes management)
- KIPT – leaching and irradiation of MPC
- DMT - optimized characterization techniques, classification, characterization, sorting
- SORC – optimization of decontamination processes

# Innovations in metallic waste management:

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- Optimization of decontamination of metallic waste (AP-CITROX technique, LOMI, electrochemical, vacuumable gel decontamination, recyclable decontamination media technology, volumes, costs ...)
- Minimize secondary waste by ionic liquids followed by electrodeposition
- New radiochemical determination procedures for DTM nuclides
- New characterization and sorting procedures to select the most effective decontamination technique in each case and decide on different management routes
- Optimized magnesium phosphate cement formulations (MPC) accounting for reactivity of steel, Al and Be, considering impacts of leaching, irradiation and hydrogen generation

# Expected Impacts of the PREDIS work on metallic waste management

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- Improved decision base for the choice of metallic waste management routes
- Minimization of waste due to increase of materials volume for clearance (restricted or unrestricted) or declassification of waste after effective decontamination
- Cost reduction due to optimised management routes and increase of materials volume for clearance or declassification
- Minimised environmental footprint resulting from optimised metallic waste treatments

# Needs and opportunities: How to get involved?

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- Exchange on inventories, characteristics and main drivers to treat metallic waste
- Exchange on technologies and on boundary conditions of their use
- Decontamination targets: declassification versus recycling
- Economic issues: decontamination versus direct storage
- WAC for decontamination techniques; performance of techniques for several radionuclides
- Important DTM radionuclides: activities for clearance and classification of waste in different countries
- Repository boundary conditions for conditioned reactive metals

**We need frequent exchange to shape the research agenda**