WP5 dedicated to geopolymers

“Innovations in liquid organic waste treatment and conditioning”

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This project has received funding from the Euratom research and training programme 2019-2020 under grant agreement No 945098.

WP5 Objectives

- Implementing **geopolymers** and **related alkali-activated materials** as mineral binders for **radioactive liquid organic waste** (RLOW).
- Development of **direct conditioning solutions** for RLOW from **TRL 3 to TRL 6** including **validation tests** (real waste) and feasibility **scale-up** tests.
- **Optimization** of geopolymers and formulations for RLOW encapsulation, especially **waste loading** and **matrix performances**.
- Process **robustness** regarding waste, raw materials and process variability including study of the **stability** and **durability** of the final waste form.
- **Disposability assessment** related to Waste Acceptance Criteria and scientific approaches for deeper physico-chemical understanding.

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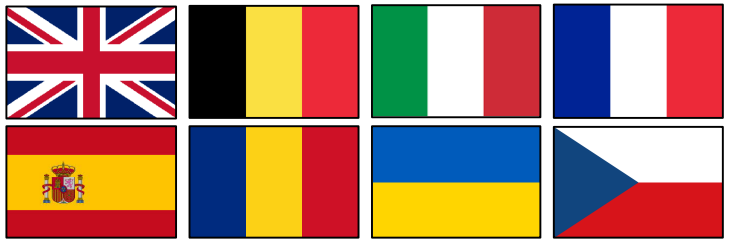
WP5 Partners



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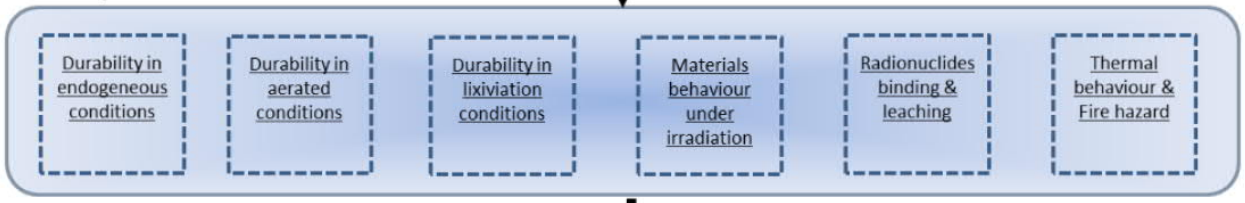
Task 1: WP5 Managment

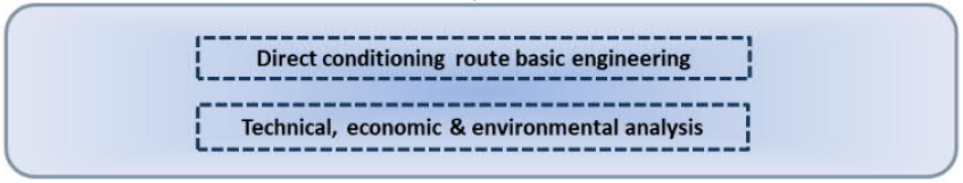
Task 2: Collection & review of waste, regulatory, scientific & technical data

Task 3: R&D – Study of direct conditioning process

Task 4: R&D – Study of conditioning matrix performances



Task 5: technical, economic, environmental analysis



Task 6: Implementation & Dissemination

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Waste considered

- **Waste inventory information** gathered from **questionnaires** completed by **PREDIS Partners** and **EUG**.
- **≈1200 m³** of RLOW categorized, mainly **oils** and almost equal parts of **solvents**, **scintillation cocktails** and **decontamination liquids**.
- In the WP, use of reference surrogates : ‘simple’ **oil** (Nevastane EP100 and Shellspirax), **TBP**, **Dodecane**, **scintillation cocktails** (Ultima Gold AB and INSTA GEL), and possibly waste of interest in national contexts.

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Direct conditioning process

- **High RLOW incorporation rates** (>30 vol.%) and **good matrix properties**.
- Screening test period with **very promising results** up to **50 vol.%** of RLOW.
- Formulations based on:
  - metakaolins,
  - slags,
  - mixes of raw materials (e.g., metakaolin, slag and fly ash) and recycled polymers.
- In the following: optimization, upscale, real waste…


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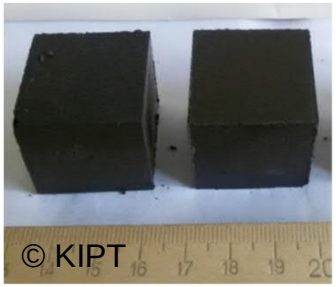
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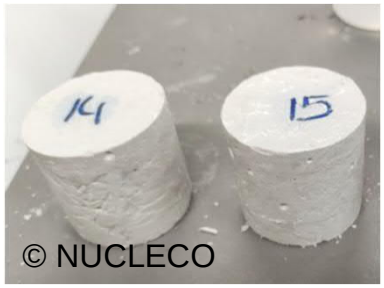

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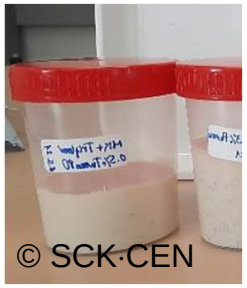
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Matrix performances

Objectives

- Study the conditioning matrices **performances** and **behavior** in relation with their transport, storage and **disposal**.
- Assess the matrices **disposability**.

Complementary approaches

- **Standards** and well-defined technical tests to check the matrices durability under specific experimental conditions.
- **Understanding** of the interactions between RLOW and the matrix during the various steps of its life cycle, especially disposal.

Durability, behavior under irradiation, thermal behavior

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