

PhD Offer: Elaboration of a decontamination process for radioactive effluents.

Starting date of the thesis: October 2021

Background

The operation of nuclear power plants generates waste that usually requires treatment before final disposal in a geological environment. These wastes include metal structures, sometimes very large, requiring pre-treatment for a change in category or total decontamination for recycling. In view of the increasing number of operations to dismantle nuclear facilities, the thesis work is part of the European PREDIS project (2020-2024), which proposes to implement pre-treatment prior to the disposal of radioactive waste other than high-level waste, in particular metallic waste.

Objective

The thesis work will consist in studying the different decontamination processes of radioactive liquid effluents resulting from the maintenance operations of the installations and the decontamination of metallic waste. The challenge will be to take into account the physico-chemical characteristics of the effluents (e.g. nature (organic, mineral), types of radionuclides, types of emitters), chemical composition and pH/Eh to optimize decontamination in an efficient way for a set of radionuclides. In addition, the decontamination process will have to take into account the acceptability criteria for radioactive waste specified by the radioactive waste disposal agencies, particularly in Europe. It will then be a question of stabilizing the radioactive residues in adequate matrices whose chemical and physical durabilities will be evaluated.

Research team

The thesis will take place in the Radiochemistry team of the Subatech laboratory in Nantes. It will be directed by A. Abdelouas (abdeloua@subatech.in2p3.fr) and supervised by T. Suzuki-Muresan (suzuki@subatech.in2p3.fr). The research activities of the team are dedicated to fundamental and applied questions related to the behaviour of radioactive substances in the environment, in the nuclear power cycle and for medical applications. The team has acquired internationally recognized scientific expertise in the field of radiochemistry related to radioactive waste disposal.



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Profile of the candidate

We are looking for a student with a master's degree in chemistry or chemical engineering, who has good oral and written knowledge in English. A strong background in inorganic/organic chemistry, analytical chemistry, chemical-physics, as well as good skills in the design and operation of experimental devices are an advantage.