

EXPLORING USED SALT TREATMENT OPTIONS BASED ON LA HAGUE HYDROMETALLURGICAL PROCESSES

I. MORLAES

Orano

Châtillon, France

Email: isabelle.morlaes@orano.group

E. CAPELLI

Orano

Châtillon, France

O. DROUVOT

Orano

Châtillon, France

B. MOREL

Orano

Châtillon, France

Abstract

Molten Salt Reactors (MSRs) are at the forefront of next-generation nuclear technologies, offering key technological advantages and the potential for integrated management of Spent Nuclear Fuel (SNF), multi-recycling of plutonium, and a reduced environmental footprint for high-level waste disposal. Since 2019, Orano has been actively exploring the potential of fast chloride MSRs actinide converters to enhance the value of the standard SNF treatment service proposed by the La Hague facility and has been developing services related to salts throughout the entire nuclear fuel cycle. Fuel salt production and the treatment of used fuel salts are key to the development of MSR technology and align seamlessly with Orano's core business.

Many fuel cycles can be envisaged the different MSR technologies, encompassing on-line and off-line processes, use of hydrometallurgy or pyrometallurgy, and combined solutions. Defining a taxonomy and related terminology of Fuel Cycles for MSRs is therefore a must to communicate among MSR community on ongoing R&D development and to compare options.

The presentation will highlight Orano approach regarding chloride MSR fuel cycle, benefiting both from its ongoing R&D work and its decades of industrial experience with the La Hague spent fuel treatment activities. While hydroprocessing is more mature and could become operational in the near future, pyroprocessing offers significant advantages that could potentially enhance the process in the long term.

Underpinned by studies carried out in the frame of MIMOSA¹ and ISAC² projects, the presentation will outline possible high level irradiated salt treatment schemes. By combining hydro processing and pyro processing and factoring the existing safety constraints, equipment and process lessons learned at La Hague, the presentation will provide inputs on their potential industrial implementation. Therefore, the presentation aims to help the MSR community define a comprehensive taxonomy and related terminology of fuel cycles for MSRs.

¹ MIMOSA (Multi-recycling strategies of LWR SNF focusing on MOlten Salt technology) – EURATOM funded project – <https://www.mimosa-euratom.eu/>

² ISAC (Innovative System for Actinides Conversion) – France Relance funded project