

Performance study of spent radioactive resin conditioning using cementitious binders incorporating clay

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The Kingdom of Morocco has a 2 MW research reactor (TRIGA MARK II) and an interim storage facility at the Maamoura Nuclear Research Center (CENM), managed by the National Center for Nuclear Energy, Science, and Technology (CNESTEN), designed for radioactive waste management and treatment on a national scale. Spent radioactive resins (SRR) are commonly used to clean and treat water pool reactors in the nuclear industry. Cement binders are considered the major matrices for the solidification/encapsulation of these radioactive wastes. Previous work from our laboratory has shown that blended cement incorporating clays can potentially yield high-performance cement binders for encapsulation of SRR at a pilot scale (A.Sadiq et al., 2021). Taking into account these endeavors, this study aimed to investigate the effect of introducing clay into the cemented radioactive resin matrix and how it affected the amount of spent resin supported by the cementing formulation. Various amounts of SRR loading ranging from 20 wt% (wet base) within the cement binders were performed. The results show that the resin ratio increased by 140.9% compared to the formulation adopted by CNESTEN and by 11.11% compared to the formulation adopted by previous studies (A.Sadiq et al., 2022). The compressive strength of the matrix was improved after 28 days of curing time. These results suggest that the developed cementitious binders incorporating clay are a potential matrix for the solidification of these radioactive wastes.

Technical Track

Fuel Cycle and Waste Management

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