

Special Issue on **Advanced Technologies in Nuclear Waste Management Process Design and Materials**

CALL FOR PAPERS

In the beginning of the 21st century, the Fukushima Daiichi nuclear incident regenerated concern and speculation regarding nuclear power. However, the rapid expansion of population worldwide and the drive for economic development, in conjunction with the environmental issues aroused by the extensive use of fossil fuels, are globally leading to a constant growth of nuclear energy production.

Nevertheless, the technological challenges in what is envisaged to grow into a global and publicly accepted industry for peaceful purposes are yet evident. Waste management and decommissioning are clearly the biggest challenge the nuclear industry is facing today. Advanced nuclear fuel cycles that are under development internationally are expected to deliver new standards in sustainability and safety, by exploiting an interdependent system of many candidate technologies, where both waste management and economic factors are considered. Most of the developments focus on maximizing resource base and minimizing high-level waste. Research efforts are increasingly focusing on the separation of higher actinides which are long-lived and can be utilized in a series of new generation reactors (fast reactors) that is anticipated to provide new principles in reliability and proliferation-resistance. The recent developments and the associated challenges indicate the need to obtain a robust perception of the role of advanced waste management and decommissioning in future nuclear technologies. This includes, but is not limited to, understanding of reactor physics, transmutation systems, infrastructures, materials, thermal hydraulics, effective utilization of actinides and fission products, advanced approaches in reprocessing of spent fuel, decontamination of structures and materials, deep borehole disposal, and development of multifunctional materials for extreme conditions.

This special issue invites all relevant research groups from academia and industry to submit original research articles containing theoretical and/or experimental studies, which identify novel design features that can be utilized to provide advanced solutions for waste management in the future nuclear fuel cycle. Submissions of articles on overall assessments of how these advanced technologies can be integrated in existing processes in the nuclear cycle coupled with optimization techniques and multiscale modelling and simulation are also welcomed.

Potential topics include but are not limited to the following:

- ▶ Nuclear waste management technology (Gen IV incl. fast reactors and molten salt reactors)
- ▶ Waste management of nuclear materials and nuclear fuels (incl. accident-tolerant fuel)
- ▶ Advanced aqueous and pyrochemical separation processes (incl. intensified process)
- ▶ Transmutation of nuclear waste fission products
- ▶ Thermal hydraulics and heat transfer
- ▶ Radioactive waste management and decommissioning
- ▶ Multiscale modelling, simulation, and optimization techniques in nuclear waste management
- ▶ Future developments in nuclear waste management technologies (incl. life cycle assessment)

Authors can submit their manuscripts through the Manuscript Tracking System at <https://mts.hindawi.com/submit/journals/stni/antwm/>.

Papers are published upon acceptance, regardless of the Special Issue publication date.

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