S6-1 Advanced materials science and technology for nuclear waste management

SHORT DESCRIPTION:

The development of science and technology on nuclear energy is crucial for creating a sustainable global environment by reducing greenhouse gas emissions and meeting the rising demand for electricity. However, managing radioactive waste from nuclear power plants and fuel recycling facilities is essential to avoid leaving a harmful legacy for future generations. Additionally, since the Fukushima Daiichi nuclear power plant accident, various issues related to nuclear power generation have sparked ongoing discussions about the safety and sustainability of nuclear energy. Addressing these concerns requires continuous advancements in handling radioactive waste effectively and safely. While advances in immobilization through vitrification and geological disposal are progressing as viable solutions for radioactive waste, there is an increasing need for deeper understanding and innovation in these fields to ensure long-term containment and minimize environmental impact. This session aims to showcase and discuss the latest developments in advanced materials science for nuclear waste management, including new materials and techniques for enhancing waste stability. It will serve as a platform for materials scientists and nuclear engineers worldwide to share their research and scientific advancements, fostering international collaboration to drive innovation and ensure the safety of nuclear waste disposal. By examining cutting-edge technologies and addressing key challenges, this session will contribute to the development of more sustainable and resilient nuclear waste management practices, vital for a future with nuclear energy.

SESSION TOPICS:

●Advanced materials including glasses, ceramics, composites, and melts for nuclear waste management
●High-performance adsorbent for purification of radioactively contaminated soil
●Experimental, theoretical, and AI-assisted approaches for designing materials and systems suitable for long-term nuclear waste storage
●Structure-property relationship of materials for nuclear waste management
●Analysis of melt properties in furnaces used for nuclear waste glass production
●Investigation of material alteration processes in underground disposal environments
●Development of next-generation vitrification processes
●Volume reduction technology for nuclear waste and radioactively contaminated materials

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