



Principal Investigator

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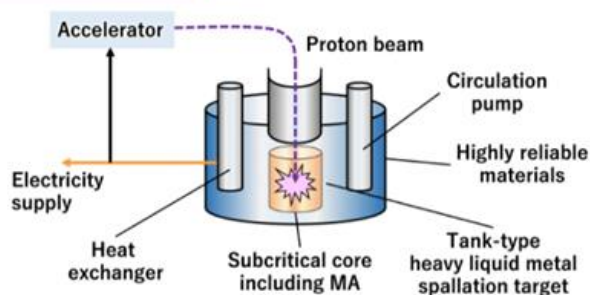
Adopted Theme

Innovative liquid metal technology for reducing impact of long-lived radioactive wastes in sustainable society

Subject of Research

Innovative liquid metal technology for reducing impact of long-lived radioactive wastes in sustainable society

Overview



In approximately 400 nuclear power plants operating worldwide, high-level radioactive wastes known as minor actinides (MA), with a half-life of up to 2 million years, are generated at a rate of about 0.1 wt% relative to the fuel, posing a burden for final disposal. This project aims to develop an accelerator-driven nuclear transmutation system (referred to as ADS) capable of converting this MA into non-radioactive or short-lived nuclides. The core of the ADS will use heavy liquid metal as spallation target to produce high-energy neutrons, and Institute of Science Tokyo has been conducting research and development on this liquid heavy metal technology for over 20 years. We aim to establish a deep tech startup company that proposes transmutation technologies for high-level radioactive waste targeting a wide range of nuclear businesses worldwide, particularly in the rapidly growing nuclear market in the United States.

Business Models (when applying)

We will perform the conceptual design of small modular ADS and the construction of its mock-up facility through investments by VCs, CVCs, companies and governmental financial institutions. The technology readiness level must be improved within 10 years, which is required for the construction of ADS plant. We aim to demonstrate the transmutation of minor actinides by the ADS through the M&A toward major corporations.

Activity Planning (when applying)

This adopted program focuses on the design of a compact accelerator-driven nuclear transmutation system (ADS) that achieves sufficient energy efficiency as an energy power plant while transmuting minor actinides in a subcritical core, primarily through numerical simulation research. At the same time, we will develop innovative structural materials and thermal fluid technologies to significantly enhance the reliability of the ADS, making full use of the technical accumulation related to liquid metal fluids at Institute of Science Tokyo. Additionally, we will develop an environmental purification system utilizing these liquid metal technologies. We will establish a deep tech startup company centered on these innovative liquid metal technologies to develop a compact ADS. Furthermore, we aim to construct a mock-up plant within ten years while building a strong collaborative framework with research institutions both domestically and internationally.