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Status of LSDS Development For Isotopic Fissile Assay In Used Fuel

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Because of the large amount accumulation of spent fuel, a research to solve the spent fuel problem is actively performed in Korea. One option is to develop the SFR linked with the pyro process to reuse the existing fissile materials in spent fuel. Therefore, an accurate isotopic fissile content assay becomes a key factor in the reuse of fissile material for safety and safeguards purpose. There are several commercial non-destructive technologies for nuclear material assay. However, technology for direct isotopic fissile content assay in spent fuel is not developed yet.

Internationally, a verification of special nuclear material in spent fuel, mainly U-235, Pu239, Pu241, is very important for the safeguards objective. These fissile materials can be misused for nuclear weapon purpose, not for peaceful use. As a future nuclear system is developed, improved safeguards technology must be developed for an approval of fissile materials. A direct measurement of fissile materials is very important to provide a continuous of knowledge on nuclear materials.

LSDS(Lead Slowing Down Spectrometer) has an advantage to assay an isotopic fissile content directly, without any help of burnup code and history. LSDS system is under development in KAERI(Korea Atomic Energy Research Institute) for spent fuel and recycled fuel. A linear assay model was setup for U235, Pu239 and Pu241. The dominant individual fission characteristic is appeared between 0.1eV and 1keV range. An electron linear accelerator for compact and low cost is under development to produce high source neutron effectively and efficiently.

The LSDS is also applicable for optimum design of spent fuel storage and management. The advanced fissile assay technology will contribute to increase the transparency and credibility internationally on a reuse of fissile materials in future nuclear energy system development.

Country or International Organization

Republic of Korea

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