



国立研究開発法人理化学研究所 仁科加速器研究センター  
第217回 RIBF核物理セミナー  
RIKEN Nishina Center for Accelerator Based Science  
The 217<sup>th</sup> RIBF Nuclear Physics Seminar

Spallation reaction study for long-lived fission products in nuclear waste:  
Cross section measurement for  $^{137}\text{Cs}$  and  $^{90}\text{Sr}$  on proton and deuteron

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Reduction in the quantity of high-level radioactive waste in the spent fuel is one of the major issues for the use of a nuclear power plant. Research and development into the reduction of radioactive waste using partitioning and transmutation technology has been performed over recent decades. In particular, the transmutation on the long-lived fission products (LLFPs) has received much attention.

Aiming at bringing a new invention to the nuclear transmutation on LLFP, we have studied the proton- and deuteron-induced spallation reactions for the long-lived fission products  $^{137}\text{Cs}$  (half-life = 30 years) and  $^{90}\text{Sr}$  (half-life = 29 years). Our study is the first attempt in the history of nuclear physics to solve the problem of the LLFP transmutation and has triggered the reaction studies for other long-lived fission products.

The cross sections were measured in inverse kinematics using secondary beams of  $^{137}\text{Cs}$  and  $^{90}\text{Sr}$  at the RIKEN Radioactive Isotope Beam Factory. The target dependence of cross section has been investigated systematically and the experimental data were compared with the spallation model including cascade and evaporation processes. In the seminar, the results on the spallation of  $^{137}\text{Cs}$  and  $^{90}\text{Sr}$  as well as the potential of spallation reaction on the LLFP transmutation will be discussed.

\* The talk will be given in English language..

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May 10th (Tue.) 2016 13:30 ~  
RIBF Hall (rm.201), RIBF bldg., RIKEN