Nuclear Science and Transmutation Research Division
Nuclear Transmutation Data Research Group
Fast RI Data Team

1. Abstract

Fast RI data team aims at obtaining and accumulating the cross section data for long lived fission products (LLFPs) in order to explore the possibility of using accelerator for nuclear transmutation.

LLFPs as nuclear waste have been generated continuously in nuclear power plants for wealth for human lives, while people noticed the way of disposal has not necessarily been established, especially after the Fukushima Daiichi power plant disaster. One of the ways to reduce the amount of LLFP or to recover them as recycled resources is nuclear transmutation technique.

RIBF facility has a property to generate such LLFP as a secondary beam and the beam species are identified by event by event. Utilizing the property, absolute values of the cross section of various reactions on LLFPs are measured and accumulated as a database.

In addition, a project to obtain nuclear reaction data on stable nuclei by means of inverse kinematic technique to provide the distribution of reaction residue nuclides. It will be utilized on Pb/Bi for ADS neutron generator materials or on Li/Be for blanket on nuclear fusion reactors.

Furthermore, we started to obtain production cross section to minor actinide (MA) nuclide from primary uranium beam. This methods will provide an opportunity to study MA nuclides by distributing them as a secondary beam in near future.

2. Major Research Subjects

(1) Measurement of reaction products by the interaction of LLFPs with proton, deuteron, and photon to explore candidate reactions for the transmutation of LLFPs
(2) Evaluation of the cross section data for the neutron induced reactions from the obtained data

3. Summary of Research Activity

(1) Acting as a collaboration hub on many groups which plan to take data using fast RI beams in RIBF facility
(2) Concentrating on taking data for proton and deuteron induced spallation reactions with inverse kinematics
(3) Accumulating the cross section data and evaluating them as evaluated nuclear data
(4) Evaluating cross section of neutron induced reaction on LLFP by collaborating with the nuclear model calculation and evaluation group

Members

Team Leader

Hideaki OTSU (Concurrent: Team Leader, SAMURAI Team)

Junior Research Associate

Riku MATSUMURA

Visiting Scientists

Takashi TERANISHI (Kyushu Univ.)
Ayano MAKINAGA (Teikyo Univ.)
Shin'ichiro MEIGO (JAEA)
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List of Publications & Presentations

Presentations

[Domestic Conferences/Workshops]

R. Matsumura, "New analytical model for momentum distribution on the spallation reaction in inverse kinematics," 2022 Symposium on Nuclear Data, Kinki University, Osaka, Japan, November 17–18, 2022.

R. Matsumura, "New analytical model for momentum distribution on the spallation reaction in inverse kinematics," JSPS/NRF/NSFC A3 Foresight Program, "Nuclear Physics in the 21st Century," Osaka International Convention Center, Osaka, Japan, February 13–15, 2023.

Other

[Bachlar Thesis]

福嶋千隼, 卒業論文, 「理研 RI ビームファクトリーでのネプツニウム 237 同位体の生成」, 東京都市大学, 2023 年 3 月.