

Study of proton- and deuteron- induced reactions on the long-lived fission product ^{93}Zr at 30MeV/u in inverse kinematics

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[background]

Nuclear reactions for the long-lived fission product (LLFP) ^{93}Zr ($T_{1/2}=1.6$ million years) have been studied for the purpose of nuclear waste transmutation. According to the previous report[1], it was found that the proton- and deuteron-induced spallation reactions at 105 MeV/u are effective for the ^{93}Zr transmutation. For systematic study, we performed an experiment for the proton- and deuteron- induced reactions on ^{93}Zr at 30 MeV/u. In this energy region, the fusion evaporation process is dominant. Thus, the reaction mechanism dependence can be studied by comparison with the high energy spallation data.

[experimental method]

This experiment was performed at RIKEN Radioactive Isotope Beam Factory (RIBF). The degraded RI beams at 30 MeV/u were produced by a newly developed beam line, OEDO. To induce the reactions, the high-pressure cooled gas targets (H_2 and D_2) were used. Reaction residues were analyzed by the SHARAQ spectrometer.

In this talk, we will present the details of experiments and the obtained results.

References

[1] S. Kawase et al., Prog. Theor. Exp. Phys. 2017, 093D03 (2017).

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