

Symposium on Nuclear Data 2020

Ag102 12.9 m	Ag103 65.7 m	Ag104 69.2m	Ag105 41.29 d	S ymposium on	Ag107 51.839 %	Ag108 2.37 m	Ag109 48.161 %	Ag110 24.6 s	Ag111 7.45 d	Ag112 2.120 h
Pd101 8.47 h	Pd102 1.02 %	Pd103 16.991 d	Pd104 11.14 %	Pd105 22.33 %	N uclear	Pd107 8.36 m	Pd108 26.46 %	Pd109 11.7002h	Pd110 11.72 %	Pd111 20.1 m
Rh100 20.8 h	Rh101 3.3 y	Rh102 1.75 y	Rh103 100 %	Rh104 42.3 s	Rh105 37.98 h	D ata	2020 Nov.	Rh108 3.0 m	Rh109 99 s	Rh110 3.3 s

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Type: **Poster Presentation**

Research for nuclear transmutation of high-radiotoxic nuclide ^{90}Sr via proton- and deuteron-induced reactions / 高放射性核種 ^{90}Sr の陽子及び重陽子誘起反応による核変換に向けた研究

Thursday, 26 November 2020 17:13 (1h 37m)

Processing of spent fuel from nuclear power plants is a worldwide problem. The high-level radioactive waste is the product after the reprocessing of spent fuel, which includes minor actinides and fission products of radioactive waste. Especially, ^{90}Sr ($T_{1/2} = 28.8$ years) is the highest radiotoxic nuclide in the fission products. It is highly desired to develop nuclear transmutation technology using accelerator facilities to reduce these harmful nuclides. The simplest way can be to irradiate a neutron beam on the radioactive waste. However, it is not well known that ^{90}Sr is transmuted into how much and which nuclide in this reaction. Therefore, it is essential to study, in advance, the reaction-cross-sections to each nuclide from ^{90}Sr . From this point of view, the inverse kinematics, i.e. including the ^{90}Sr beam incident on light-particle targets, is an effective method the reaction products can be identified at the forward directions.

To realize this purpose, we have planned the proton- and deuteron-induced reaction-cross-section measurements in inverse kinematics and performed the experiment using the BigRIPS separator [1] and the ZeroDegree spectrometer [1] at the RIKEN Radioactive Isotope Beam Factory. The radioactive ^{90}Sr beam with 104 MeV/u, produced and separated in the BigRIPS, incident on the C, CH₂, and CD₂ targets. The reaction products in the forward directions were transferred to the ZeroDegree and identified using the detectors at the focal plane. The reaction-cross-sections were obtained from the measured yields of each reaction channel. At this time, the contributions from carbon and beam-line materials were subtracted as a background. The obtained reaction-cross-sections were compared to the PHITS calculation [2] and the data with different energy of 185 MeV/u [3].

[1] T. Kubo, et al., Progr. Theor. Exp. Phys. 2012, 03C003 (2012).

[2] T. Sato, et al., J. Nucl. Sci. Technol. 50, 913 (2013).

[3] H. Wang, et al., Phys. Lett. B 754, 104 (2016).

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