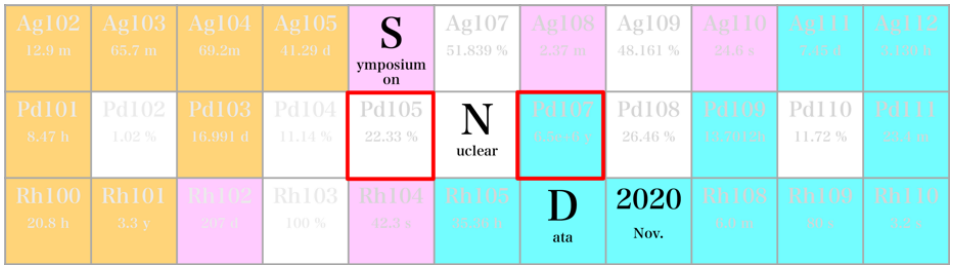

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Isotope production in spallation reaction of 93Zr and 93Nb induced by proton and deuteron / 93Zr 及び 93Nb に対する陽子・重陽子入射核破砕反応からの同位体生成

Nuclear transmutation technology has been attracting attention as a method for treating high-level radioactive waste. One of the candidates is the spallation reaction using high-energy particles, especially for the nuclides with relatively small neutron-capture cross sections such as long-lived fission product (LLFP) ^{93}Zr. The accumulation of nuclear reaction data and the development of nuclear reaction models based on the data are indispensable for the accurate prediction of the amount of conversion of ^{93}Zr to stable nuclides and/or short-lived nuclides and residual long-lived nuclides after the transmutation. Therefore, under the ImPACT program (Period: 2014 –2018), we have measured isotope-production cross sections in proton- and deuteron-induced spallation reactions on LLFP ^{93}Zr and adjacent nuclide ^{93}Nb at RIKEN RIBF.

In the experiment, a ^{93}Zr beam at 50 MeV/nucleon and a ^{93}Nb beam at 113 MeV/nucleon were produced by inflight-fission of ^{238}U. These beams were irradiated to secondary targets containing hydrogen and deuterium to induce spallation reactions, and the product yields were analyzed by ZeroDegree Spectrometer to determine the product cross sections. The results are compared with the nuclear reaction models.

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