Contribution ID: **1** Type: **not specified**

Treating Radioactive Waste: Measurement of 93Zr + d Reactions at 30 MeV/u

Wednesday, 8 March 2023 15:05 (5 minutes)

Treating nuclear waste, in particular long-lived fission products (LLFPs), remains a worldwide problem for the future long-term sustainability of nuclear energy. A promising solution uses nuclear transmutation reactions to convert LLFPs into stable and short-lived nuclear matter for simpler, safer storage. Transmutation studies typically use neutron-induced fission, however, the LLFP ^{93}Zr (half-life ~ 10^6 years) poses the challenge that stable Zr isotopes in the waste, namely ^{91}Zr and ^{92}Zr, may be transformed into ^{93}Zr by neutron capture. Consequently, transmuting ^{93}Zr by neutron capture is not practical. An alternative transmutation process uses deuteron-induced pre-equilibrium reactions on ^{93}Zr, but there's a lack of cross-section data at energies below 50 MeV/u. To address this knowledge gap, the ^{93}Zr+d pre-equilibrium cross-sections were measured at ~ 30 MeV/u as part of the ImPACT program using the BigRIPS-OEDO beamline at the RIBF in RIKEN, Japan. A radioactive ^{93}Zr beam was produced and separated by BigRIPS. Using OEDO the beam was decelerated and focused onto the cryogenically cooled deuterium gas target. Reaction products were momentum-analyzed by part of the SHARAQ spectrometer and then identified using the Bρ-dE-range method. This poster presents the experimental procedure and preliminary results.

Experimental study on nuclear physics

Primary author: CHILLERY, Thomas

Co-authors: Dr HWANG, Jongwon (Center for Nuclear Study, University of Tokyo); DOZONO, Masanori (Kyoto University); IMAI, Nobu (CNS); MICHIMASA, Shin'ichiro (Center for Nuclear Study, the Univ. of Tokyo); Dr SUMIKAMA, Toshiyuki (RIKEN Nishina Center); Dr CHIGA, N. (RIKEN Nishina Center); Prof. OTA, Shinsuke (RCNP, Osaka University); BELIUSKINA, Olga (CNS); HAYAKAWA, Seiya

Presenter: CHILLERY, Thomas

Session Classification: Poster Session