Contribution ID: **14** Type: **Experimental Nuclear Physics**

Barrier distribution and excitation function measurements of the 51V + 159Tb fusion reaction for estimating the optimal reaction energy for the synthesis of new elements.

Wednesday, 9 August 2023 14:50 (5 minutes)

We, the nSHE Research Group, are searching for new elements beyond element 118 (oganesson), i.e. element 119, at RIKEN. The probability of producing superheavy elements by fusion reactions is extremely low. Therefore, it is crucially important to determine the optimal experimental conditions to maximize the production rate, especially by predicting the optimum incident energy that maximizes the cross section. For this purpose, we have been developing a method to estimate the optimal energy based on the experimental data of quasielastic (QE) barrier distributions. In this study, we measured the QE barrier distribution and excitation function of the evaporation-residue cross section for the 51V+159Tb fusion reaction. This reaction system was chosen because 159Tb has a large quadrupole deformation similar to that of 248Cm used in the search for element 119. The comparison of the QE barrier distribution and the excitation function was used to clarify the fusion reaction mechanism involving the deformed nuclei and to improve the accuracy of the method for estimating the optimal incident energy.
In this presentation, We will show the results of the barrier distribution and excitation function measurements for the 51V+159Tb system. The experiments were performed at the RIKEN superconducting heavy-ion linear accelerator facility (SRILAC). The measured data are compared with coupled-channel calculations using the CCFULL code.

Presentation type

Primary author: Mr MICHIMOTO, Yuya (Kyushu Univ.)

Co-authors: Prof. SAKAGUCHI, Satoshi (Kyushu Univ.); NSHE COLLABORATION

Presenter: Mr MICHIMOTO, Yuya (Kyushu Univ.)

Session Classification: Short presentation for poster contributions