Study on the high energy proton linac-based production of theranostic radioisotope ^{67}Cu.

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Copper-67 (half-life, 61.83 h) is well known as a theranostic radionuclide, because of its simultaneous emission of a γ-ray (184 keV) and β-ray (mean energy, 141 keV). It is expected that ^{67}Cu may have the same biological behavior due to the same chemical properties as ^{64}Cu which is a positron emitter radionuclide showing excellent biological results in clinical studies. Thus, recently, ^{67}Cu leads to increased interest in theranostics. Owing to this increasing interest in ^{67}Cu, the coordinated research project of the international atomic energy agency selected ^{67}Cu as new theranostic radionuclides together with ^{47}Sc and ^{186}Re. However, an insufficient supply of ^{67}Cu limits the application in clinical and pre-clinical researches. By using a 100-MeV proton linac installed at the Gyeongju branch of Korea atomic energy research institute, we now develop the production technology of ^{67}Cu thanks to a license for RI production from the Korea institute of nuclear safety. In this talk, I would like to present the results of the accurate measurement of cross-section ^{68}Zn(p,2p)^{67}Cu in the energy range 40-100 MeV using a developed analytical peak-separation method that is a fundamental study to produce ^{67}Cu isotope. Furthermore, I will address a plan to obtain the cross-section ^{70}Zn(p,x)^{67}Cu data in the high energy range, because there is a possibility of getting a higher yield from the this reaction.

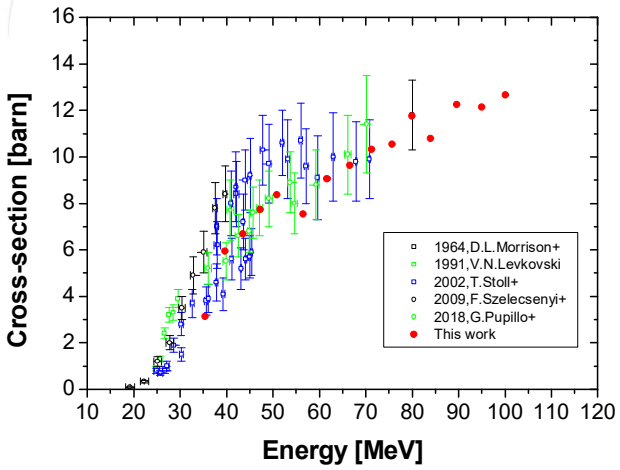

Fig. 1. Reaction cross section as a function of incident proton energy for the reaction of ^{68}Zn(p,2p)^{67}Cu.

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