Abstract

^{52}Fe is the solitary radioisotope of iron that can be employed for diagnostic application in the future, due to its in vivo visualization distribution. The radionuclide might be beneficial for patient-specific PET dosimetry due to its suitable half-life ($T_{1/2} = 8.27h$) and specific activity (E_{γ} =168 keV, 99.2%). The main attribute that makes ^{52}Fe significant is that it has a mode of decay that involves both positron emission (56%) and electron capture (44%) and therefore is well-suited for imaging with both conventional "gamma-ray and Positron emission tomography (PET)". It is also useful for the indirect production of short-lived radionuclide ^{52m}Mn ($T_{1/2} = 21.1m,$), which may further serve as a tracer in nuclear medicine.

In this research, experimental data for excitation functions and cross-sections will be analyzed for the radionuclide ^{52}Fe produced in proton-induced reactions of ^{nat}Ni (p, x) ^{52}Fe and ^{55}Mn (p,4n) ^{52}Fe up to 100MeV. The experimental excitation functions and previous experimental results are compared to the theoretical calculations from TALYS-based Nuclear Data Library (TENDL), Alice-IPPE and Empire-3.2.2.