Abstract

Terbium is the most intriguing element for theragnostic application in future. The intensity of the ^{152}Tb positron emissions ($T_{1/2}$, 17.5 h) is 17%, and their average energy is 1.080 MeV. The radionuclide might be beneficial for patient-specific PET dosimetry before the use of therapeutic radiolanthanides. The main reason that ^{152}Tb is of interest is because of its positron radiation, which enables the use of it as a diagnostic pair for ^{177}Lu and a therapeutic terbium isotope.

In this study, experimental data for excitation functions and cross sections will be analysed for the radionuclide ^{152}Tb produced in proton-induced reactions of ^{152}Gd(p, n)^{152}Tb, ^{155}Gd(p,4n) ^{152}Tb, and ^{159}Tb(p,8n) ^{152}Tb, as well as alpha-induced reactions of ^{151}Eu(α,3n)^{152}Tb up to 100MeV. The theoretical predictions from TALYS 2017, 2019, and 2020 are compared to the experimental excitation functions as well as to prior experimental data.