

Abstract

One of the elements with the most intriguing potential uses in theragnostic is terbium. In fact, four of its radionuclides, ^{149}Tb , ^{152}Tb , ^{155}Tb , and ^{161}Tb can be used in all the primary nuclear medicine applications due to their physical characteristics. Only ^{149}Tb among the radio-lanthanides has the lowest mass alpha emitter that is physically acceptable for receptor-targeted alpha therapy (TAT).

In this study, cross sections for the radionuclide ^{152}Tb produced in proton-induced reactions for the reactions of $^{152}\text{Gd}(p,4n)$, $^{154}\text{Gd}(p,6n)$, $^{155}\text{Gd}(p,7n)$, and $^{156}\text{Gd}(p,8n)$, as well as alpha-induced reactions for $^{151}\text{Eu}(,6n)^{149}\text{Tb}$ up to 100Mev, are calculated using the data from experimental excitation functions. The experimental excitation functions are compared to theoretical data from TALYS 2017, 2019, and 2020 as well as prior experimental data, where available.