

## VALIDATION AND UPGRADING OF THE RECOMMENDED CROSS SECTION DATA OF CHARGED PARTICLE REACTIONS USED FOR PRODUCTION OF GAMMA EMITTER DIAGNOSTIC RADIOISOTOPES

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A recommended charged particle cross section database was published by IAEA, Vienna in 2001 (IAEA-TECDOC-1211. (2001), <http://www-nds.iaea.org/medical>) under the title "Charged particle cross-section database for medical radioisotope production: diagnostic radioisotopes and monitor reactions". The database is divided into three main parts: monitor reaction, production of gamma emitter diagnostic radioisotopes and production of PET radioisotopes.

An upgrade and validation test of the database was performed and published for the PET isotope production reactions in 2003 to improve the quality and increase the reliability of the corresponding part of the database. As a continuation of that work the cross sections of nuclear reactions in which gamma emitter radioisotopes are produced were investigated. The experimental cross section data published earlier or measured recently and not yet included in the evaluation work of IAEA were collected and added to the primary database in order to improve the quality of the recommended data. The following reactions are considered:  $^{67}\text{Zn}(p,n)^{67}\text{Ga}$ ,  $^{68}\text{Zn}(p,2n)^{67}\text{Ga}$ ,  $^{111}\text{Cd}(p,n)^{111}\text{In}$ ,  $^{112}\text{Cd}(p,2n)^{111}\text{In}$ ,  $^{123}\text{Te}(p,n)^{123}\text{I}$ ,  $^{124}\text{Te}(p,2n)^{123}\text{I}$ ,  $^{124}\text{Te}(p,n)^{124}\text{I}$ ,  $^{127}\text{I}(p,5n)^{123}\text{Xe}$ ,  $^{127}\text{I}(p,3n)^{125}\text{Xe}$ ,  $^{82}\text{Kr}(p,2n)^{81}\text{Rb}$ ,  $^{nat}\text{Kr}(p,x)^{81}\text{Rb}$ ,  $^{124}\text{Xe}(p,2n)^{123}\text{Cs}$ ,  $^{124}\text{Xe}(p,pn)^{123}\text{Xe}$ ,  $^{203}\text{Tl}(p,3n)^{201}\text{Pb}$ ,  $^{203}\text{Tl}(p,2n)^{202m}\text{Pb}$ ,  $^{203}\text{Tl}(p,4n)^{200}\text{Pb}$ .

The collected data sets were analysed again and a new selection was made. From the newly selected data groups a single coherent data set was composed. An updated, recommended excitation curve produced, by fitting the selected set using the cubic spline statistical fitting method. The updated recommended data were verified and validated using independent experimental thick target yield data. The collected experimental yield data were critically compared with integral thick target yields deduced from the new recommended cross sections.