Abstract

Evaluation of nuclear reaction cross section data was performed for the production of radionuclides of yttrium i.e. $^{86,87,88}Y$ for medical applications via charhged particle induced reactions on different targets of $^{86.87,88}Sr$, ^{85}Rb and ^{nat}Zr. Nuclear reaction cross sections for the production of these radionuclides were also measured experimentally via deuteron induced reaction on natural zirconium target up to 50 MeV beam energy by stack foil activation technique followed by gamma ray spectroscopy at Lawrence Berkeley National Lab, USA. A comprehensive analysis of all the experimental data obtained during actual experiment, EXFOR database and literature was done. The nuclear model calculations were performed by using nuclear model codes i.e. ALICE-IPPE, TALYS 1.6 and EMPIRE to check the reliability and consistency of experimental data. The recommended cross sections were generated based on our evaluation methodology. Yield of each radionuclide was calculated from the recommended cross sections. Medical applications of these radionuclides demand that they should be in a pure form, free from any radionuclidic impurity. So analysis of radionuclidic impurities associated with each reaction was performed based on our recommended cross sections and TALYS calculations. The recommended cross sections, yield and accompanying impurities are used for optimization of different charged particle induced reactions for the production of $^{86,87,88}Y$.