



Contribution ID: 42

Type: **not specified**

Measurement and simulation of radionuclide product yields in iron from 400 AMeV carbon ions

Wednesday, June 2, 2010 5:50 PM (20 minutes)

Radioactive fragments induced in an iron target bombarded by 400 MeV/nucleon carbon ion beam were measured and compared with simulation carried out using Monte-Carlo radiation transport code FLUKA.

An iron target thicker than the stopping range of carbon ion beam was irradiated with a focused 400MeV/u carbon ion beam. After the irradiation, the iron target was disassembled to extract cylinders (2.0 cm of radius and 0.15 cm of thickness) coaxial with the ion beam line. Gamma-ray spectra of 41 samples were measured with a high purity germanium detector. Distribution of activity of 18 gamma-ray emitting fragments from ${}^7\text{Be}$ to ${}^{58}\text{Co}$ were measured as a function of depth.

This irradiation was simulated using FLUKA to reproduce activation inside cylinders induced by both primary ion beam and secondary particles produced by carbon ion based on the default nuclear model of FLUKA. Taking account of the build-up during the irradiation and decay after the irradiation, measured and simulated results were compared.

In general, the simulation and experiment agree within a factor of two. Particularly simulation underestimates activity of most of the nuclides by a factor of about 10 at the end of the range of ion beam, which is probably attributed to the deficiency of default nuclear reaction model (RQMD) to reproduce ion induced reactions below 100 MeV/u. Furthermore, it is found that simulation tends to give better estimate for heavier nuclides.

Primary author: Mr OGAWA, Tatsuhiko (University of Tokyo)

Co-authors: Dr TOSHISO, Kosako (University of Tokyo); Dr MOREV, Mikhail (University of Tokyo); Dr IIMOTO, Takeshi (University of Tokyo)

Presenter: Mr OGAWA, Tatsuhiko (University of Tokyo)

Session Classification: Session 3 - Benchmarking code/code & code/experimental data

Track Classification: Benchmarking - code/code and code/experimental data