Contribution ID: **335** Type: **not specified**

ANITA-NC: a Code System for Modelling Material Activation Induced by Neutral or Charged Particles

Monday, 17 September 2018 11:00 (2 hours)

The evaluation of the neutron induced material activation plays an important role for the development of future fusion power plants for issues related to safety, engineering design and radioactive waste management. For these devices the activation codes and cross section libraries handling neutron energies up to 20 MeV are quite adequate.
Besides, in order to study the irradiation effects on fusion materials, some facilities have been proposed to produce accelerator-based neutron sources of sufficient intensity to test samples of candidate materials to be used in future fusion power plants. The International Fusion Materials Irradiation Facility (IFMIF) and, more recently, DONES (DEMO Oriented Neutron Source), more tightly focused on DEMO needs, have been proposed to be such dedicated facilities. In both these plants the neutron source is produced through the reaction of 40 MeV deuterons impinging on a liquid lithium target so that neutrons with energies up to 55 MeV are produced.
In these facilities the deuterons will themselves cause activation, particularly in the accelerator structure and in the lithium target.
ANITA-NC (Analysis of Neutron Induced Transmutation and Activation – Neutral and Charged) is an inventory code developed in ENEA-Bologna, capable of modelling material activation induced by several neutral and charged projectiles (neutron, proton, alpha, deuteron and gamma). It is an extension of the previous ANITA versions.
ANITA-NC uses the EAF-2010 group-wise cross-section libraries in EAF format. The VITAMIN-J+ (211) energy group structure for neutrons, up to 55 MeV, and the CCFE (162) group structure for p, α, d and γ, up to 1 GeV, are used.
The decay data used in ANITA-NC are based on the JEFF-3.1.1 Radioactive Decay Data Library.
The present paper summarizes the main characteristics of the ANITA-NC activation system. Some relevant application cases and examples of data and code validation on experimental results are also shown.

Co-author: FRISONI, Manuela (FSN ENEA)

Presenter: FRISONI, Manuela (FSN ENEA)

Session Classification: P1