

Simulation of activation reaction distribution in concrete exposed to
intermediate energy neutrons

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Abstract

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Neutron induced reaction rate depth profiles inside concrete shield irradiate by intermediate energy neutron were calculated using a Monte-Carlo code and compared with an experiment. An irradiation field of intermediate neutron produced in the forward direction from a thick (stopping length) target bombarded by 400 MeV/nucleon carbon ions was arranged at the Heavy Ion Medical Accelerator in Chiba. Ordinary concrete shield of 90 cm thickness was assembled 50cm downstream the iron target. Activation detectors of aluminum, gold, and gold covered with cadmium were inserted at various depths. Irradiated samples were extracted after exposure and gamma-ray spectrometry was performed for each sample. Comparison of experiment and calculation shows good agreement for both low and high energy neutron induced reaction except for  $^{27}\text{Al}(n,X)^{24}\text{Na}$  reaction at the surface.