

Comparison of FLUKA predictions to measured induced activities
in shielding and environmental samples irradiated at the Pohang
Light Source with 2.5 GeV electrons

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Abstract

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Monte Carlo predictions of induced activities in environmental and shielding materials are a cost-effective and fast way to determine and reduce the radiation exposure to personnel and the environment. In order to better understand the level of agreement that can be expected between FLUKA simulations and typical measurements of the induced activity in environmental media and shielding materials from high energy electron accelerator operations, an irradiation experiment was carried out and then reproduced in detailed FLUKA simulations. Samples of soil, concrete, marble, shotcrete, copper and rebar were placed around a copper dump at the Pohang Light Source injector of the Pohang Accelerator Laboratory, Korea. For approximately 3 days, a 2.5-GeV, 20-W electron beam was incident on the copper dump. The induced activity of the materials and the activation isotopes were determined via gamma ray spectroscopy using HPGe detectors. The measurement results were compared with the predictions obtained using a FLUKA simulation that was based on the actual irradiation conditions. Work supported by Department of Energy contract DE-AC02-76SF00515