

Study of ^{149}Sm capture and total cross sections for burnup credit applications

A. Stamatopoulos¹⁾, P. Koehler¹⁾, E. Leal-Cidoncha¹⁾, A. Couture¹⁾, G. Rusev²⁾, J. Ullmann¹⁾,

1) Physics Division, Los Alamos National Laboratory, 87545, NM, USA

2) Chemistry Division, Los Alamos National Laboratory, 87545, NM, USA

thanos@lanl.gov

Abstract: The performance of evaluated cross sections of fission products (FP) in the thermal, resolved (RRR) and unresolved resonance region (URR) for burnup credit analysis has been found to be insufficient (ORNL/TM-2005/65). Throughout the years, the evaluations were focused on actinides such as Uranium and Plutonium, whereas efforts on evaluating cross sections of FP were significantly less thorough. More specifically, there is a lack of measurements and R-matrix analyses in the RRR and URR for various FP nuclei such as ^{143}Nd and ^{149}Sm . ^{149}Sm in particular, has a thermal capture cross section of 40 kb and is an important stable FP for burnup credit. ^{149}Sm builds up like ^{135}Xe in power reactor fuel, however, it does not decay out of spent nuclear fuel. The capture and total cross sections have been identified as insufficient (ORNL/TM-2005/65). The 4π Detector for Advanced Neutron Capture Experiments (DANCE) and the new neutron-transmission Device for Indirect Capture Experiments on Radionuclides (DICER) have been used at the Los Alamos Neutron Science Center (LANSCE) to study the capture and total cross section, respectively. Experimental details and efforts on the ongoing analysis will be presented.