BURN-UP PHYSICS IN A COUPLED HAMMER-TECHNION/CINDER-2 SYSTEM AND ENDF/B-V AGGREGATE FISSION PRODUCT THERMAL CROSS SECTION VALIDATION

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ABSTRACT

The effect of the fission product poisoning in a thermal reactor has been explicitly addressed. The proposed scheme is based in a coupled HAMMER–TECHNION/CINDER–2 system. The fission product chain treatment considers nearly 99% of all original CINDER–2 fission product neutron absorption.The calculational methodology and the ENDF/B–V fission product nuclear data performances have been investigated by comparing the calculated aggregate fission product neutron absorption against the available experimental data. Good agreement has been found for the fission product quantity σ_{2200} for U235 and U233. The Pu239 calculated values are not in good agreement.

INTRODUCTION

Fission product poisoning in nuclear reactors is one of the most important aspects in reactor technology .The accurate prediction of neutron absorption by fission products is extremely important in the fuel cycle strategy of a nuclear reactor. In the past, the lack of adequate nuclear data sets and the unknown fission product transmutation behavior have imposed severe restrictions in the predictions of fission product poisoning in nuclear reactors.However, since the development of the CINDER [1] computer code in 1962 and after the release of ENDF/B–IV [2-6] and ENDF/B–V [7] libraries there has been a significant progress in these areas. Furthermore the computer technology development has contributed for the use of more sophisticated approaches in reactor physics analysis such as an explicit fission product treatment that was made available by the development of the CINDER computer code.

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