Analysis of irradiated UO2 and MOX fuel composition data measured in REBUS program

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1. Introduction

Critical Experiments with UO2 and MOX fuels irradiated in LWR commercial plants were performed in the REBUS international program. We performed burnup calculations for irradiated fuels with the nuclear library JENDL-3.2 in the analyses of the critical experiments. The irradiated fuels used in critical experiments were MOX fuel irradiated in the BR3 PWR plant (BR3-MOX), MOX fuel irradiated in the Gundremmingen BWR plant (GUN-MOX) and UO2 fuel irradiated in the GKN-Ⅱ PWR plant (GKN-UO2).The fuel compositions of three samples taken from the irradiated fuels were measured at the hot laboratory in SCK/CEN. We have been studying the analysis method including nuclear data through the comparison between the calculated and the measured composition data, in which burnup calculations were performed with SRAC and MVP-BURN codes.

2. Summary of Study

The burnup of measured fuel samples are about 20GWd/t in BR3-MOX, about 62 GWd/t in GUN-MOX and about 54 GWd/t. We compared the calculated values and the measured values for the measured actinides and FPs shown as the follows.

・Actinide nuclides :

U : U-234, U-235, U-236, U-238

Np : Np-237

Pu : Pu-238, Pu-239, Pu-240, Pu-241, Pu-242

Am : Am-241, Am-242m, Am-243

Cm : Cm-242, Cm-243, Cm-244, Cm-245

・FP nuclides :

Ce : Ce-144

Nd : Nd-142, Nd-143, Nd-144, Nd-145, Nd-146, Nd-147, Nd-148, Nd-150

Sm : Sm-147, Sm-148, Sm-149, Sm-150, Sm-151, Sm-152, Sm-154

Eu : Eu-153, Eu-154, Eu-155

Gd : Gd-155

Cs : Cs-133, Cs-135, Cs-137

Metal FPs : Mo-95, Tc-99, Ru-101, Rh-103, Pd-105, Pd-108, Ag-109

The results of our study will be presented in the conference.