Preliminary Analysis of In-reactor Behavior of Three MOX Fuel Rods in the Halden Reactor

Yang-Hyun KOO, Byung-Ho LEE and Dong-Seong SOHN
Korea Atomic Energy Research Institute

Abstract

Preliminary analysis of in-reactor thermal performance of three MOX fuel rods, which are going to be irradiated in the Halden reactor beginning in the first quarter of the year 2000 under the framework of the OECD Halden Reactor Programme, have been conducted by using the computer code COSMOS to ensure their safe operation. Parametric studies have been carried out to investigate the effect of uncertainties on in-reactor behavior by considering the four kinds of uncertainties; thermal conductivity, linear power, manufacturing parameters, and model constants. The analysis shows that, in the case of annular MOX-1 fuel, calculation results for thermal performance vary widely depending on the selection of model constants for fission gas release (FGR). On the contrary, the thermal performance of solid MOX-3 fuel does not depend on the choice of FGR constants to a large extent as MOX-1, because the fuel temperature is very high in the MOX-3 irrespective of the choice of FGR constants and hence the capacity of grain boundaries to retain gas atoms is not large enough to accommodate the number of gas atoms reaching the grain boundaries. It is planned that when the data on microstructure and thermal conductivity for each type of MOX fuel are available, new analysis will be made using these information. In addition, FGR model constants will be derived from the measured fuel centerline temperature, rod internal pressure and other related data.

Zircaloy 피로 설계 곡선 및 중수로용 개량핵연료 (CANFLEX) 설계에서의 적용

Zircaloy Fatigue Design Curve and Its Application to CANFLEX Fuel Design

심기섭, 석호천
한국원자력연구소

요약

Zircaloy 피로시험 결과들을 수집하고 서로 비교 평가하여, 재료 특성, 온도, 부식성 분위기 및 중성자 조사가 피로에 미치는 영향을 규명하였다. 이 검토 결과를 토대로 Zircaloy 피로 설계 곡선을 제안하였고, 이것을 중수로용 개량핵연료인 CANFLEX 설계에 적용한 결과를 기술하였다.