PRIME code for Thermo-Mechanical Performance Analysis for U-Mo/Al Dispersion Fuel

Gwan Yoon Jeong, Dong-Seong Sohn
Department of Nuclear Engineering
Ulsan National Institute of Science and Technology, 50 UNIST-gil, Eonyang-eup, Ulju-gun,
Ulsan 689-798 – Republic of Korea

Yong Jin Jeong, Jong Man Park
Korea Atomic Energy Research Institute, 989-111 Daedeokdaero, Yuseong, Daejeon 305-353
Korea

ABSTRACT

The development of PRIME (PRedIction code for thermo-MEchanical performance of research reactor fuel) is aimed at an establishment of the performance prediction program for U-Mo/Al dispersion fuel with concise, robust manners and an efficient computation time. Temperature and burnup dependency material properties for the fuel and cladding have been utilized during analysis. Fully two-dimensional temperature, displacement, and stress distributions for the fuel meat and cladding during irradiation can be predicted, corresponding to the user-provided input data including fabrication as well as power history information. In this paper, some prediction results for RERTR plates by the PRIME code are presented, and they are compared to the measurement data for the verification process using RERTR plates. By the verification process, it was shown that the implementation of the concept of homogeneous medium for the fuel meat is justifiable, and the prediction results are in good agreement with the measurement data.