Contribution ID: **21** Type: **Poster**

Deformation Behavior of an Irradiated Spacer Grid for PWR Fuel Assembly

The mechanical properties of a space grid of a fuel assembly are of great importance for fuel operation reliability in extended fuel burnup and duration of fuel life. A spacer grid with inner and outer straps has cell spring and dimples, which are in contact with the fuel rod. The spacer grids supporting the fuel rods absorb vibration impacts due to the reactor coolant flow, and grid spring force decreases under irradiation. This reduction of contact force might cause grid-to-rod fretting wear. The fretting failure of the fuel rod is one of the recent significant issues in the nuclear industry from an economical as well as a safety concern. Thus, it is important to understand the characteristics of cell spring behavior and the change in size of grid cells for an irradiated spacer grid. To evaluate the fretting wear performance of an irradiated spacer grid, hot cell tests were carried out at IMEF of KAERI. Hot cell examinations include spring stiffness measurement and dimensional measurement for the irradiated spacer grid. The stiffness of cell springs was dependent on the measurement positions, leading to significant load variations. The change of cell sizes was dependent on the direction of the spacer grids, leading to significant gap variations. It was found that the change in size of the cell springs due to irradiation-induced stress relaxation and creep during the fuel residency in the reactor core affect the contact behavior between the fuel rod and the cell spring.

Primary author: Dr JIN, Young Gwan (KAERI, 989-111 Daedeok-daero, Yuseong-gu, Daejeon, 305-353, Republic of Korea)

Co-authors: Dr KIM, D. S. (KAERI, 989-111 Daedeok-daero, Yuseong-gu, Daejeon 305-353, Republic of Korea); Mr KIM, G. S. (KAERI, 989-111 Daedeok-daero, Yuseong-gu, Daejeon 305-353, Republic of Korea); Dr AHN, S. B. (KAERI, 989-111 Daedeok-daero, Yuseong-gu, Daejeon 305-353, Republic of Korea); Mr BAIK, S. J. (KAERI, 989-111 Daedeok-daero, Yuseong-gu, Daejeon 305-353, Republic of Korea); Dr CHUN, Y. B. (KAERI, 989-111 Daedeok-daero, Yuseong-gu, Daejeon 305-353, Republic of Korea)

Presenter: Dr JIN, Young Gwan (KAERI, 989-111 Daedeok-daero, Yuseong-gu, Daejeon, 305-353, Republic of Korea)