

Study of Irradiation Induced Restructuring of High Burnup Fuel - (2) Use of Computer and Accelerator for Fuel Science and Development

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ABSTRACT

The New Crossover Project (NXO) is studying effect of fission irradiation on fuel material that research activity is crossing over universities, national and private laboratories. Simulation studies are being performed to find principal and triggering processes of the rim-structure formation in high burnup LWR fuel pellet, using accelerator irradiation and computational calculations. Although this project is was originated from the field of LWR fuel engineering, the methodology is based on advanced nano-science and non-linear mathematics. The experimental procedure is mainly based on accelerators of classical facilities, However, synchrotron radiation is recently applied for atomic scale investigations. The most recent result is the simulated reproduction of the rim-structure (grain subdivision) in sub-micron scale under accelerator environment, not in the fission reactor. The TEM observation results will be shown at the presentation. The first principle calculations are employed to have physically relevant model for the computer simulation of the forming process of the structure. The role of Oxygen defects are presently focused and planar structure formation will be demonstrated by the computation.