

Comparison of Irradiation Behavior Between Atomized and Comminuted U₃Si₂/Al Mini-Plate Fuels

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Abstract

The irradiation test on both the atomized and comminuted U₃Si₂ dispersion mini-plate fuels, with connection to international research co-operation under the RERT program, has been performed in the HANARO reactor in order to understand fuel irradiation performance of two different types of fuel powder. The mini-plates, irradiated until 70 at%U₂₃₅ burn-up at OR6 hole in HANARO were subjected to IMEF for post-irradiation analysis. Visual inspection, gamma scan, dimension measurement, microstructure analysis including EPMA have been conducted. From the PIE results, it is of note that both the atomized and comminuted U₃Si₂ dispersion mini-plate fuels irradiated at HANARO exhibit sound swelling behaviors. The thickness of the aluminide layer formed in all samples ranges from 1.73 μm to 2.13 μm , which implies fuel meat swellings of $\sim 3.3 \Delta V/V_m$. However a bubble distribution with slightly smaller mean diameters was found in the atomized fuel than in the comminuted sample, and the bubble population in atomized fuel appears to be more homogeneous than that in the comminuted fuel.