HTR-PM FUEL PEBBLE IRRADIATION QUALIFICATION IN THE HIGH FLUX REACTOR IN PETTEN

Abstract:
NRG has performed a High Temperature Reactor fuel qualification test in the framework of the Chinese HTR development for INET – Tsinghua University, as a part of the qualification process of Chinese fuel for use in the HTR-PM (High Temperature Reactor -Pebble bed Module). Fuel qualification is an essential part of the licensing process of the HTR-PM, currently under construction in the Shandong province in the People’s Republic of China. The design of the INET irradiation setup for irradiation in the High Flux Reactor is performed by NRG. In the design of the irradiation rig, the pebbles are encased in graphite half shells to form a solid cylindrical stack. Within the graphite, thermocouples are located for temperature monitoring, and neutron fluence monitor sets for neutron fluence verification. Next to the temperature measurements, the online monitoring consisted of fission product release measurements. These measurements were performed with the Sweep Loop Facility, designed and built by JRC-IET. Post Irradiation Examinations are performed and consisted of gamma scanning, dimensional and weight measurements and visual inspection. In April 2016, the pebbles were transported from Petten to Karlsruhe, Germany where the second required step of fuel qualification will be performed, namely heating tests in the KÜFA facility. This paper describes the global lay-out and functionality of the irradiation facility. The online data generated and irradiation parameters are reported, with focus on the measured fission product release behavior of the fuel. The paper also presents non-destructive post irradiation examinations.

URI:  

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