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Extending the grid plate life - Incorporation of lower axial shield for FBTR

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Operational life of Fast Breeder Test Reactor (FBTR) is limited by the grid plate life. An irradiation experiment was carried out in FBTR to determine changes in the mechanical properties of specimens of grid plate material at the desired low fluence irradiation conditions. Based on the analyses of these experiments and flux measurements at the grid plate location, the residual life of FBTR was estimated to be 6.52 EFPY at the end of 18th campaign. Possibility of reducing the neutron damage by including lower axial shields has been considered. Neutronics studies on the effectiveness of materials such as tungsten, tungsten carbide, boron carbide and ferro-boron have been conducted. A suitable arrangement of enriched boron carbide and stainless steel has been analyzed too. Based on these studies, tungsten carbide emerges as the best option. Chemical and metallurgical studies indicate that the material is compatible with sodium, has good thermo-physical properties and, hence suitable for introducing in the FBTR core as the lower axial shield. On implementation, it is expected that the life of FBTR would be increased by 35% of its remnant life.

Country/Int. Organization

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