World Academy of Science, Engineering and Technology
International Journal of Nuclear and Quantum Engineering
Vol:9, No:09, 2015

Development and Analysis of SFR Control Rod Design

Authors : Lenka Dujčíková, Laurent Buiron, Ján Haščík

Abstract : The study is dedicated to safety management of SFR CAPRA core with CFV design improvements. In the case of CAPRA core, demands for reactivity control are higher than for reference core. There are two possible ways how to ensure the certain amount of negative reactivity. One option is to boost control rods worth. The Greater part of the study is aimed at the proposal of appropriate control rod design. At first, the European Fast Reactor (EFR) control rod design with high-enriched boron carbide B4C as absorber material was tested. Considering costly and difficult enrichment process, usage of natural boron carbide absorbator is desired. Obviously, the use of natural boron leads to CR worth reduction. In order to increase it to required value, moderator material was inserted inside the control rod. Various materials and geometric configurations were examined to find optimal solution corresponding with EFR based CR worth value.

Keywords : boron carbide, CAPRA core, control rod design, low void effect design, melting temperature, moderator material
Conference Title : ICNPE 2015 : International Conference on Nuclear Power Engineering
Conference Location : Paris, France
Conference Dates : September 21-22, 2015