

# Radiation Effects in 15-15Ti Steel

The integrity of materials in reactors is associated with the safety and reliability of a nuclear power plant. The accurate evaluation of radiation effects in a material is one way of controlling the reliability of the material. The study presents an evaluation of radiation effects for 15-15Ti steel as a cladding material in irradiation conditions of the China Initiative Accelerator Driven System (CiADS). We compute displacement cross-section for 15-15Ti steel in NRT and BCA-arc-dpa models, using NJOY2016 and IOTA software suites. Then, based on obtained NRT displacement cross-section and empirical property-dpa correlations, we estimate degradation of the cladding material in the CiADS radiation environment, such as expected swelling and hardening of the steel and failure lifetime of the cladding due to swelling. We also simulate titanium carbide precipitations in the steel under irradiation using Cluster Dynamic. Where point defect production rate was estimated by the BCA-arc-dpa displacement cross-section.