

PROCEEDINGS

Development of Small Punch Test to Research the Mechanical Properties of Nuclear Fuel Cladding Tubes

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ABSTRACT

Nuclear fuel cladding tubes have a outer diameter about 10 mm with a wall thickness about 0.5 mm. Their mechanical properties hence cannot be researched using standard test methods. In this study, small punch test (SPT) was developed to research the mechanical properties of nuclear fuel cladding tubes. Instead of plate SPT specimen, tube specimen was used to research fracture toughness and creep properties. Fnite elment simulation based on GTN model was used to verify the proposed method. Results indicated that the tube specimen with a noth can be sufficiently to research fracture toughness. The small punch creep test (SPCT) results were not affected by the specimen initial shape. Therefore, tube specimens were used to research the creep properties of nucale fuel cladding tubes. A power-law creep constitutive of a FeCrAl fuel cladding tube was obtained using tube speicmen based SPCT.

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