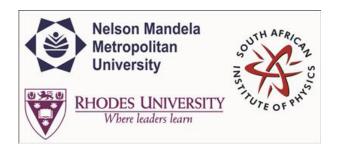
## **SAIP2015**



Contribution ID: 304

Type: Poster Presentation

## Microstructural analysis of proton irradiated zircaloy-4

Tuesday, 30 June 2015 16:10 (1h 50m)

## Abstract content <br/> &nbsp; (Max 300 words)<br/> dry-<a href="http://events.saip.org.za/getFile.py/starget="\_blank">Formatting &<br/> &classed chars</a>

To help understand the microstructural evolution of reactor materials under neutron irradiation, charged particle irradiation of materials in an accelerator environment are carried out. Charged particles have been shown to produce damage effects equivalent to those of neutrons in materials. In this experiment, zircaloy-4 in tubular form was exposed to a pulsed proton beam in a radio frequency quadrupole (RFQ) accelerator at the South African Nuclear Energy Corporation (Necsa). The sample was irradiated to a total dose of 1.19x10E19 ions /cm2. Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM) and X-ray diffraction (XRD) were used to characterize the induced changes in the materials microstructure. With XRD, a reversal of the residual stress and grain growth were observed after proton irradiation. SEM and TEM revealed crack formation in the microstructure plus grain growth as revealed by XRD.

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Session Classification: Poster1

**Track Classification:** Track A - Division for Physics of Condensed Matter and Materials