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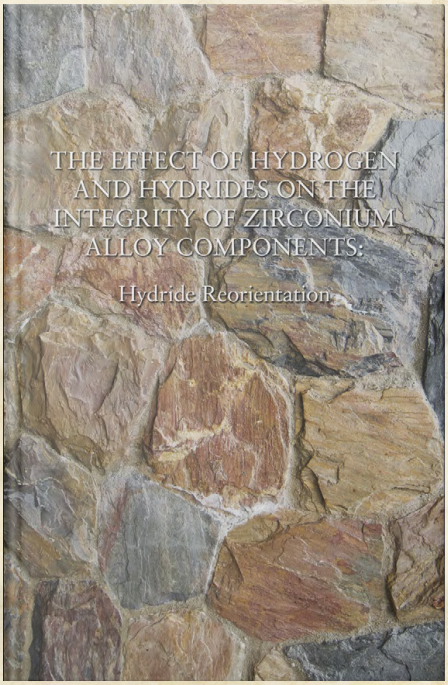


VALUABLE REPORTS ON SALE

Opportunity to purchase all you need to know about Effects of Hydrogen and Hydrides in Zr Alloys as well as about Fuel Material Technology vol. I-IV. The unique reports are described more in the following.

LINK – DOWNLOAD SAMPLE OF REPORT

THE EFFECT OF HYDROGEN AND HYDRIDES ON THE INTEGRITY OF ZIRCONIUM ALLOY COMPONENTS: HYDRIDE REORIENTATION

About this report

Under normal operating conditions, hydrides in zirconium alloy fuel cladding and pressure tubes used in nuclear power reactors are formed as platelets oriented in the circumferential-axial direction of these tubes. Under these conditions, the effect of increasing hydride volume fraction on reducing the fracture toughness of the material is relatively small. However, if conditions are such that hydride platelets precipitate in the radial-axial conditions, then these reoriented hydrides can result in a significant reduction in the fracture toughness of such tubes. This reduction in fracture toughness is also associated with a significant reduction in ductility. Hydride reorientation is, therefore, a key step in understanding and quantifying the effect of hydride precipitates on the fracture toughness of pressure and fuel cladding tubes.

The objective of this report is to provide 1) detailed, up-to-date (or updated) mathematical derivations of theoretical models and experimental methods; 2) data under which hydride reorientation can occur and 3) a purely explanatory summary of these more detailed results. The report is equally accessible and useful for both new workers in the field and those working at the forefront of it. Combined with the author's own assessment of the literature on hydride reorientation, it represents an enriched, cohesive and unique source of information on this topic, useful to all practitioners in this field

Editor & publisher: Peter Rudling © A.N.T. INTERNATIONAL 2020

About the author

Dr. Puls has a PhD degree in Physics from McMaster University, Hamilton, Ontario, Canada. After spending a year as a post-doctoral fellow at McMaster, he joined AECL, retiring from AECL in 2006 after 35 years of service. The first 20 years of service in AECL were spent as a researcher working on pressure tube integrity issues such as Delayed Hydride Cracking, whilst the remaining 15 were spent in various management positions, the last 9 of which were at AECL's Engineering Company located in Missisauga, Ontario, Canada. At that site he managed a resource group of engineers consisting of many of the company's experts for the design, build support, development, life management and service of fuel channel technology in CANDU reactors.

Read more: *https://antinternational.com/experts/dr-manfred-puls/*

Fuel Material Technology Report (FMTR)

Objective

The objective of the Fuel Material Technology Reports Vol. I-IV is to provide guidance for those needing to get an introduction to and an initial understanding of fuel material technology or to update and refresh the memory of those with materials background. This group includes individuals ranging from young engineers and researchers to upper management. The Report provides the basic understanding of various material topics and relate that to fuel performance. It covers the range from basic data to current practical experience.

Authors:

Al Strasser

Brian Cox

Friedrich Garzarolli

Dr. Ron Adamson

Dr. Peter Ford

Dr. Rolf Riess

Peter Rudling

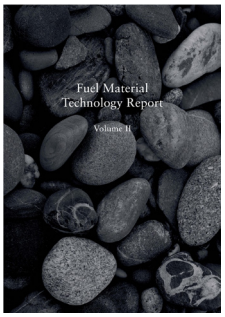
FMTR vol. I

This first volume of the Fuel Material Technology Report covers short general outlines of the designs of PWR, BWR, CANDU, VVER and RBMK reactors but with focus on the corresponding fuel assembly and supporting structure designs together with the rational for the selection of the materials used in the different applications. This volume also gives an overview of the in-reactor fuel performance, of fuel performance codes and the manufacturing process of the fuel assembly.

Contents

- General Reactor Characteristics
- Fuel Assembly Design
  - General outline of fuel assembly design and functions
  - Descriptions of various LWR fuel vendor designs and their specifics
- Fuel assembly materials
- Fuel rod, assembly and pressure tube in-rector performance
- Fuel performance codes
- Manufacturing of pressure tubes for CANDU and RBMK reactors
- Manufacturing of PWR and BWR fuel assembly materials

Read more: *https://www.antinternational.com/docs/samples/FM/11/fmtr1_example_2.pdf*



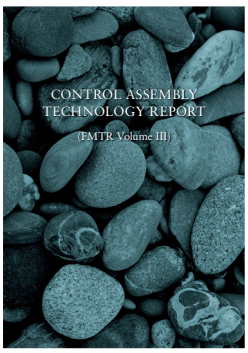
FMTR vol. II

The FMTR vol II covers the effect of radiation on the fuel materials as well as the interaction between materials and cooling water chemistry in the radioactive environment. These effects are treated in a systematic and detailed manner for all types of water cooled nuclear fuel and associated materials

Contents

- Irradiation
  - Types of irradiation
  - Impact on materials
- Water chemistry impac
- Material properties
  - Corrosion and hydriding of Zr alloys
  - Dimensional stability of Zr alloys (irradiation growth, creep, residual stress relaxation, hydriding)
  - Mechanical properties of Zr alloys (stress-strain behaviour, fracture toughness, fatigue)
  - Stress corrosion cracking of Zr alloys (PCI)
  - IASCC of austenitic and nickel alloys
  - Grid-to-rod fretting
  - Secondary degradation of failed fuel
- Safety and design basis accidents (LOCA and RIA)
- Fuel design criteria and operating limits
- Fuel performance during intermediate storage
- High burnup issues and limits

Read more: *https://www.antinternational.com/docs/samples/FM/11/fmtr2_example_2.pdf*



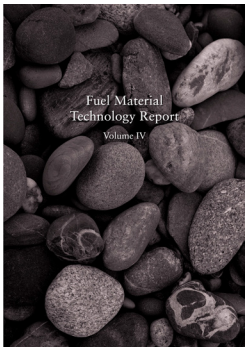
FMTR vol. III

The report on Control Assembly Technology which constitutes Volume III of the series of Fuel Material Technology Reports (FMTRs) will be available during the Spring of 2014. It describes the designs, manufacturing, performance and issues related to BWR/PWR/VVER/CANDU Control Assemblies with Ag-In-Cd (AIC), B4C, Hf absorber materials and stainless steel structural materials.

Contents

- » General outline of control rod designs and what are the functions of the different components
- » Materials used in the control rods and their characteristics (general)
- » Description of various fuel vendor designs (their specifics) and their manufacturing (general)
- » Reactor performance

Read more: *https://www.antinternational.com/docs/samples/FM/11/CATH_FMTR3_sample1.pdf*



FMTR Vol. IV

THE PRIMARY OBJECTIVE of this volume of the Fuel Material Technology Report, FMTR Vol. IV is to provide guidance in improving fuel reliability. To reach this objective various Poolside and Hot Cell Examinations techniques may be used. A good knowledge of the pros- and cons- with the different techniques can guide the utility/fuel vendor to select the most cost efficient techniques for this specific objective. A second objective of this Report is to document this knowledge in a form, which can be updated as new information, and methods become available.

Contents

- » Structure and components of the BWR and PWR FA
- » Fuel vendor licensing data
- » Root cause examinations of failed and degraded fuel
- » Maintaining good fuel reliability
- » Fuel Assembly characterisation techniques

Read more: *https://www.antinternational.com/docs/samples/FM/11/fmtr4_example_2.pdf*

Customer feedback:

"FMTR vol. I has been very helpful to us on numerous occasions"

MARCUS NILSSON & ALEXANDER LINDQVIST,
Fuel Managers, OKG AB, E-ON Group, Sweden

Read more: *http://www.antinternational.com/docs/newsletter/old/ANTENNA_006.pdf*

"FMTR vol. II provides an excellent advanced summary of the materials issues relevant to nuclear fuels, written by experts in the field."

ROSAURA HAM SU, Materials R&D Scientist,
Fuel Development, Atomic Energy of Canada

Read more: *http://www.antinternational.com/docs/newsletter/old/ANTENNA_008.pdf*

"FMTR Vol. II - A starting point for every new project"

DR. RAUL B. REBAK,
Corrosion Engineer, GE Global Research

Read more: *http://www.antinternational.com/docs/newsletter/old/ANTENNA_009.pdf*

Deliverables and price:

All reports are delivered as electronic files (high resolution pdfs).

A.N.T. International ZIRAT and IZNA (click on the links for more information) customers gets 50 % discount.

For price information and questions please contact **Mikaela Strand** at e-mail:
Mikaela.strand@antinternational.com

I look forward to hear from you,
With best regards,

Mikaela Strand
Marketing and Sales Director

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