

Nuclear Graphite Technology Course Programme

12-13 November 2019

Room H18, Pariser Building
University of Manchester
Sackville St
Manchester, M1 3NJ

£1500 per delegate
Includes lunch and
refreshments

Organised by: Nuclear Graphite Research Group

Department of Mechanical,
Aerospace and
Civil Engineering
University of Manchester

SPEAKERS



Prof Abbie Jones
Chair in Nuclear
Graphite Engineering



Prof Barry Marsden
Prof of Nuclear
Graphite Technology



Dr Graham Hall
Senior Lecturer in
Nuclear Graphite



Dr Muhammad Fahad
Research Fellow in
Nuclear Graphite

DAY ONE: TUESDAY 12 NOVEMBER 2019

- 09:00 Welcome and Introductions**
Prof Abbie Jones, UoM
- 09:10 AGR Safety Issues and Regulation**
Office for Nuclear Regulation
- 09:40 AGR Designs**
Prof Barry Marsden, UoM
- Overview of an AGR
 - Graphite Core Design
 - Differences Between Stations
- 10:40 Tea & Coffee**
- 11:10 Nuclear Graphite**
Prof Abbie Jones, UoM
- Raw Materials
 - Manufacture
 - Microstructure
 - Unirradiated Properties
- 12:30 Lunch**
- 13:30 Dosimetry and Temperature**
Prof Barry Marsden, UoM
- Fluence and Flux
 - Graphite Damage
 - Units (Historical vs. Current)
 - Nuclear Heating
 - Irradiation Temperature
- 14:30 Tea & Coffee**
- 15:00 Irradiation Damage in Graphite Crystals / Crystallites**
Dr Graham Hall, UoM
- Displacement Cascade
 - Defect Formation
 - New Theories
 - Crystal Properties Changes
- 15:45 Irradiation Damage in Polycrystalline Graphite**
Dr Graham Hall, UoM
- Directionality
 - Effect of Irradiation
 - Effect of Oxidation
- 16:30 Close**

DAY TWO: WEDNESDAY 13 NOVEMBER 2019

- 09:00 Irradiation Creep in Polycrystalline Graphite**
Dr Graham Hall, UoM
- Dimensional Change Under Load
 - Effect of Creep on CTE
 - Effect of Creep on Young's Modulus
 - Effect of Unloading
 - Effect of Oxidation
- 09:45 Radiolytic Oxidation**
Prof Abbie Jones, UoM
- Radiation Chemistry
 - Graphite Radiolysis
 - Historical Oxidation Experiments
 - Other Factors Affecting Oxidation Rate
 - Porosity and Weight Loss Models
- 10:45 Tea & Coffee**
- 11:15 Materials Models**
Prof Barry Marsden, UoM
- EDF Energy Integrated Model (EIM)
 - Description of Inert EIM Equations
 - Description of how Weight Loss is Included
 - Eason/UoM Models
 - Philosophy
 - Approach
 - Case Studies (Dimensional Change)
- 12:30 Lunch**
- 13:15 Graphite Component and Multi-Component Modelling**
Dr Muhammad Fahad, UoM
- Structural Integrity Introduction
 - Stress Analysis of a Graphite Moderator Brick
 - Constitutive Equations
 - Feature Strength
 - Examples
 - Array Modelling
 - Whole core modelling
- 14:45 Tea & Coffee**
- 15:15 Q & A Session**
- 16:00 Close**