

TENTATIVE TECHNICAL PROGRAM



SYMPOSIUM ON GRAPHITE TESTING FOR NUCLEAR APPLICATIONS: THE VALIDITY AND EXTENSION OF TEST METHODS FOR MATERIAL EXPOSED TO OPERATING REACTOR ENVIRONMENTS

Sponsored by ASTM Committee D02.F on Manufactured Carbon and Graphite Products

23-24 September 2021
Virtual Symposium

Symposium Chair: **Athanasia “Nassia” Tzelepi**
National Nuclear Laboratory
Sellafield, Cumbria, UK

Symposium Co-Chair: **Will Windes**
Idaho National Laboratories
Idaho Falls, ID, USA

Symposium Co-Chair: **Martin Metcalfe**
Consultant
Woolhope, Hereford, UK

ABOUT THE SYMPOSIUM

The ASTM D02.F subcommittee has developed and continues to maintain a suite of standards and guides for graphite testing, the majority of which were developed with the participation of graphite manufacturers for use on as-manufactured graphite, where there are no specimen volume or geometry constraints. Over recent years, the subcommittee has focused on nuclear applications and the applicability of these standards to small specimens and small specimen populations. This symposium provides a forum for national laboratories, academics, nuclear graphite specialists, new reactor designers, nuclear regulators and individuals working in the nuclear waste management and decommissioning industry to develop this theme further by reviewing the applicability of standards to materials exposed to operating reactor environments.

Topics for this symposium include:

- Measurements on irradiated samples
- Measurements on oxidized samples
- Measurement on samples impregnated with molten salts

Particular attention is given to processes for the handling and testing of materials, the implications of test result validity in the absence of certified standards, and confidence in and representativeness of test results in the context of operating plant conditions.

THURSDAY, 23 SEPTEMBER 2021

(All times in U.S. EDT)

8:00 AM **Opening Remarks**
Nassia Tzelepi, Symposium Chair

SESSION 1:

Measurement Strategy and Characterization, Molten Salt Reactors and Oxidation

Session Chair: Nassia Tzelepi, National Nuclear Laboratory, UK

8:10 AM **Measurement Strategy for an Irradiated Graphite Post Irradiation Examination Campaign**
Samantha Wilkinson, National Nuclear Laboratory, UK

8:50 AM **Testing Method for Graphite Exposed to a Molten Salt Reactor Environment**
Derek Tsang, Shanghai Institute of Applied Physics, People's Republic of China

9:30 AM **Evaluating the Effect of Molten Salt on Graphite Properties Gaps, Challenges and Opportunities**
Nidia Gallego, Oak Ridge National Laboratory, USA

10.10 AM BREAK

10.25 AM **Measurement of Gas Permeability of Irradiated and Virgin Graphite Specimens**
John Dinsdale-Potter, National Nuclear Laboratory, UK

11:05 AM **Performance of Graphite Oxidation with Environment and Specimen Geometry Variations**
Will Windes, Idaho National Laboratory, USA

11.45 AM **A Microstructural Modeling-Based Approach to Graphite Oxidation Beyond ASTM D7542**
Ryan Paul, Oak Ridge National Laboratory, USA

12.25 PM SYMPOSIUM ADJOURNS FOR THE DAY

FRIDAY, 24 SEPTEMBER 2021
(All times in U.S. EDT)

8:00 AM **Opening Remarks**
Nassia Tzelepi, Symposium Chair

SESSION 2:

Physical and Mechanical Property Measurements

Session Chair: Will Windes, Idaho National Laboratory, USA

8:10 AM **Small Specimen Testing, with Image-Based Analysis, for Crack Propagation Resistance in Polygranular Nuclear Graphite**
James Marrow, University of Oxford, UK

8:50 AM **Investigation of Size Effects in Test Methods Used for Irradiated and Oxidised Graphite**
Athanasia Tzelepi, National Nuclear Laboratory, UK

9:30 AM **A Review of High-Temperature Characterization of Nuclear Graphites**
Matthew Jordan, National Nuclear Laboratory, UK

10:10 AM BREAK

10:25 AM **Effects of Microstructural Composition, Porosity and Microcracks on the Elastic Moduli of Nuclear Graphites**
James Spicer, Johns Hopkins University, USA

11:05 AM **Development of an Equibiaxial Strength Testing Technique for Irradiation-Induced Strength Changes in Fine-Grained Nuclear Graphite**
Anne Campbell, Oak Ridge National Laboratory, USA

11:45 AM **Measurement of Coefficient of Thermal Expansion of Small Graphite Specimens**
John Dinsdale-Potter, National Nuclear Laboratory, UK

12:25 PM Closing Remarks

12:30 PM SYMPOSIUM ADJOURNS