AGENDA

**26th International QUENCH Workshop**

**Organized by Karlsruhe Institute of Technology, Institute for Applied Materials, Germany  
Virtual event via MS Teams, 06-09 December 2021**

## **Daily starting time: 1 p.m. Karlsruhe (Paris, Berlin), 7 a.m. Washington, 9 p.m. Tokyo**

## ***Monday, 06 Dec 2021***

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| 0:00 | Welcome | W. Tromm/M. Steinbrück, KIT | | |
|  | QUENCH Program (Chair: M. Steinbrück) | | | |
| 0:20 | Update of the QUENCH program | | | M. Steinbrück, KIT |
| 0:40 | Results of metallographic analysis of the QUENCH-20 bundle with B4C absorber | | | J. Stuckert, KIT |
| 1:00 | Analysis of QUENCH-20 Test with ASTEC V2.2.b | | | O. Murat, KIT |
| 1:20 | **Break/discussion** | | |  |
|  | **EXPERIMENTS** (Chair: J. Stuckert) | | |  |
| 1:40 | Fuel rod / bundle behavior in the early stages of a severe accident in a nuclear reactor and spent fuel pool using the DEGREE facility | | | K. Nakamura, CRIEPI |
| 2:00 | Outline of the CLADS-MADE-03 test under steam-rich conditions and high heating rate | | | A. Pshenichnikov, JAEA |
| 2:20 | The CODEX-SBO experiment | | | R. Farkas, MTA |
| 2:40 | Refined relationship between through wall clad oxygen diffusion profiles and post-quenching impact properties of as-received and pre-hydrided Zircaloy-4, following High-Temperature (HT) steam oxidation | | J.-C. Brachet, CEA | |

## ***Tuesday, 07 Dec 2021***

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|  | **MODELLING AND CODE APPLICATION II** (Chair: F. Gabrielli) | |
| 0:00 | PSI-KIT Nitriding Model for Zirconium based Fuel Cladding Alloys | B. Jäckel, PSI |
| 0:20 | Development of New Model to Calculate High-Temperature Oxidation of ATF Chromium-Coated Zr-Based Cladding | A. Vasiliev, IBRAE |
| 0:40 | Implementation of LEI experience on modeling and uncertainty quantification of QUENCH tests for the development of QUENCH-20 numerical model | N. Elsalamouny, LEI |
| 1:00 | International Development and Assessment of a MATPRO-based Accident Tolerant Fuel Material Property Models and Correlation Library | S. Khalil, AU |
| 1:20 | Break/discussion | |
|  | **ATF cladding I** (Chair: M. Steinbrück) |  |
| 1:40 | ATF modelling in Severe Accident Codes | F. Gabrielli, KIT |
| 2:00 | Summary on IL TROVATORE WP 5 results | M.Grosse, KIT |
| 2:20 | Overview on the IAEA ATF-TS project | J. Stuckert, KIT |
| 2:40 | Experimental SiC coatings | B. Sartowska, INCT |

## ***Wednesday, 08 Dec 2021***

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|  | ATF cladding II (Chair: M. Grosse, KIT) | | |
| 0:00 | The OECD-NEA project QUENCH-ATF | M. Steinbrück, KIT |
| 0:20 | The coating degradation mechanism during the isothermal steam oxidation of Cr-coated Zry-4 at 1200°C | J. Liu, KIT |
| 0:40 | Multilayer protective CrN/Cr coatings on E110 zirconium alloy | D. Sidelev, Tomsk PU |
| 1:00 | The results of high temperature single rod tests with chromium coated cladding | K. Vizelkova, KIT |
| 1:20 | **Break/discussion** |  |
|  | **ATF CLADDING III** (Chair: J. Stuckert, KIT) | |
| 1:40 | Magnetron-sputtered Cr-C-Al based coatings for enhanced accident tolerant fuel (ATF) zirconium-based alloy cladding | C. Tang, KIT |
| 2:00 | High-temperature oxidation of silicon carbide composites  for nuclear applications | M. Steinbrück, KIT |
| 2:20 | Mechanical properties degradation of Cr-coated cladding under the loss-of-coolant accident conditions | P. Cervenka, CTU |
| 2:40 | Microstructural Analysis of Iron-Chromium-Aluminum Samples Exposed to LOCA-Type Conditions Followed by Quench | P. Doyle, ORNL |
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## ***Thursday, 09 Dec 2021***

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|  | Zr-H System I (Chair: M. Grosse, KIT) | | |
| 0:00 | The SPIZWURZ Project – Bundle Experiment and Benchmark on Axial Hydrogen Diffusion | F. Boldt, GRS |
| 0:20 | KIT-INE contribution to the SPIZWURZ project | M. Marchetti, KIT |
| 0:40 | Neutron investigations of the hydrogen diffusion dynamics in different cladding tube materials | S. Weick, KIT |
| 1:00 | Elevated temperature hardness measurements of Zry-4 in the presence of hydrogen in solid solution | F. Fagnoni, PSI |
| 1:20 | **Break/discussion** |  |
|  | **Zr-H System II** (Chair: M. Steinbrück, KIT) | |
| 1:40 | Hydrogen quantification in zirconium cladding materials using high-resolution neutron radiography imaging | L. Duarte, PSI |
| 2:00 | Hydrogen measurements and metallographic examination  of high-burnup nuclear spent fuel claddings | M. Ayanoglu, ORNL |
| 2:20 | Fatigue Testing of High Burnup PWR Fuel Rods with Zircaloy-4 cladding with and without Heat Treatment to Simulate a Drying Cycle | P. Cantonewine, ORNL |
| 2:40 | Closure | M. Steinbrück, KIT |
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