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IAEA ATF BENCHMARK OF FUEL ROD CODES FOR SIMULATION OF SELECTED SEPARATE EFFECT TESTS

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Since 2021, IAEA has been organizing a Coordinated Research Project (CRP) on Testing and Simulations of Accident Tolerant and Advanced Technology Fuels (ATF-TS). A work task (WT2) is dedicated to benchmark the computer codes used for ATF behaviour simulation. The WT includes ATF specific modelling developments in fuel performance codes and simulation benchmark exercises using these codes to predict ATF fuel rod behaviour in normal operating conditions, power ramps and accident conditions. Participation in this task is a prerequisite for the WT3 of the CRP (LOCA safety evaluation methodology), as it is a sort of code validation phase for investigating different ATF solutions.
The WT is divided into two sub-tasks: single rod effects tests (WT2.1) which is the object of the paper, and bundle tests (WT2.2).
In the single rod sub-task, the following fuel concepts and experimental cases are considered:
- Chromia-doped UO2 pellets, using Halden tests IFA677.1 and IFA716.1 for steady state conditions, and SCIP II power ramps for transient conditions,
- FeCrAl and chromium coated zirconium cladding, using separate effects tests performed in the experimental WT of the CRP (burst tests),
- Cr-coated Zircaloy-4 single rod test performed in the DEGREE facility.

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