



VTT

SAFIR2022 INFLAME

Interim webinar

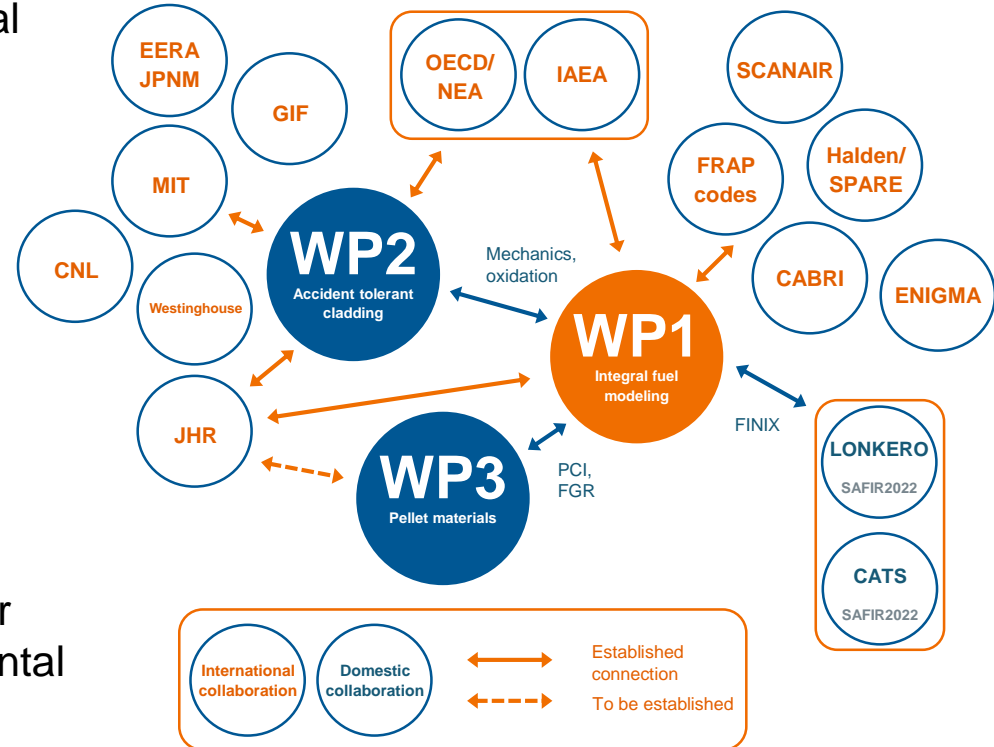
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18/03/2021

INFLAME

Interdisciplinary Fuels And Materials

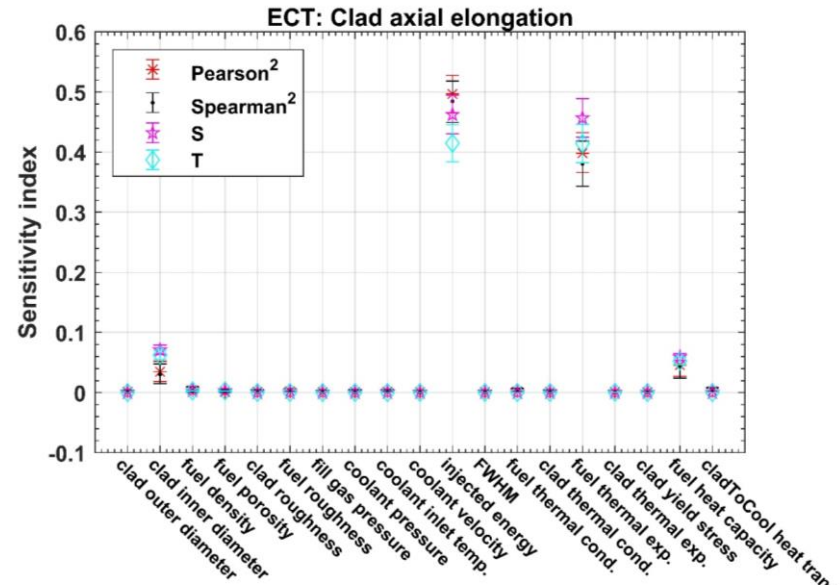
- WP1 Integral fuel behaviour modelling
 - Participation in modelling of international fuel experiments
 - Design basis accident analysis
 - FINIX development
- WP2 Advanced cladding materials
 - Mechanical properties
 - Hot loop corrosion testing
 - Steam furnace corrosion testing
- WP3 Fuel pellet materials
 - Development of the pellet sintering procedure
 - Development of separate effect tests for pellet mechanical properties and elemental diffusion



WP1 Integral fuel behaviour modelling

Comparison of 1st order and total effect sensitivity indices with correlation coefficients in reactivity-initiated accident (RIA) modelling

- Demonstration case was taken from OECD/NEA RIA fuel codes benchmark Phase 2 – a fresh fuel case
- 19 varied input parameters, 9 output variables
- S close to T for all cases
 - 2nd order indices in Sobol' variance decomposition are close to zero
 - The interaction effects of the input parameters are negligible
- 1st order and total effect indices were close to the Pearson and Spearman correlation coefficients
- The behaviour might be different for irradiated fuel



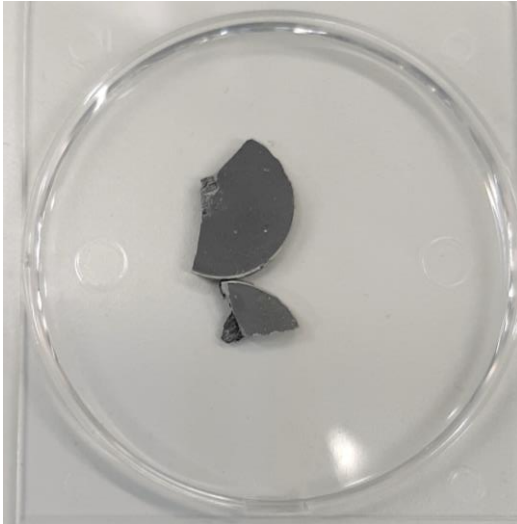
S=first order Sobol' index
T=total effect index

WP3 Fuel pellet materials

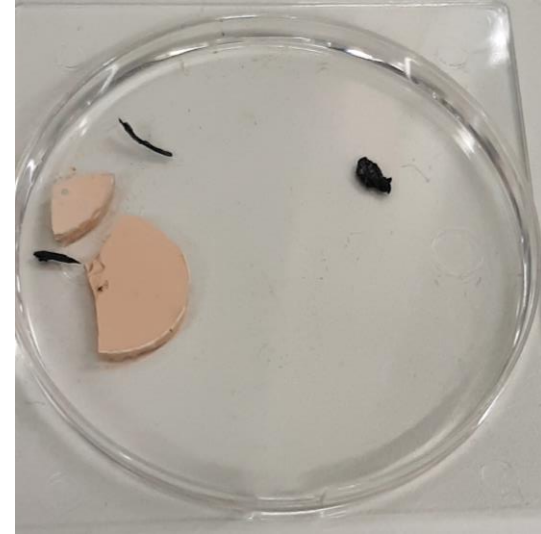
Experiments for analysis of iodine release behaviour: samples

- CeO_2 + 1mol% CsI samples
 - Spark plasma sintering (SPS) of the samples at different temperatures (900 °C, 1000 °C and 1100 °C)
 - Done at Charles University, Czech Republic

Pre-annealed SPS 900 sample

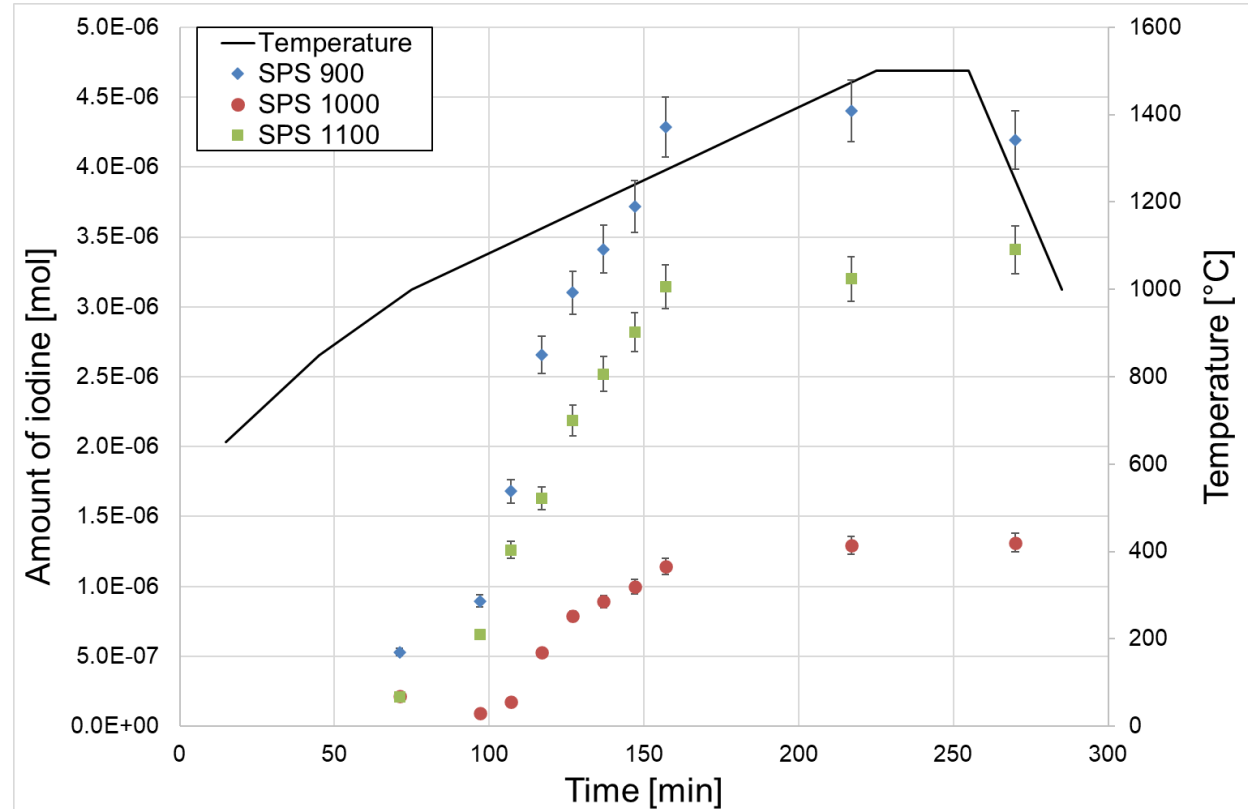


Post-annealed SPS 900 sample



Iodine release behaviour as a function of temperature

- Iodine trapped in the sodium hydroxide solution
- Inductively coupled plasma mass spectrometry (ICP-MS) measurements of the sampled solution



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the obvious

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