Objectives of CATFIS

Primary circuit and containment conditions

- The aim is to investigate the transport and chemistry of gaseous and particulate fission products in severe accident conditions.

- The emphasis is on the phenomena, which are poorly-known internationally or not considered in the current severe accident analysis codes due to the lack of information.
a) Boron and b) molybdenum reacted with CsI forming solid caesium-borate and caesium-molybdate, respectively. It resulted in a high formation of gaseous iodine. Oxygen in the atmosphere seemed to enhance the formation of gaseous iodine. The surface deposits could be an important source of gaseous iodine in a long term.
Primary circuit chemistry of ruthenium

Formation and transport of Ru compounds

- Transport of ruthenium as gaseous and aerosol compounds.
- Air radiolysis products may significantly increase the transport of (low volatile) ruthenium as a gaseous compound into the containment building (air ingress conditions).
  - NO$_2$ was efficient in forming gaseous RuO$_4$.
- The highest transport of ruthenium as a gaseous compound was observed when CsI reacted with ruthenium oxides.
  - Further studies to explain the observation are needed.
Pool scrubbing

Retention of gaseous and aerosol FPs in containment pools

- Aerosol retention in suppression pool conditions at 20 to 100 °C was investigated with experiments (CATFIS project) and subsequent simulations (CASA project) of experiments with ASTEC and MELCOR severe accident analysis codes.

- Preliminary decontamination factor (DF) results:
  - Experiments were performed with CsI aerosol at 20 °C varying the pool depth from 0.1 to 0.7 m and non-condensable N₂ flow rate through the pool from 8, 14 to 27 l/min.
  - ASTEC V2.1.1.4 code calculations seemed to be in a good agreement with the experiments.
  - However, experimental and analytical methods will be further improved to assure reliable results.

- The research work has been started recently and it will be continued in SAFIR2022 MANTRA.


