RÉPUBLIQUE FRANÇAISE

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INSTITUT DE RADIOPROTECTION ET DE SÛRETÉ NUCLÉAIRE

CHROMIA EXPERIMENTAL PLATEFORM

PSN-RES/SEREX/L2EC, Cadarache, Buidings. 325 - 327- 328

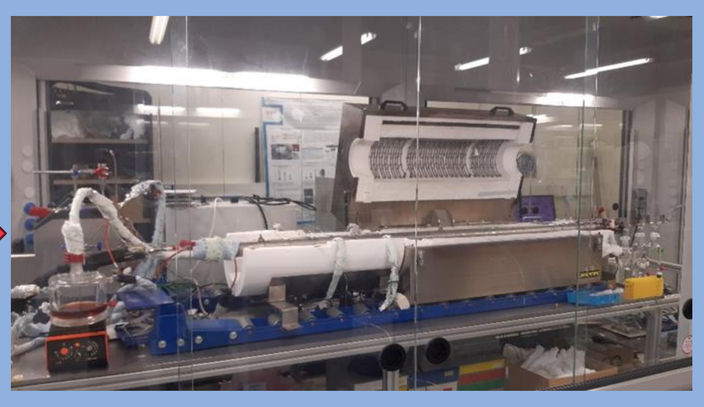
CHROMIA is a platform dedicated to research on the behaviour of fission products (iodine, caesium, ruthenium, tellurium, etc.) in accident conditions, including transport, reactivity and radiochemical aspects as well as the mitigation aspect.

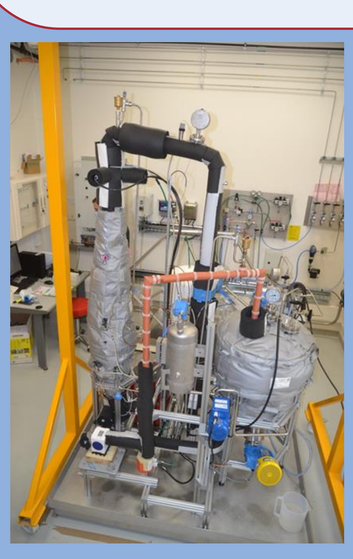
A part is also specific to studies carried out on the behaviour of polymers subjected to thermal/radiolytic stresses.

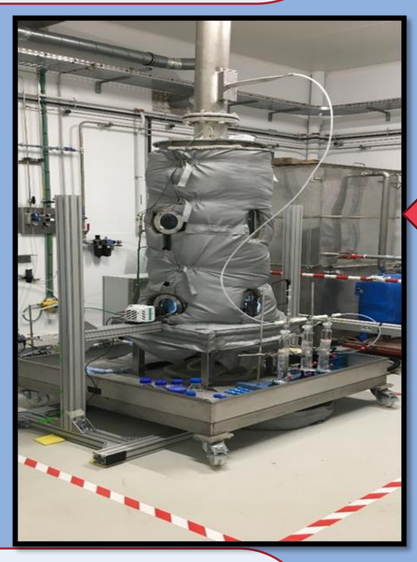
To carry out these studies/researches, the platform has a chemistry laboratory equipped with a range of analytical means for chemical measurements in gas, liquid and solid phases, measuring means for aerosols, fume hoods for studies at the bench scale, experimental benches for high temperature chemistry (transport tubes with thermal gradient), experimental benches for trapping contaminants either by pool-scrubbing or on solid supports made of porous materials, benches for testing the tightness of polymer joints subjected to thermal constraints, climatic chambers and for the radiochemistry part, a hot laboratory (LEAR) for the handling of radioactive iodine (131-I) and a γ irradiator for the radiation study of chemistry (radiolysis of solutions and materials)

Research works focused on chemistry-transport coupling concerning fission products behaviour

- Chemistry-transport at high temperature (~1500°C)
- Interactions with surfaces
- Chemical reactivity
- Condensation/nucleation
- Aerosol physics
- CHIP and START experimental benches





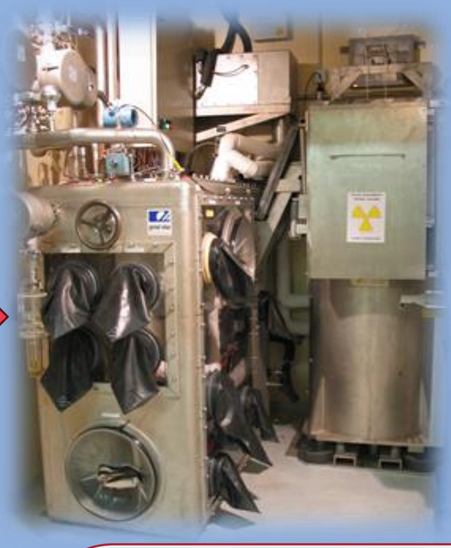


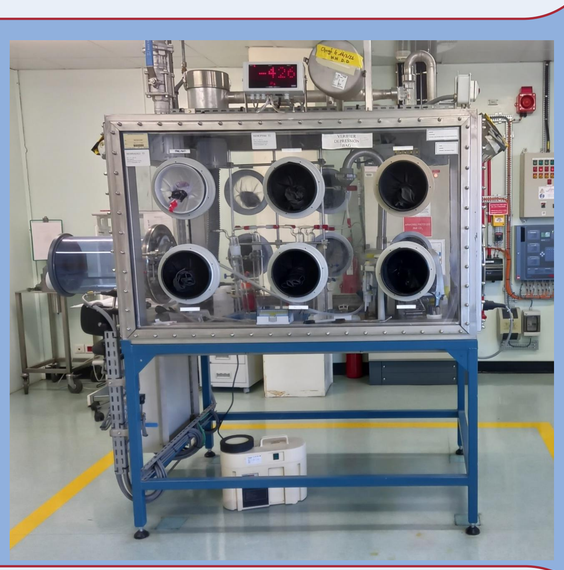
Mitigation/trapping of contaminants in gaseous and liquid phases

- Benches for qualifying trapping performance at laboratory or semi-pilot scale (DOFIN exp. loop)
- Design of porous materials: zeolites and MOFs
- Epuration by pool-scrubbing
- Trapping on liquid filter: clogging issue

Radiochemistry of fission products

- γ EPICUR irradiator
- Temperature up to 140°C
- Variable atmosphere compositions (air, H_2O, H_2 …)
- Labelled iodine with gamma measurements
- Physico-chemistry of gases and aerosols in accident conditions





Behaviour of polymers in accidental conditions and ageing phenomena

- Experimental mock-up (compression sets) submitted to thermal and/or irradiation stresses
- Evolution of physical properties under thermal stress
- Static and dynamic behaviour (leakage rate measurements)
- Leakage rate measurements (Helium)

Analytical techniques: ICP-MS, ICP-AES, CPG-MS, ion chromatography, pH-metry, specific probes, ovens, DSC, XRD, microscopy, SEM-EDX, etc.…

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MEMBRE DE ETSON

Université de Lille · ANR · Aix*Marseille université Socialement engagée · EDF · U.S.NRC · cea · NRA JAPAN Nuclear Regulation Authority · OCDE · NUVIA PROTECTION · ism Institut des Sciences Moléculaires · université de BORDEAUX · JAEA · VTT · orano · GRS · cnrs · irCer institut de recherche sur les céramiques · KAERI Korea Atomic Energy Research Institute