

PAUL SCHERRER INSTITUT



Wir schaffen Wissen – heute für morgen

Paul Scherrer Institut
Gavillet Didier

Division HOTLABOR (AHL) / The PSI Hot Laboratory
Status and Core competences

- Status of the hot laboratory
- Mission
- Core competences
- Short conclusion

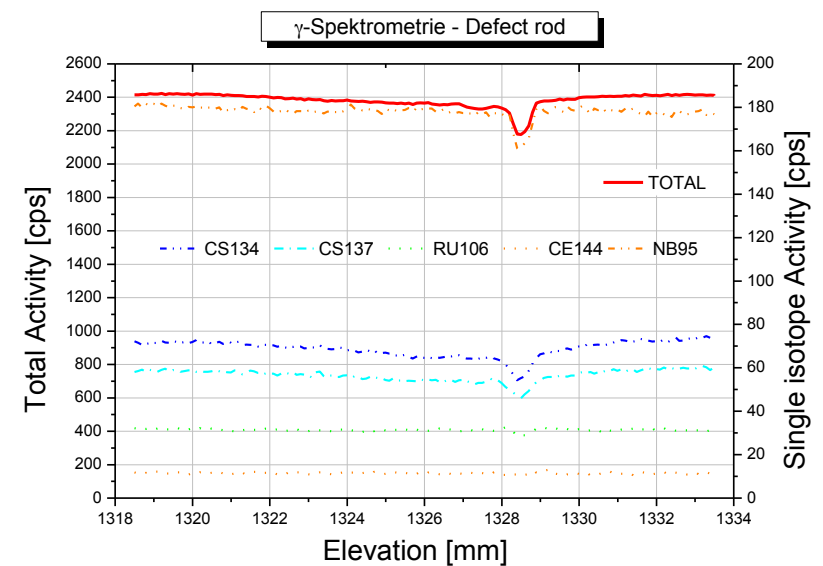
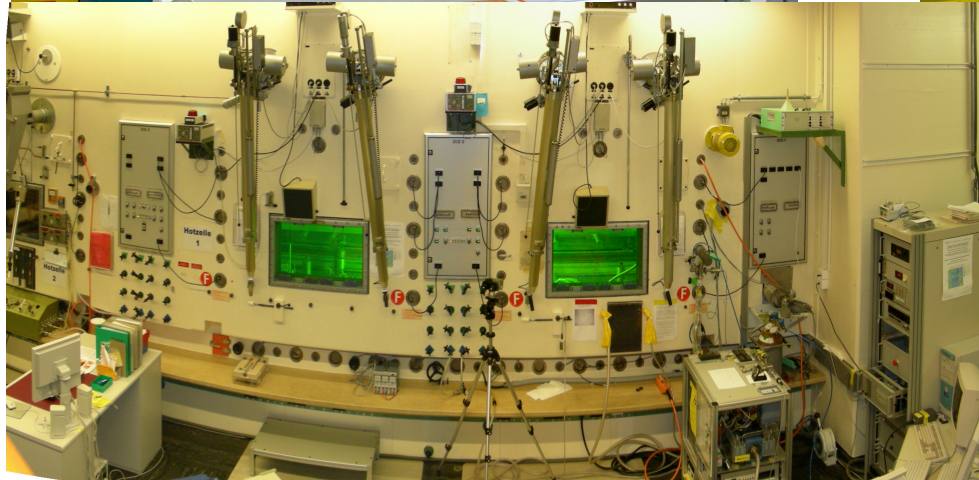
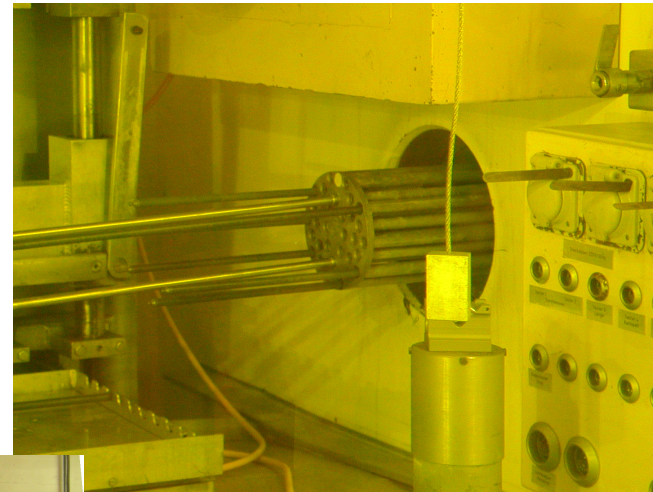
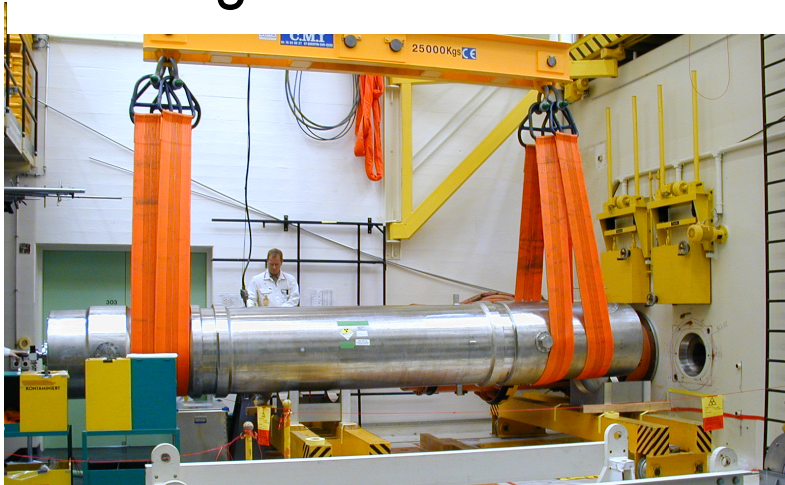
- The renewal of the operational licence is on going
- The review of the safety authority (ENSI) is positive but some improvements and conditions are requested
 - refurbishment of part of the building to improve the earthquake-resistance
 - Strengthening of the activity-inventory control in the different zones and laboratories of the facility
 - Access limitation to the facility (request of minimum training for working in the lab)

- safe and efficient operation of the Hot laboratory
- Swiss competence centre for the handling and analysing highly radioactive materials including nuclear fuel
- contributes to the safe operation of the Swiss power plants
- supports PSI and external research groups for the handling, the preparation and the analysis of radioactive specimens
- develops and improves its analytical methods in the interest of the users of the lab

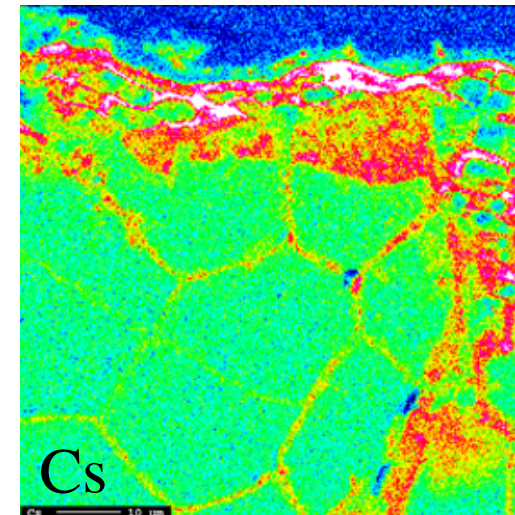
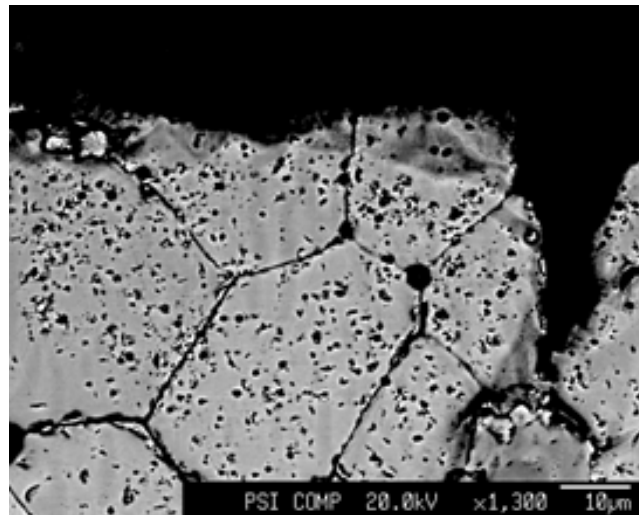
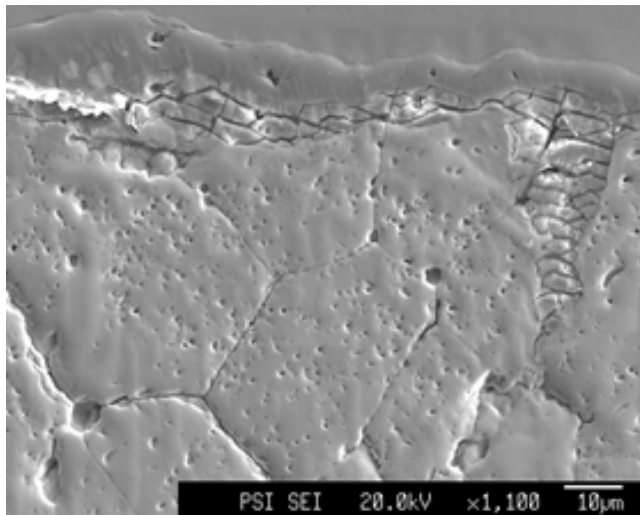
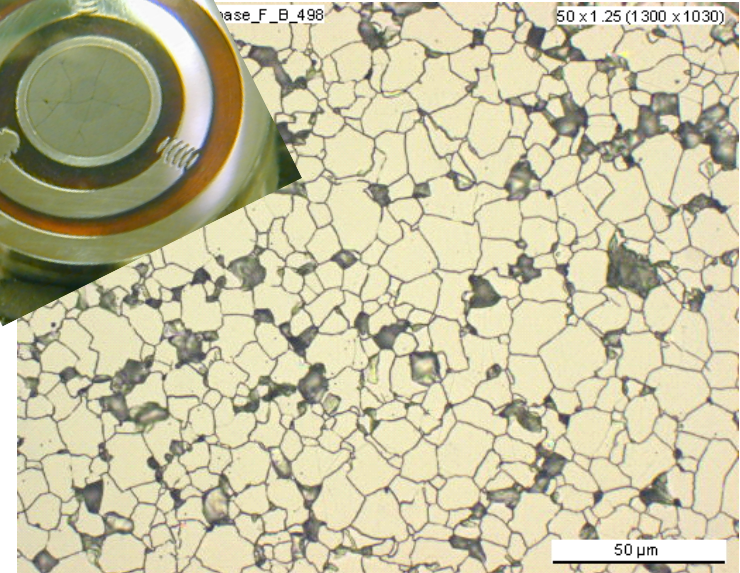
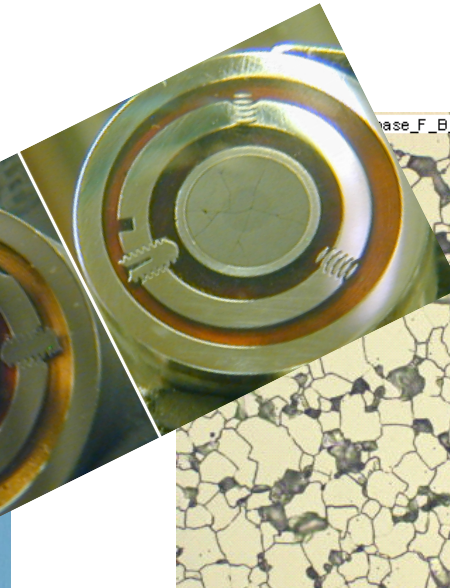
Core competences and projects

- Operation of a nuclear facility / Safety culture
- Handling, investigation and conditioning of highly radioactive materials
- Preparation and analytical investigation of radioactive materials (structure, chemical composition, material isotopic composition, failure mechanisms, ...)
- Support to nuclear operators in Switzerland (Readiness and flexibility)

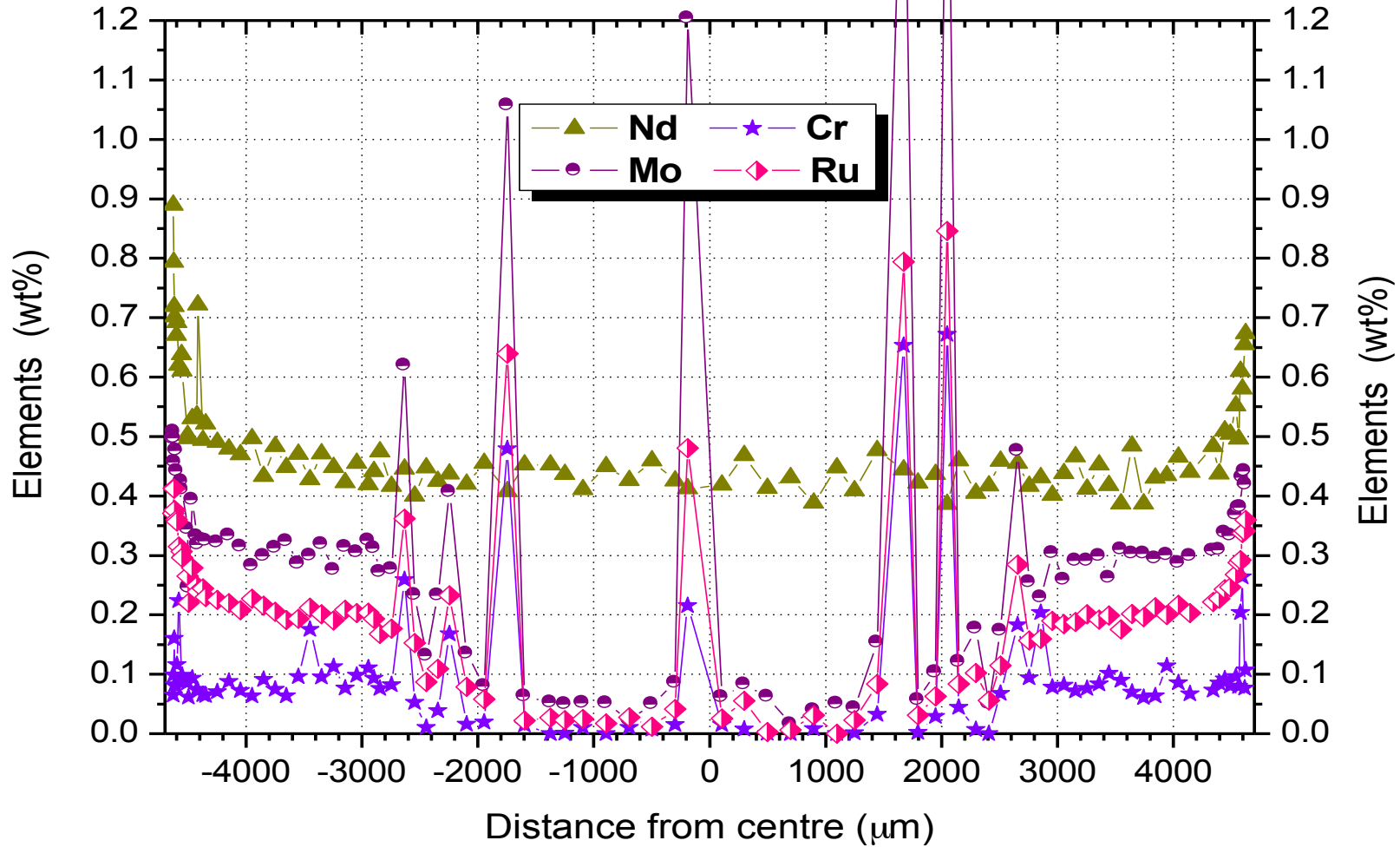
Handling and PIE of fuel rod in the concrete Cell



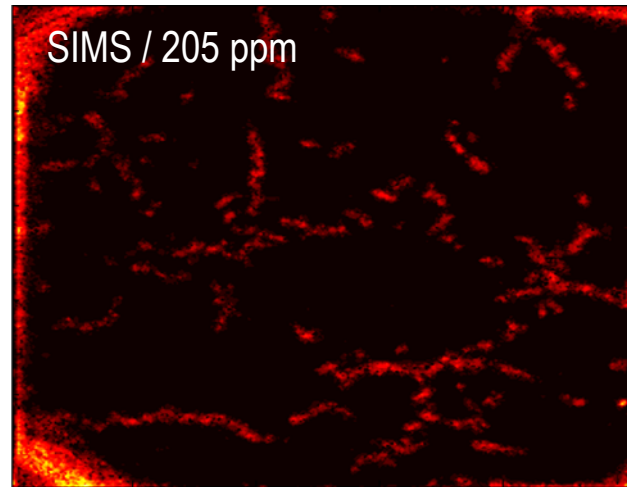
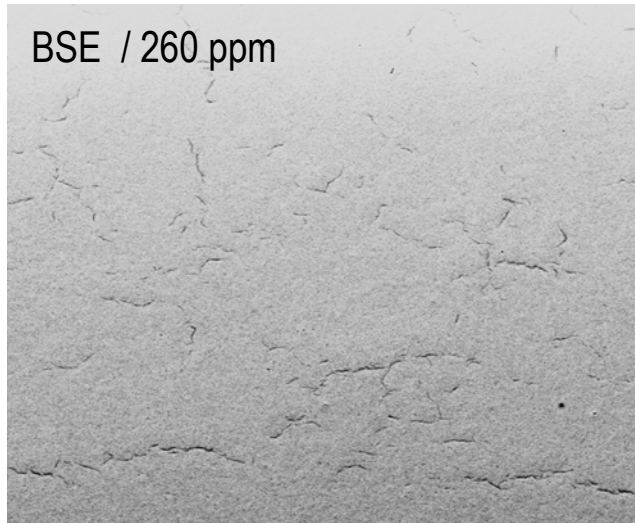
Surface analyses of irradiated fuel



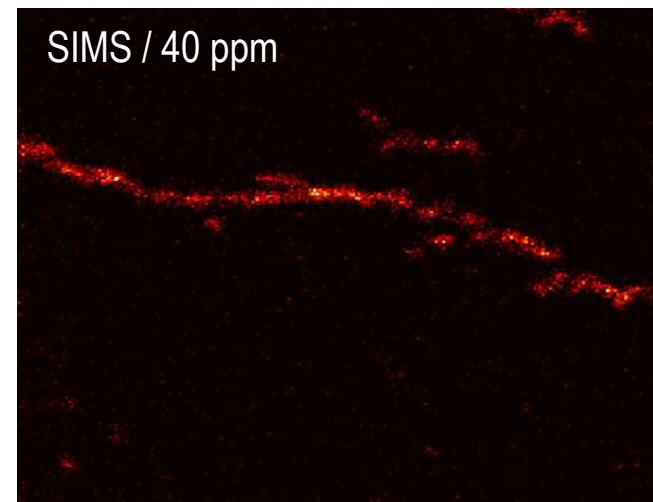
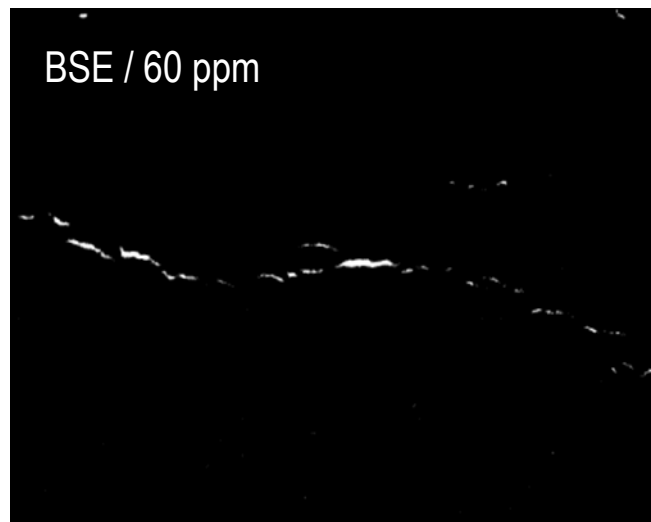
Fission products distribution across a pellet



Hydrogen, qualitative and quantitative distribution in cladding

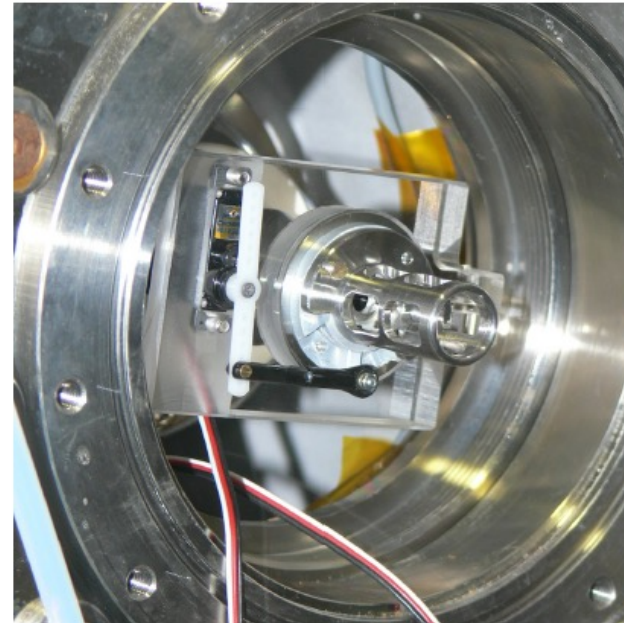
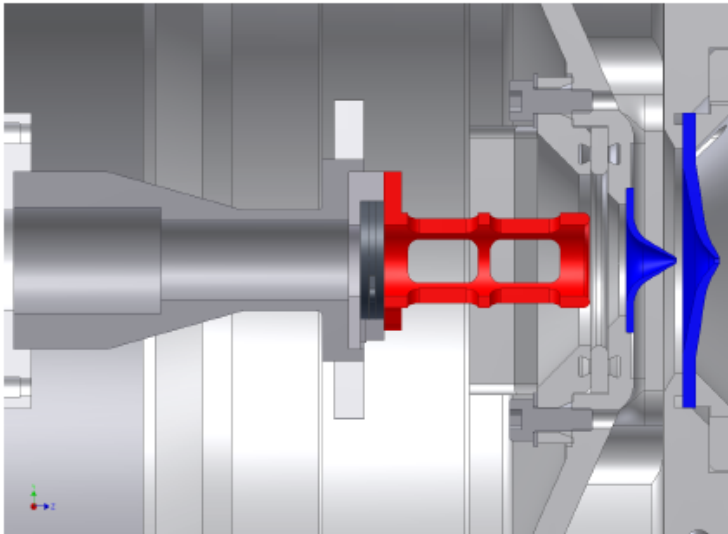


From hot gas extracted
hydrogen content is
230 ppm ($\pm 5\%$)

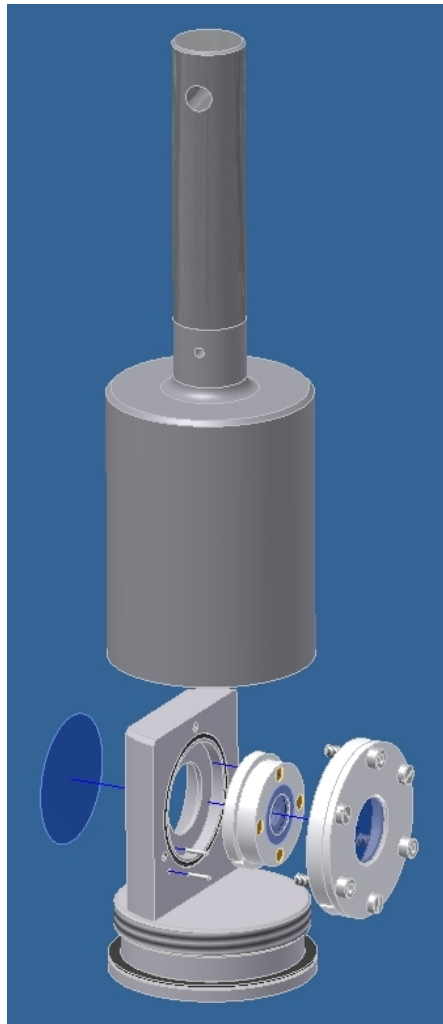


Research work / PhD in AHL

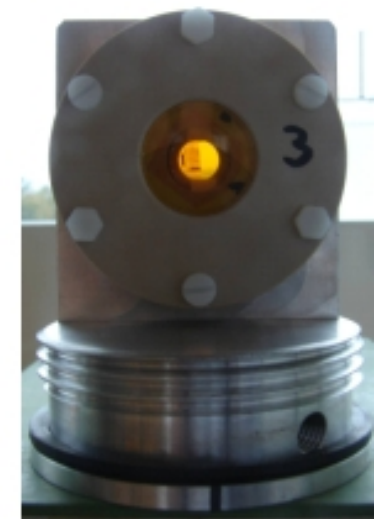
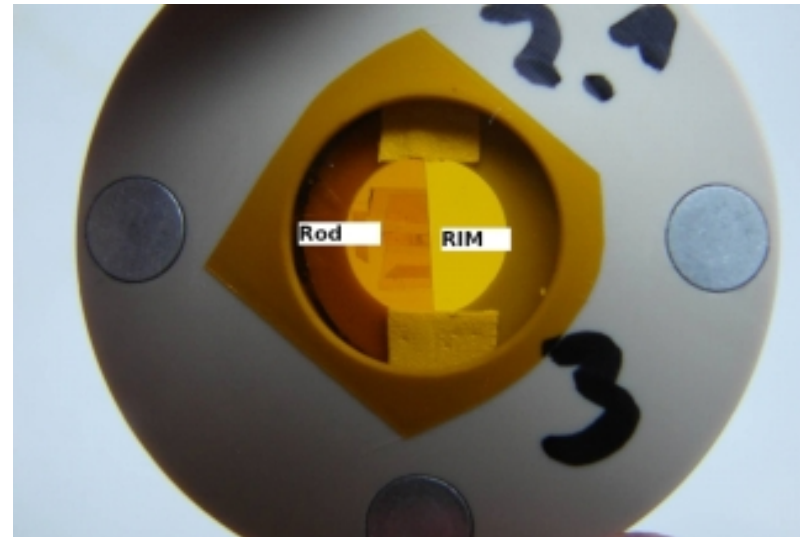
- Fundamental studies of the mass discrimination in multiple-collector inductively coupled plasma mass spectrometry
- Improvement of the instrumentation



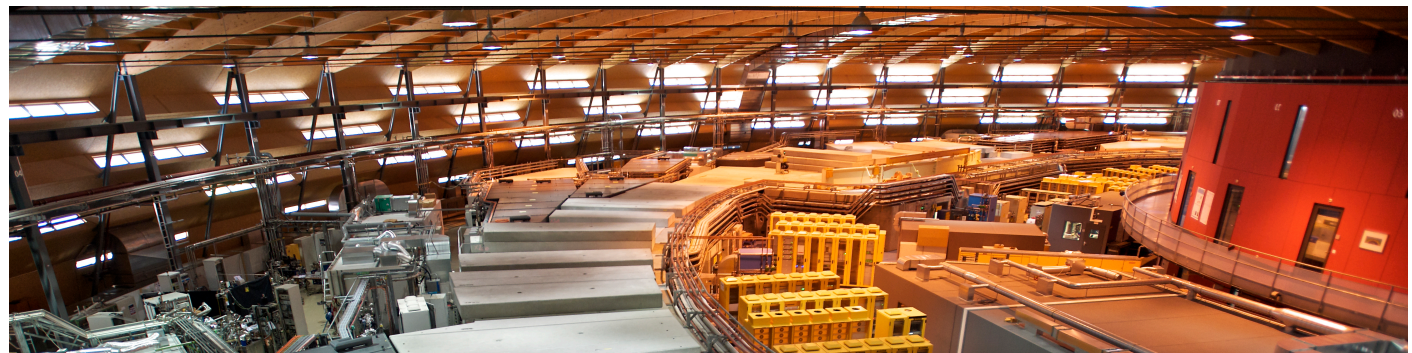
Specimen holder for XAS examination in SLS



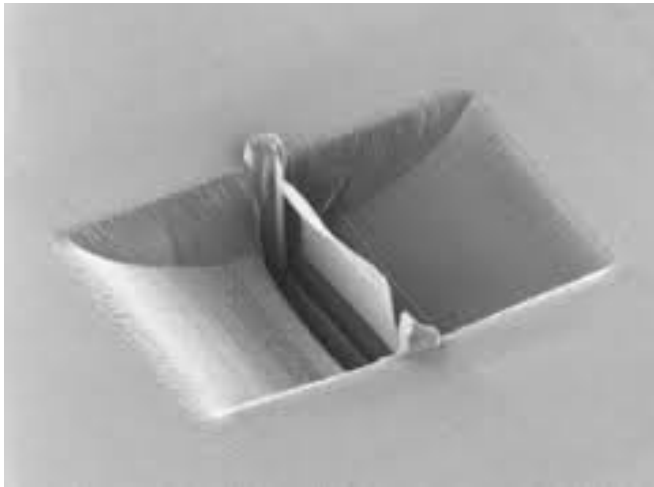
Access to more specific information



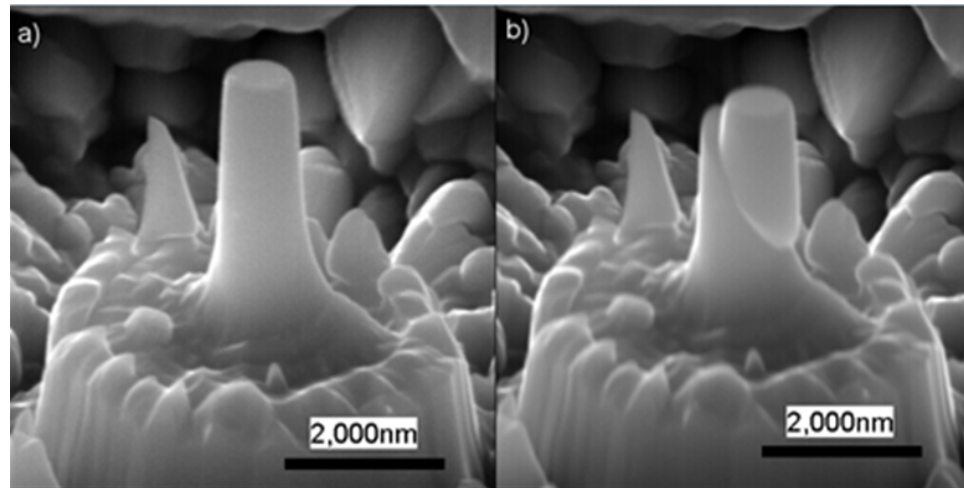
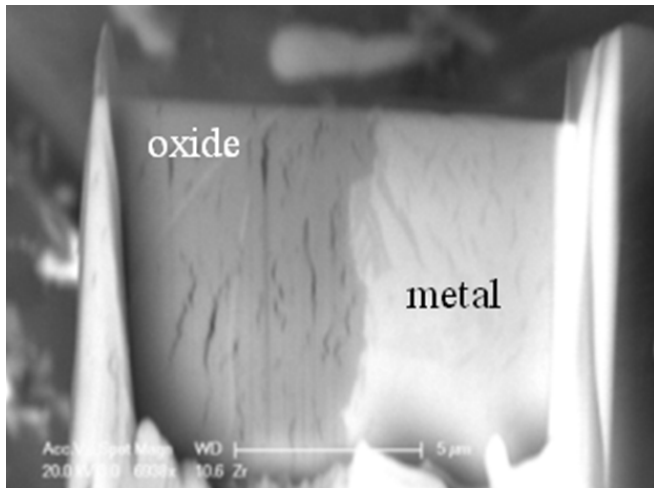
XAS: x-ray absorption spectroscopy in SLS / Collaboration with LNM



Focus Ion Beam for highly radioactive materials



- Micro-specimen extraction at precise location
- Specimen preparation at interface
- Shaping for mechanical test (nano-indenter)

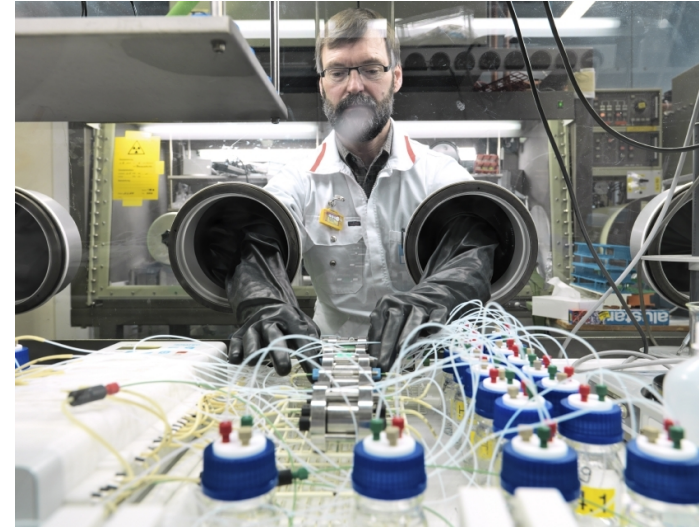


AHL and LNM common investment with SNF support (R-Equip)

Hosting

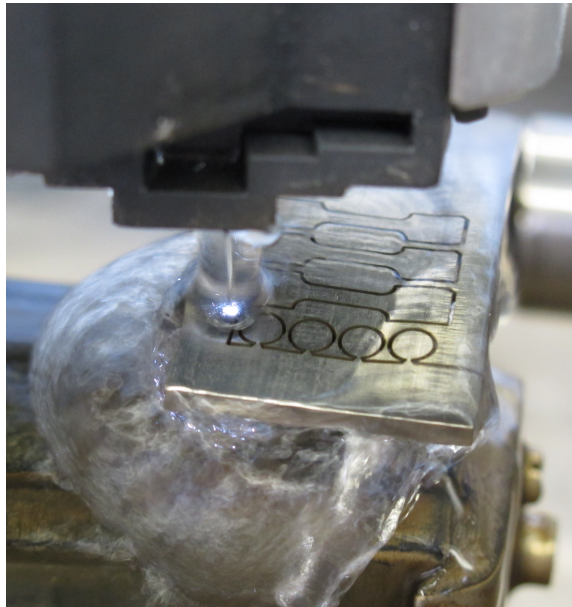


LNM

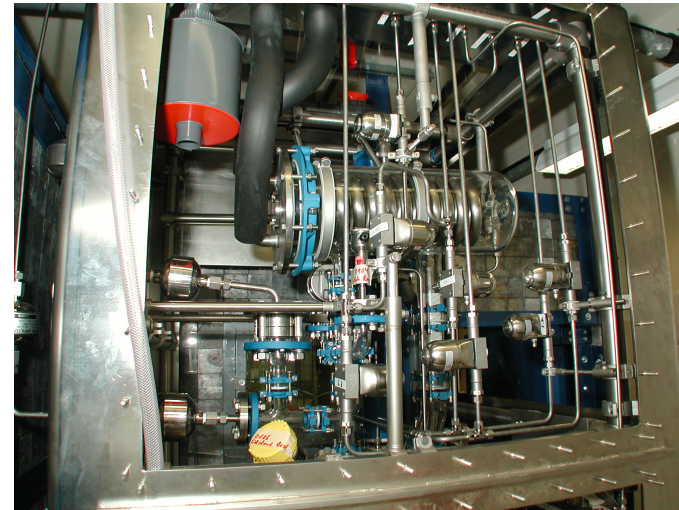


LES

Supporting



Cutting tool (EDM)



Waste conditioning
(FIXBOX)

Conclusion

HOTLAB is a key facility for NES, the PSI and Switzerland

- As the Swiss center of competence for the handling and analysis of highly radioactive materials
- As a key tool for research groups using radioactive materials

AHL is the organization and people that make it possible

