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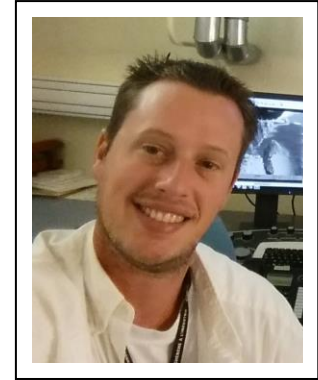
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EPMA CHARACTERIZATION OF A RADIOACTIVE NUCLEAR GLASS SAMPLE

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France has chosen a closed fuel cycle with a reprocessing step of the used nuclear fuels after irradiation in PWR reactors. The spent fuel recycling process separates uranium and plutonium from the high-level wastes, composed mainly by fission products and minor actinides (Np, Am, Cm). The waste stream is confined into a borosilicate glass matrix with a vitrification process operated by Orano at LA HAGUE plant.

This talk will present the solid characterizations carried out at the CEA-ISEC at Marcoule of an old nuclear glass monolith. Some characterizations on this glass sample have been performed previously at the CEA-ISAS at Saclay. The goal of this current study is to evaluate the effect of 28 years of self-irradiation ageing on the microstructure and chemical composition of the glass.

The SEM and EPMA characterizations performed showed that the glass still consists of a homogeneous amorphous vitreous matrix surrounding few inclusions (less than 1% in volume), as expected and already observed after fabrication. These different phases are composed of numerous chemical elements having close decay lines. This last point imposes the use of WDS spectrometers to separate correctly their contributions. This study was carried out with a nuclearized Cameca SX50R microprobe in the DHA-L29 laboratory of the Atalante facility.

The first part will introduce the context and illustrate the restrictive environment of our hot-cell laboratory (fig.1). The results will be presented in a second part. Finally, the last part of the talk will be devoted to our EPMA equipment replacement project, in the view to invest into a FIB equipped with a WDS detector.

[1] Cheron, P., Chevalier, P., Do Quang, R. *et al.* Examination and Testing of an Active Glass Sample Produced by Cogema. *MRS Online Proceedings Library* **353**, 55–62 (1994).
<https://doi.org/10.1557/PROC-353-55>

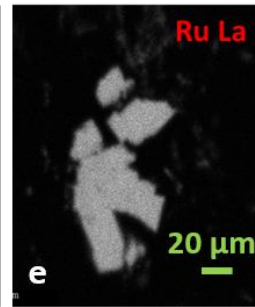
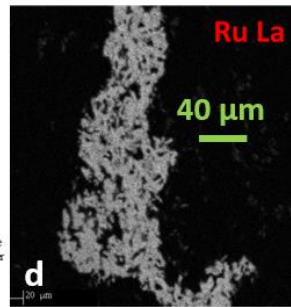
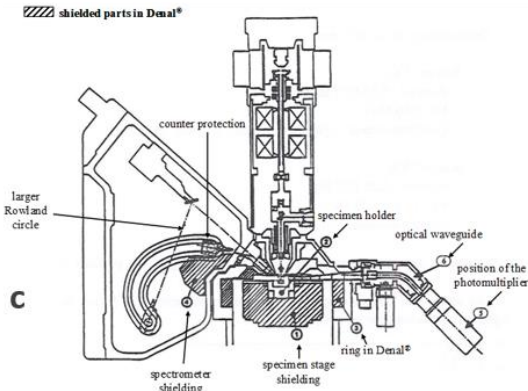
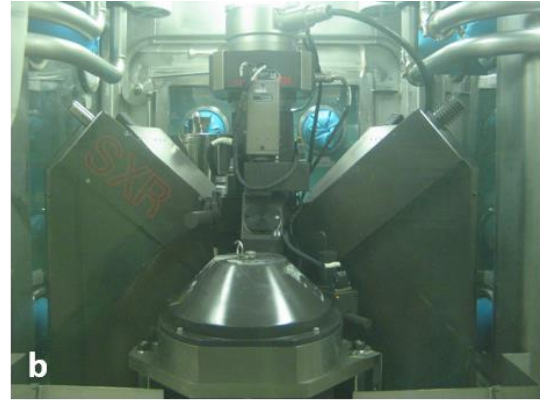


Fig. 1: a-b-c nuclearized EPMA in L29 hotlab, d-e ruthenium La X-ray cartography