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## AN EXPERIMENTAL APPROACH FOR THE ANALYTICAL STUDY OF SECONDARY HYDRIDING OF \*M5<sub>Framatome</sub> CLADDED FUEL RODS DURING A LOCA

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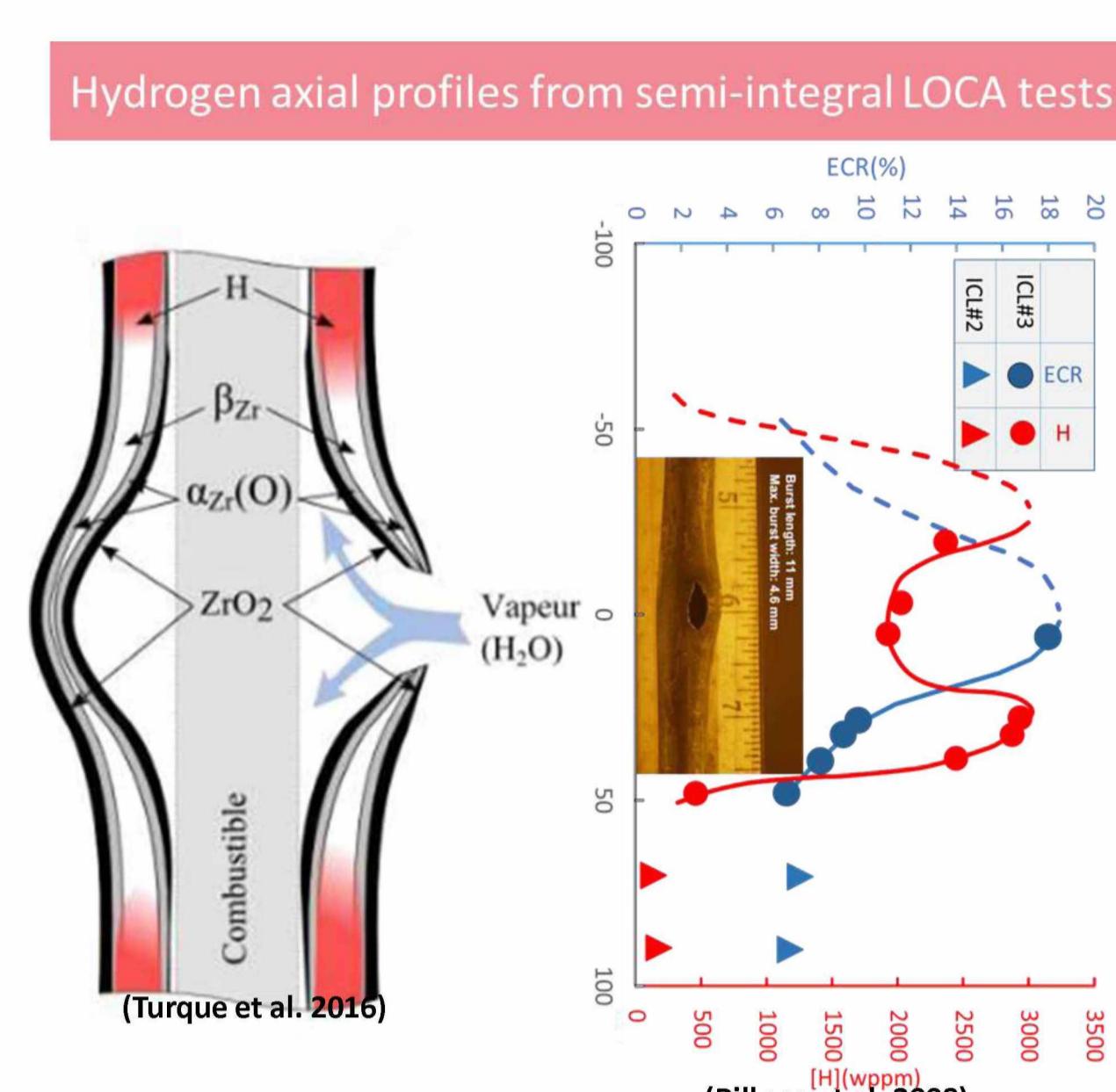
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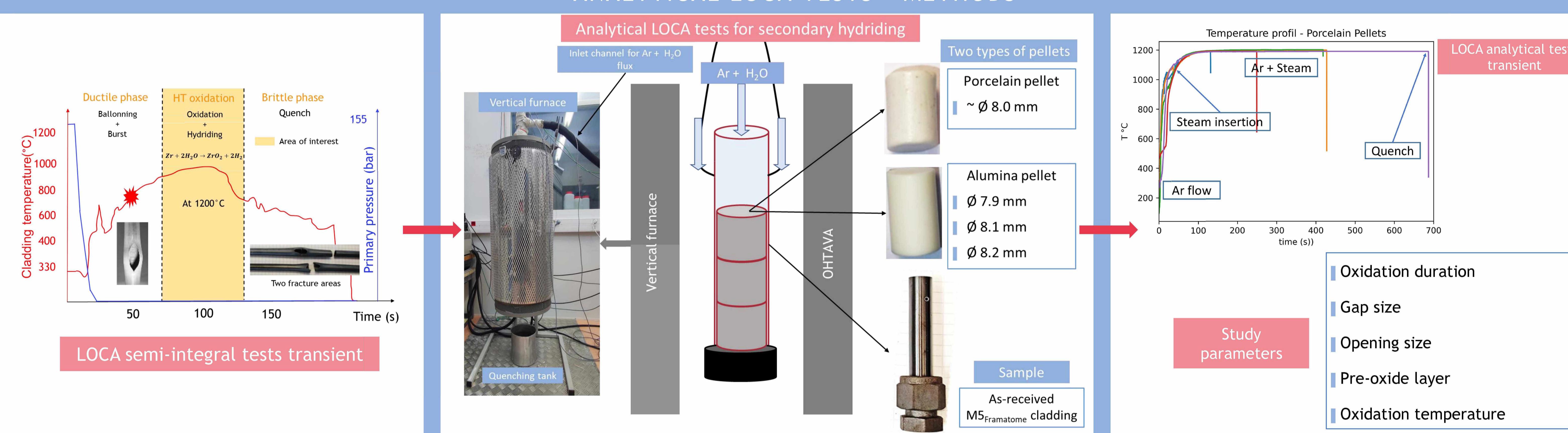
### ABSTRACT

Secondary hydriding may occur in nuclear fuel cladding exposed to steam at high temperature in Loss of Coolant Accident (LOCA) conditions. During a LOCA transient, the cladding may burst, and the steam ingress into the cladding results in inner surface oxidation in the vicinity of the burst region. A high hydrogen uptake can then occur near the burst position, leading to localized hydrogen peak concentration in the cladding : this is known as secondary hydriding (Hsec).

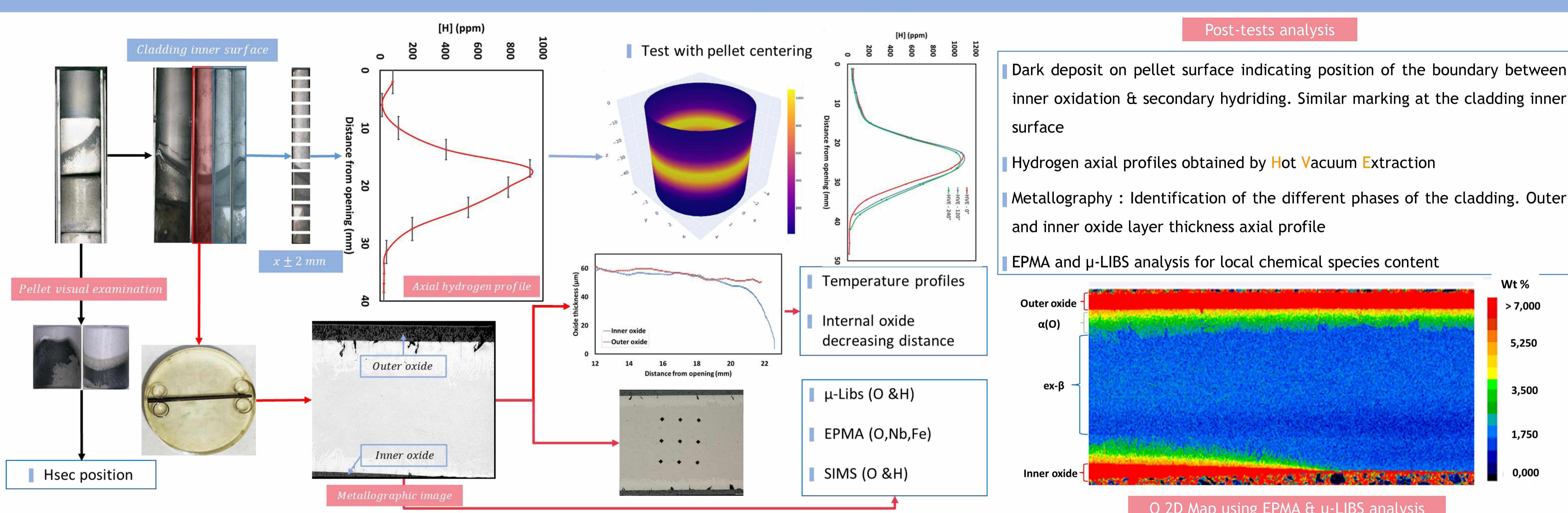
The aim of this project is to improve the understanding of this phenomenon. Burst opening and gap size, oxidation duration and other parameters influences are characterized using an axisymmetric testing procedure reproducing LOCA conditions including oxidation and final quench on \*M5<sub>Framatome</sub> cladding.



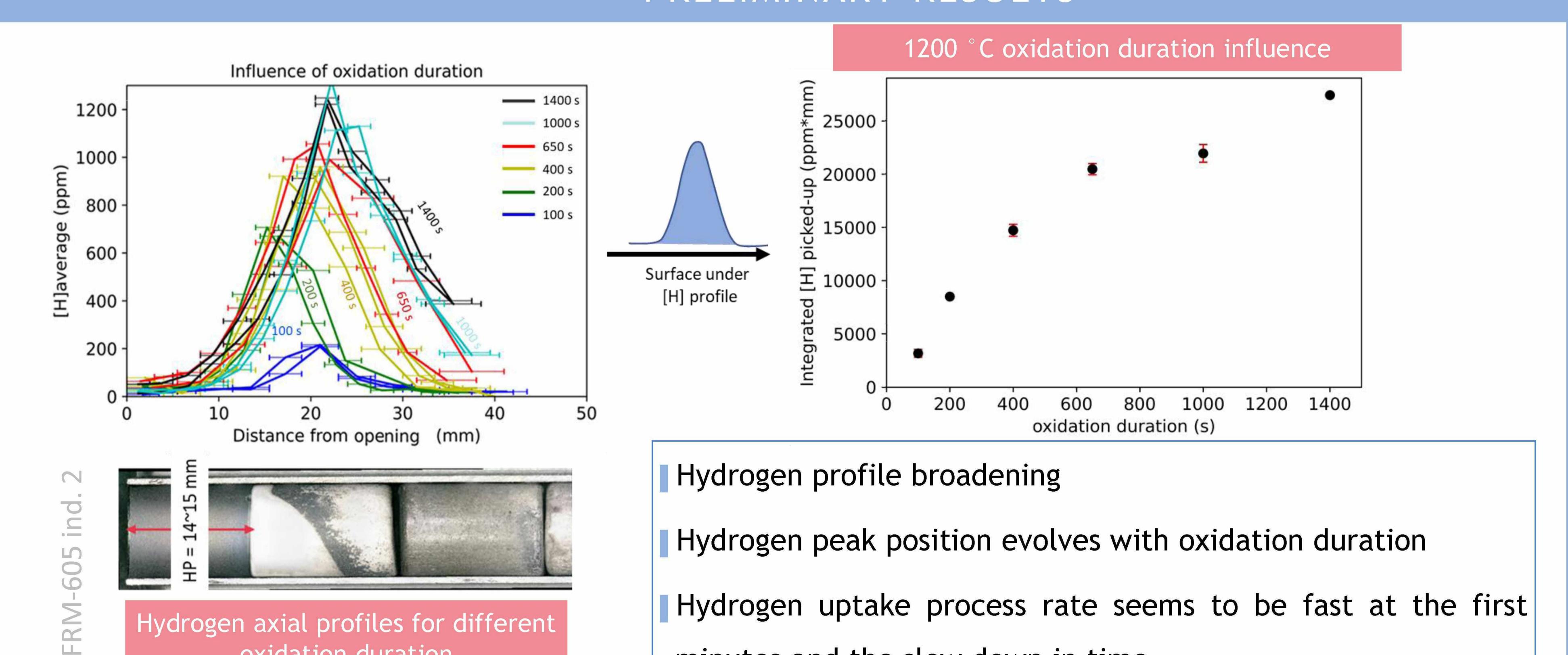
### ANALYTICAL LOCA TESTS - METHODS



### ANALYSIS METHODS



### PRELIMINARY RESULTS



### CONCLUSIONS - PERSPECTIVES

Analytical tests allow secondary hydriding parametric studies during HT oxidation under steam environment. The longer the oxidation duration is, the higher the hydrogen uptake is with a decreasing rate.

The study of gap size, pre-oxide layer, opening size and oxidation temperature influence is under progress. Semi-integral segmented tests (creep ballooning then HT oxidation) are planned.