

MASTER THESIS M2 CDM (5 months, Feb. - June)

2025-2026

Title of the project: Hihi Temperature Oxidation of Titanium and Titanium Alloys Under Wet Atmosphere**Supervisor(s): Virgil Optasanu (Mcf HDR)**

Location/ Laboratory / Department / Team: M4OXE

Collaborations: Ioana Popa (Mcf HDR), Luc Lavis (Mcf HDR)**Summary:**

Our team works on titanium alloys oxidation since about 10 years and have published many articles on this topic. Most of them were about titanium oxidation under dry atmosphere. We wish now to expand our investigation on high temperature oxidations under wet atmospheres, which are closer to real-life conditions. Indeed, the presence of water vapor can highly influence the oxidation mechanism and change then the metal resistance to harsh conditions. We are particularly interested in the quantification of the nitrogen involved in the oxidation mechanism and in the comparison with oxidation under dry atmospheres.

This internship will be part of the OHTH-Ti EIPHI project (and will be financed by this project).

The work will consist first in bibliographic research to understand the high temperature phenomena, then in preparation of samples (cut, polishing), high temperature oxidation tests (furnace, thermogravimetric analyzers), sample characterization after oxidation (XRD, SEM, XPS, SIMS, nanoindentation, etc). The intern will participate to experimental devices setup, oxidation tests, sample characterizations and data analysis in collaboration with his/her supervisors. The samples can further be analyzed on large national facilities (Ion Beam Analysis, Synchrotron) for fine investigations.

The candidate will further participate as a co-author to articles based on the results found during the internship.

This work can eventually be a first step to a further doctoral thesis work.

The main skills expected from the candidate are curiosity, open mind, desire to learn, experimental work appetite, excel, word.

Type of project (theory / experiment): mainly experiment**Required skills: appetite for experimental investigations,**

To send to Virginie Bourg (Virginie.Bourg@ube.fr) or Jean-Marc Simon (jmsimon@ube.fr) head of the master M2 CDM.