CHARACTERIZATION OF THE THERMAL OXIDE SCALE FORMED DURING THE AUSTENITIZING PROCESS OF MARTENSITIC STAINLESS STEELS

Post-doctoral position

12 months starting from September 2018

Context and objectives:

Aperam is a leading producer of stainless steels. The Company has developed **MaX grades**, a new family of **martensitic stainless steels** for automotive structures. Their autenitizing process happens during hot stamping. For this short treatment at high temperature, a thermal oxide scale forms on the metallic surface. Depending on the oxidation **parameters,** catastrophic oxidation can happen.

This project aims at understanding the influences of the **furnace atmosphere** (humidity, nitrogen, gas flow ...) and the **sample heating rate** on the steel oxidation behaviour. **Thermal treatments** will be carried out in **conventional tubular furnace** and **infra-red heating furnace**. The relation between the changes in the bulk microstructure during the autenitizing process and the oxide scale features will be studied by electron backscatter diffraction (EBSD). The **microstructure**, **morphology** and **chemical composition** of the oxide scales will be finely studied with various **surface characterization techniques** such as scanning electron microscopy (SEM-EDX), X-ray diffraction (XRD), glow discharge spectroscopy (SDL), Raman spectroscopy and photo-electrochemistry.

This work happens in the frame of a close collaboration between SIMaP laboratory and APERAM Company. **The postdoctoral researcher will be based at SIMaP** in Grenoble and may have to carry out **experiments** (heat treatment with infra-red heating furnace) and **characterization campaigns** (SDL) **at Aperam Research and Development Center** located in Isbergues in the Lille region.

Salary: around 1800€/month

Applicant background:

Applicants must hold a **PhD in materials science** or equivalent, with a proven experience in **surface characterisation techniques**. The applicant must be **self-driven** and **highly motivated** with a very good English level. He/she must exhibit human skills to work within a motivated team of technicians and researchers between two laboratories.

Application:

Please send a resume + motivation letter + references to laura.vallat@aperam.com