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