**Oxidation behaviours of AISI 430 stainless steel under humid air**

Oxidation phenomenon should be considered for life estimation of components made by metals and alloys. The understanding of oxidation kinetics and atomic diffusion mechanism of oxide scale growth is very important to choose materials and manufacture process, to limit high temperature corrosion and to keep the structure integrity.

Many studies have been carried out for AISI 430 stainless steel oxidation under dry air. The obtained information was very interesting to identify theoretically oxide scale growth mechanism and the associated kinetics. Few research works have been reported until now for oxidation behaviour of AISI 430 stainless steel under humid air. But humidity exists in all circumstance during all stages of oxidation in reality and in most of applications, such as powder generation centre (nuclear and thermal), industrial incinerators, urban heating and hot water supply system, Solid oxide fuel cells (SOFCs) components etc…

Oxidation behaviour of AISI 430 stainless steel under humid air will be studied to collect information concerning oxide scale growth kinetics with the used of multi-scale approach and multi-techniques:

* Thermogravimetric analysis (TGA) will be used to record the oxidation kinetics under humid air;
* Thermodynamic analysis will be carried out to identify the main atomic defects and their movements with the use of numeric analytical approach;
* Crystalline structure of oxide scale will be identified by Grazing Incident X-ray diffraction (GIXRD) technique;
* Microstructure observation will be realized by SEM-FEG and the chemical composition of oxide scales will be studied by EDX analysis;
* Residual stress study, oxide growth stress and thermal stress will be analysed either by experimentation (XRD or in-situ deflexion study) or by numerical modelling;

No grant from Universite Paris-Sud 11 has been provided for the internship. The student will be integrated in a PhD project.

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