Projet SHLyCC 2020-24

Post-doctoral position

Impact of hydrogen on elementary mechanisms of plasticity under monotonic solicitation of a strengthened alloy

CIRIMAT, Ecole Nationale Supérieure des Ingénieurs en Arts Chimiques et Technologiques, UMR CNRS 5086.
LaSIE, La Rochelle Université, UMR CNRS 7356.

One of the main objectives of industries consists in improving the lifetime of structures under cyclic solicitations. Precipitation hardening is an interesting and a privileged choice. But the effect of environment on damage processes of strengthened microstructures is not well known and more particularly the role of hydrogen on the by-pass of precipitates by mobile dislocations. In this context, SHLyCC project (Slip Localization - Hydrogen - Cyclic Crack) was supported by Agence Nationale de la Recherche (ANR), in order to characterize hydrogen-precipitation interactions in a strengthened alloy (Waspaloy) and the influence of these interactions on the hydrogen-enhanced localized plasticity phenomenon, crack initiation step and finally damage rate under cyclic solicitation.

The aim of this post-doctoral position is to characterize, in a first time, the hydrogen distribution (introduced in material by cathodic charging) by Scanning Kelvin Probe Force Microscopy technique (SKPFM) in relation with different hardening precipitation states. Then, the impact of hydrogen on dislocation passing mechanisms will be studied by means of nanoindentation measurements.

Candidate profile: The successful candidate will have a PhD in materials science and engineering. He (she) will have a good knowledge of metallic materials and particularly their microstructures. Skills in plasticity mechanisms in relation with dislocation-precipitates interactions and/or hydrogen embrittlement are required. An experience with AFM or SKPFM techniques would be a plus. He (she) will have a strong affinity for experimental research and teamwork capacity.

Complementary informations:
Deadline for application: 28/11/22. The position is to be filled for 01/03/23 for 12 months.
The post-doctoral research will be conducted in two research laboratories located at CIRIMAT/ENSIACET- INP Toulouse (first semester) and at LaSIE - Université de La Rochelle (second semester).
Remuneration: 2800 € (gross) / month

Contacts:
Application files (CV + cover letter) must be sent to Christine Blanc – 05 34 32 34 07 – christine.blanc@toulouse-inp.fr **AND** Grégory Odemer – 05 34 32 34 38 – gregory.odemer@toulouse-inp.fr