

PhD position at IFP Energies nouvelles (IFPEN) in *Chemical Engineering and Corrosion*

Impact of mineral scaling on stress corrosion cracking of steels for use in geothermal conditions

A PhD position on corrosion and scaling in geothermal energy is proposed in collaboration between IFP Energies nouvelles, and Ecole des Mines de Saint-Etienne.

The work is divided in three scientific axes. The first work package aims at studying various types of mineral scales, representative of geothermal fluids. These solutions usually contain high levels of dissolved minerals, which can precipitate at the wall of metallic surfaces as pressure and temperature change in the geothermal process. During this first part of the study, various types of scales will be studied, both at a theoretical level using in-house thermodynamic tools, and also experimentally. A full characterization of these scales will be performed, including chemical composition, morphology, adhesion to the substrate...

In a second stage, the impact of mineral scales on the electrochemical reactivity of stainless steel will be studied. Various electrochemical techniques will be used, in order to evaluate the loss of passivity or the onset of localized corrosion. Eventually, the main parameters governing the risks of localized corrosion will be identified.

The third part of the work will add mechanical stresses. Indeed, geothermal environments may be prone to stress corrosion cracking of stainless steels. Since this type of failure is highly associated with local changes at the surface of steels, the presence of mineral scale is likely to induce changes in the SSC resistance.

This highly multidisciplinary work will require various skills, from thermodynamics to chemistry, electrochemistry, mechanics and materials. Experimentation at the laboratory level is an important aspect of the work.

Keywords: Geothermal Energy, Corrosion, Stress Corrosion Cracking

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PhD location	IFP Energies nouvelles, Lyon, France
Duration and start date	3 years, starting not earlier than September 2020
Employer	IFP Energies nouvelles, Lyon, France
Academic requirements	University Master degree in Chemistry, Electrochemistry, Materials
Language requirements	Fluency in English + B1 min in French, willingness to learn French
Other requirements	A taste for experimental work

For more information or to submit an application, see theses.ifpen.fr or contact the IFPEN supervisor.

About IFP Energies nouvelles

IFP Energies nouvelles is a French public-sector research, innovation and training center. Its mission is to develop efficient, economical, clean and sustainable technologies in the fields of energy, transport and the environment. For more information, see <https://www.ifpen.com>.

IFPEN offers a stimulating research environment, with access to first in class laboratory infrastructures and computing facilities. IFPEN offers competitive salary and benefits packages. All PhD students have access to dedicated seminars and training sessions.