

Postdoctoral position at MATEIS (INSA Lyon)

Description

This job offer is related to a four-year project supported by the ANR (French Agency for Research). The main objective of the project concerns the reduction of wear and friction in a lubricated contact, using oil containing fullerenes nanoparticles. A PhD student involved in the project is in charge of optimizing the type of fullerenes and other parameters related to the efficiency of oil when tested in friction experiments (performed at LTDS – Ecole Centrale de Lyon). In relation with the PhD student, you will be in charge of the characterization part and will study the lubrication mechanisms. A large part of the work will be devoted to *in situ* TEM nanocompression and nanofriction experiments to better model the behavior of nanoparticles inside the tribological contact. The experiments will be carried out on an aberration-corrected environmental TEM. *Operando* experiments will also be performed by inserting gas, to test the influence of the surrounding, especially oxidizing agents. You will work in close relation with the PhD student hired in the project, but also with several microscopists from the SNMS team in the MATEIS lab. As a member of the SNMS team in the MATEIS lab, you will be able to participate to all events organized by the team and the lab.

MATEIS is a Materials Science and Engineering laboratory with a multidisciplinary approach including Physics, Chemistry and Mechanics. The three classes of materials are investigated (metals, ceramics, polymers and their composites) integrating volume, surfaces and interfaces. MATEIS is focused on relations between Process-Microstructure-Properties, with an experimental and/or modelling approach. MATEIS focuses particularly on advanced processing methods, microstructural evaluation (often *in situ* and in 3D), mechanical and multi-functional properties in relation to architectures, as well as modelling at different scales. MATEIS is involved on societal issues ('Materials for'): health, energy, environment, transport, building applications.

The general objective of the SNMS group (Structures, Nano and Micro-Structures) is to understand the micro- and nano structure of materials and multi-materials studied within the groups of the MATEIS laboratory, with a view to better understanding the relations between their properties of use and structural aspects. Development of new characterization techniques in scanning and transmission electron microscopy is presently focused on *in situ* and *operando* techniques on the different microscopes of the CLyM (Consortium Lyon Saint-Etienne de Microscopie). The SNMS team is composed of 2 professors, 5 associate professors, 1 researcher, 5 engineers or technicians and about 10 PhD or postdoctorate students.

Requirements

- PhD in material sciences, in physics in which the focus of your project was on transmission electron microscopy.

- at least **2 years well-documented, hands-on expertise in high resolution transmission electron imaging**. TEM in situ nanocompression experiments would be a plus.
- **proficiency in spoken and written English**, French is an asset
- capacity for interdisciplinary and international teamwork and excellent communication skills
- **excellent publication records**
- documented experience in elastic/plastic behavior of materials and the determination of mechanical properties

Starting date: 1st April or 1st May 2022

Fixed term: 18 months

Salary: according to public service grids depending on the experience of the applicant

Your application **MUST** contain the following information:

- **cover letter** of maximum **2 pages** that should include (1) a **statement about the research you have done**, and (2) **how you fit** the above described **tasks and qualifications**,
- **CV including a publication list** and **coordinates of at least 2 referees**.

and has to be sent to lucile.joly-pottuz@insa-lyon.fr and karine.masenelli-varlot@insa-lyon.fr