



Postdoc position

Shear band and damage formation in soda-lime and boro-silicate glasses in atomic-scale models

LaMCoS (Contact and Structure Mechanics Laboratory) is a joint laboratory of the CNRS and the INSA of Lyon. We aim to understand and control the mechanical behavior of structures and moving systems. The researchers at LaMCoS use various experimental and simulation techniques to solve academic and industrial challenges.

Context

Silicate glasses are exceptional materials that combine mechanical stiffness and optical transparency, durability, and ease of processing. In this project, we propose to build on the paradigm that crack initiation in silicate glasses is mediated by material damage induced through plastic flow and especially inhomogeneous flow. We offer to develop this idea into a quantitative mechanical description of crack initiation and establish relations with glass composition and structure.

Job description

The position is focused on developing a molecular dynamics model for shear banding in soda-lime and boro-silicate glasses. The candidate will identify the elementary mechanism responsible for this localization and improve constitutive relationships for a ductile phase-field model. Finally, she/he will determine the material parameters for fracture and plasticity as a function of the glass composition.

Required skills

- Advanced level of understanding of atomic-scale simulations (molecular dynamics/statics).
- Adequate experience in continuum mechanics.
- Basic knowledge of the concept of shear band formation.
- Adequate experience in computer programming.
- Fluent in English.

Experience in the following areas is a plus:

- Basic level of understanding in computational fracture mechanics and the finite element method.
- Experience in LAMMPS.

Timing

Starting date in the first half of 2022. Duration: 12 months.

Location

Campus LyonTech-la Doua, Villeurbanne, Lyon (FR). Regular missions to Paris (FR) to interact with the experimental team at ESPCI Paris.

Contacts

To apply, send your application including a CV with a list of publications and a motivation letter by email with the subject line: "PostDoc GaLAaD MD" to:

Gergely Molnár (gergely.molnar@insa-lyon.fr)

This project is funded by the French National Research Agency (ANR) in the framework of the project GaLAaD.