



Postdoc position

Brittle to ductile transition in silicate glasses using the phase-field model

LaMCoS (Contact and Structure Mechanics Laboratory), a collaborative research laboratory of CNRS and INSA Lyon, is dedicated to unraveling and controlling the mechanical intricacies of structures and dynamic systems. Our researchers employ a diverse range of experimental and simulation techniques to address both academic and industrial challenges.

Context

Silicate glasses, renowned for their unique combination of mechanical stiffness, optical transparency, durability, and ease of processing, serve as exceptional materials. This project aims to build upon the concept that crack initiation in silicate glasses results from material damage induced through plastic flow, specifically inhomogeneous flow. We seek to develop a quantitative mechanical description of crack initiation, establishing correlations with glass composition and structure.

Job description

This position focuses on developing a phase-field model to simulate shear banding. The successful candidate will implement a suitable yield criterion using the phase-field method to model shear bands in soda-lime and borate glasses. She/he will create a phase-field finite element model for indentation experiments, identifying the critical length scale where shear bands manifest based on strength and fracture toughness.

Required skills

- Advanced level of understanding in computational fracture mechanics and the finite element method.
- Experience with the phase-field method in fracture.
- Basic knowledge of the concept of shear band formation.
- Adequate experience in computer programming, preferably in FORTRAN, Python, and MATLAB.
- Fluent in English.

Experience in the following areas is a plus:

- Basic knowledge in glass science
- Basic understanding of molecular dynamics/statics
- Experience in ABAQUS.

Timing

Starting date: As soon as possible.

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 phase-field" to:

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