PROBING MINERAL SOAP FILMS WITH INFRARED SPECTROSCOPY

LABORATORY : Institut Lumière Matière

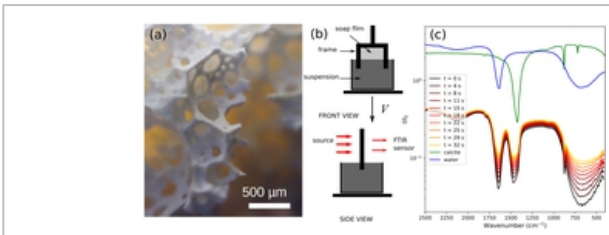
LEVEL : M2
TEAM(S) : SOPRANO
LIQ@INT

CONTACT(S) : LE MERRER Marie

CONTACT(S) DETAILS: marie.le-merrer[at]univ-lyon1.fr / Tel. 0472448570

KEYWORD(S) : soap films / gypsum plaster / Fourier Transform InfraRed spectroscopy

SCIENTIFIC CONTEXT :



(a) Gypsum foam (J. Trosseille). (b) Experimental setup. (c) FTIR preliminary results

Foaming a cement or another hydraulic binder is an efficient method to obtain **aerated mineral materials** (figure a), used for instance as insulating building materials. The insulating properties highly depend on the ability to create and solidify **soap films**, the elementary building blocks of foams, **laden with mineral particles**. However, little is known on their dynamics —generation, stability, solidification— because optical light scattering by the mineral particles (e.g. cement grains) makes the films difficult to characterize. On the contrary, in the **mid infrared** (wavelength ~ 10 µm), light is absorbed by water and mineral materials at distinct wavelengths, so that information can be obtained at the same time on the liquid and solid content of a particle laden soap films (preliminary results for a soap film laden with calcite particles, figure c).

MISSIONS :

The objective of the internship is therefore to **combine** an existing experimental **set-up able to generate soap films** at constant velocity with a **Fourier Transform InfraRed** spectrometer (FTIR) available in the lab (figure b). This is a collaboration between two teams at iLM: Liquids and interfaces and SOPRANO. The aim is to obtain new measurements of the thickness and solid fraction of the soap films laden with mineral particles. This will be done for various experimental conditions (particle concentrations, velocity of film generation).

OUTLOOKS :

Continuation towards a PhD on the topic of the **generation of mineral foams** is possible.

published on 04/10/2021