

# NÉEL INSTITUTE Grenoble

## Topic for Master 2 internship – Academic year 2019-2020

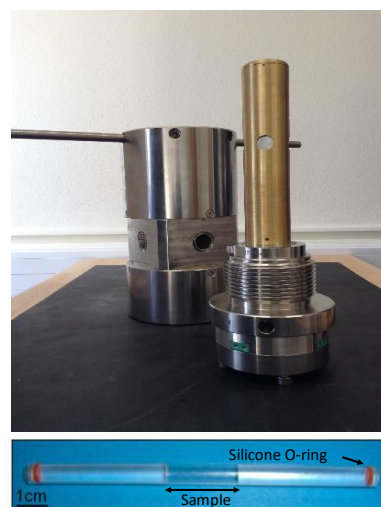
### Raman spectroscopy study of sulfur in hydrothermal fluids

#### General Scope:

Subduction zones on the Earth involve seawater into deep circulation in the crust. Under high T-P, hydrothermal fluids originated from this seawater realize an important matter transport. Sulfate is the most important ligand in seawater, after chloride. This sulfur participates in the formation of many types of hydrothermal ore deposits in the crust. The knowledge of sulfur speciation is crucial for metal transport and precipitation modelling. This project investigates into quantification and characterization of sulfur speciation under hydrothermal conditions using in situ Raman spectroscopy.

#### Research topic and facilities available:

Thermodynamic modelling of aqueous systems rich in sulfur requires knowledge of the stability of major sulfur aqueous species at high T-P. Nowadays, the properties of  $\text{H}_2\text{SO}_4$  species remain poorly understood. Exceptional hydrothermal spectroscopic equipment (photo) recently developed in the Néel Institute allows accurate in-situ measurements at high T-P by Raman spectroscopy. The key experiments will be performed in the systems  $\text{H}_2\text{SO}_4\text{-H}_2\text{O}$  and  $(\text{NH}_4)_2\text{SO}_4\text{-H}_2\text{O}$  at 25-600°C and 500-2000 bar.



#### Possible collaboration and networking:

This internship is a part of ANR project Radicals (<http://www.get.obs-mip.fr/recherche/projet/radicals>) in the framework of collaboration within Institut Néel/ESRF (Grenoble), GET (Toulouse) and I'IMP/ENS (Paris).

#### Possible extension as a PhD: yes

#### Required skills:

General interest in hydrothermal experimental chemistry, good bases and skills in physics and aqueous chemistry.

**Starting date:** February 2020 – June 2020, Néel Institute, in-city Raman facility at high T-P

#### Contact:

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