NÉEL INSTITUTE Grenoble

Topic for Master 2 internship – Academic year 2019-2020

Evolution of the equilibrium morphology of KH_2PO_4 crystals at different growth conditions

General Scope:
Single crystals, such as KH_2PO_4 (fig. 1a), are central to many fields of science and industry. From all the techniques used to obtain them, growth from solution remains one of the most efficient synthesis route for synthetic crystalline solids in research laboratories and in the related industry. In solution crystals are grown by lowering the temperature and develops flat faces (morphology), so the driving force is the resulting supersaturation in the solution. Depending on several experimental conditions (T, T lowering rate, pH, ...), this morphology can change because growth mechanisms are modified (fig. 1b). Being able to determine the changes in morphology and the growth mechanism for different experimental conditions will lead to a better understanding and an optimization of the crystal growth process.

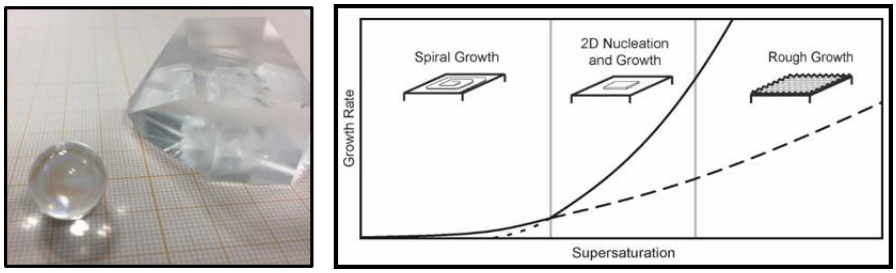

Figure 1: a) KH2PO4 bulk crystal and sphere shaped sample obtained from that crystal and b) growth mechanism as a function of supersaturation.

Research topic and facilities available:
The main objective of this internship is to determine the effect of experimental parameters (supersaturation, temperature, crystallization medium and solution viscosity, …) on the crystal habit and morphology and also on the nucleation and growth kinetics. The internship will be made in collaboration between two research laboratories. The experiments concerning low supersaturation conditions will be performed at *Néel Institute* (Grenoble) in an original growth cell and the ones concerning high supersaturation will be performed at *CINaM* (Marseille) in a µ-droplet-based microfluidic platform. All the obtained results will be part of the data that will be used to develop a numerical model able to predict the growth shapes of crystals.

Possible collaboration and networking: Laboratoire de Physique de la Matière Condensée (Paris, France)

Possible extension as a PhD: Possible if any financial support is found.

Required skills: Strong interest in materials science and experimental work is needed. Skills in crystal growth will be appreciate.

Starting date: February/March 2020

Contact:
Name: Bertrand Ménaert & Julien Zaccaro & Alexandra Peña Revellez
Institut Néel - CNRS
Phone: 04 76 88 78 03 e-mail: bertrand.menaert@neel.cnrs.fr & julien.zaccaro@neel.cnrs.fr & alexandra.pena@neel.cnrs.fr

More information: http://neel.cnrs.fr