



## PROPOSITION DE STAGE M2/PFE

### Exploring a TSM (travelling solvent method) approach for the growth of 3C-SiC single crystals

Silicon Carbide (SiC) is a wide bandgap semiconductor material which is currently changing the game of power electronics. For medium voltage applications, the cubic structure of SiC called 3C-SiC is the most suitable materials among the different polymorphs of SiC, especially for MOSFETs devices. Unfortunately, no 3C-SiC single crystalline wafers are available today, with the required quality. The challenge lies in reducing stacking faults (SF), electrically active defects in 3C-SiC, at a density less than 500/cm. With this aim in view, a crystal growth process, specifically adapted to the high quality growth of 3C-SiC has to be found.

This internship aims at exploring a totally disruptive implementation of a solution growth process, based on a travelling solvent method (TSM). Applying a temperature gradient between a source and a seed crystal, the growth is achieved by a dissolution and growth process through a very thin liquid film. The candidate will have to study the effect of the source material on the dissolution rate, on the growth rate of the crystal, and on the morphology and stability of the growth front. The work consists in preparing and conducting the experiments, characterizing the samples by a large variety of characterization tools (XRD, Raman, profilometry, SEM, ...) and analyzing the data in order to give a comprehensive understanding of the TSM configuration behavior.

We are looking for a highly motivated master student (M2 or PFE) with a background in material science, and who shows interest in research. The candidate must be dynamic, curious and autonomous. The candidate must speak French or English.

**LOCATION**            **Laboratoire SIMAP** (Univ. Grenoble Alpes, CNRS, Grenoble INP)  
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**SUPERVISION**    **Didier CHAUSSENDE, Email :** didier.chaussende@grenoble-inp.fr

*The candidate will receive the legal internship allowance.*

