

OPTIMIZATION AND TEMPLATED GROWTH OF GRAPHENE ON SILICON CARBIDE

Graphensic AB is a research spin-off company that manufactures and sells graphene grown on SiC. A cost-cutting strategy for the market price of the final product is to grow graphene on large area SiC wafers rather than on individual mm-sized chips, the current method of the company. This represents a technological challenge, since the homogeneity and quality of the as-grown graphene has to be guaranteed on such a large area.

During this project you will develop a methodology to assess the morphological and electrical quality of graphene grown on large-area SiC substrates. The information collected through thorough characterization will be fed back to the growth steps in order to optimize growth parameters. Additionally, you will explore alternative routes to ensure the large-area quality of graphene by modifying the SiC prior growth.

Along the project, you will go through the entire microfabrication process in order to pattern SiC: 1) CAD design, 2) E-beam lithography, 3) Thin-film deposition and lift-off, and 4) Dry etching. The grown material device will be tested by electrical measurements at room and cryogenic temperatures, under strong magnetic field (Hall Effect).

By the end of the project you will have acquired/developed at least the following:

- General cleanroom experience
- Micro/nanofabrication skills using electron beam lithography
- Knowledge of electrical measurements for low/high resistive devices
- Computer controlled of instruments using standard software MatLab/LabView.
- Image processing using Matlab/Labview
- Knowledge of physics of Hall effect/Quantum Hall effect.

The thesis work will be done in the period January-June 2019 at Chalmers with Samuel Lara Avila (Chalmers) and Amer Ali (Graphensic) as supervisors.

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