

## Chemical surface modification via stencil lithography Semester/Master project

(Section: Microengineering – Physics – Materials Science)

Stencil lithography is a high-resolution patterning technique based on the shadow mask principle which has been used since the ancient ages. In the last decades, this technique has evolved for the patterning of micro and nanostructures mainly for thin-film deposition, but also for etching and ion implantation. Using stencil for micro and nanopatterning offers some advantages compared to conventional lithographic techniques such as being an easily repositionable and reusable mask and the fact that allows to by-pass many steps of conventional lithographic techniques. Considering all these advantages, stencil may be a good candidate to explore to be used as a mask for the selective chemical modification of surfaces

The main objective of this project is to use stencils as masks for the selective chemical modification of the surface of a substrate so that then molecules binding specifically only to the chemically modified regions can be placed in the predefined pattern.

The initial idea is to study the effect of using stencils on an HF-pretreated silicon surface for an oxygen plasma treatment, but the student is welcome to bring new ideas for different chemical surface modification strategies.

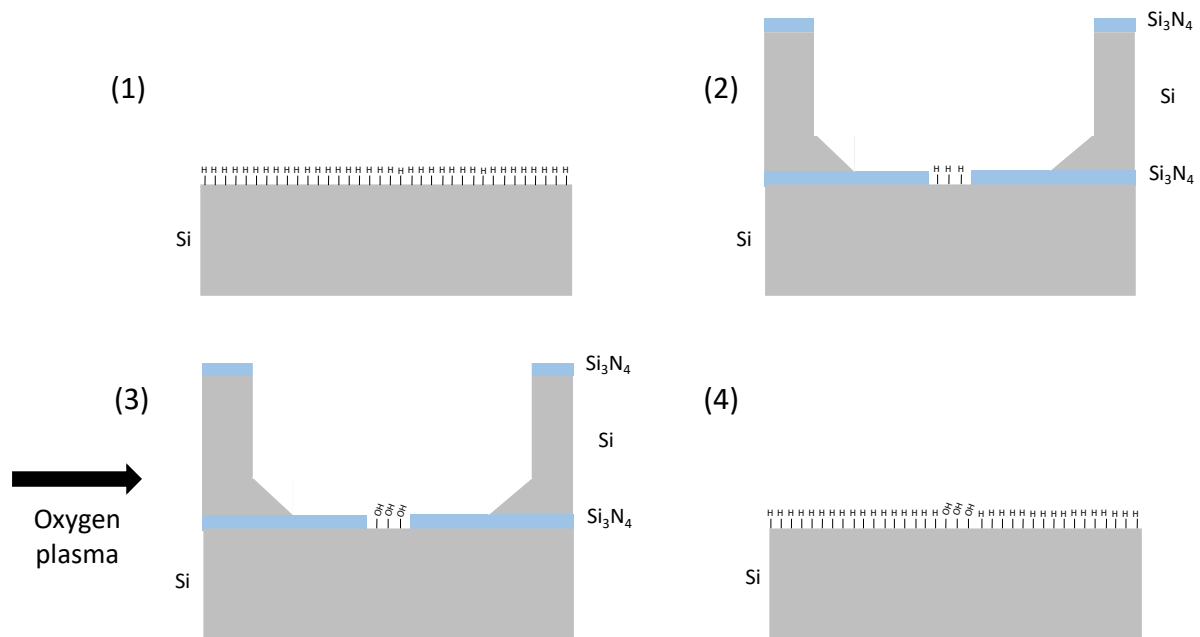


Figure 1. Main idea and scheme of the process: (1) Si surface treated with HF, (2) Stencil is placed over the surface to be modified, (3) Oxygen plasma is performed to chemically modify the surface, (4) Stencil is removed

Work description:

- Review state of the art of selective chemical surface modification and characterization.
- Design and fabrication of micro and /or nanostencils at CMi cleanroom
- Application of chemical modification strategies such as oxygen plasma using the stencil as a mask.
- Characterization of the chemically modified surface.

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