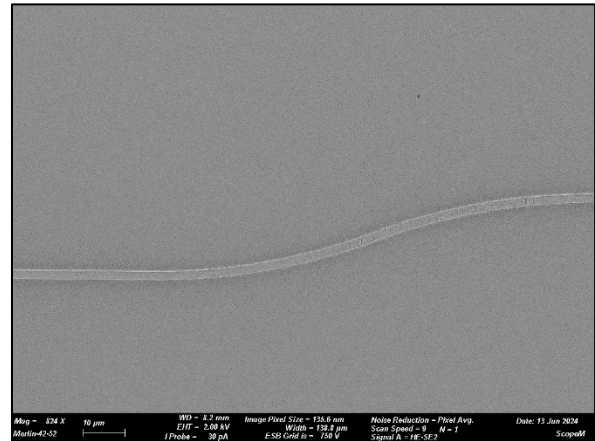
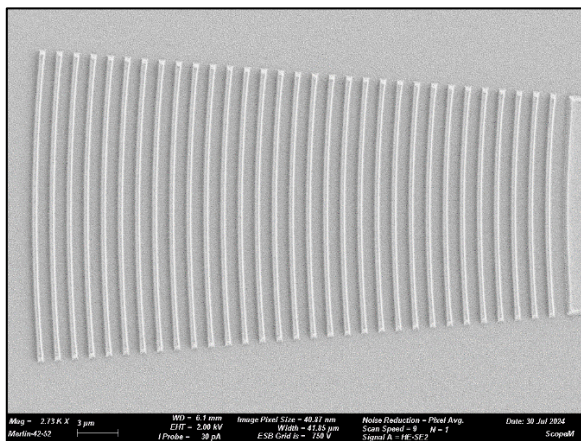


Development of Low-Loss Waveguides Using Barium Titanate Sol-Gel: From Synthesis to Optical Characterization

We are excited to introduce a challenging and innovative project within the Optical Nanomaterial Group, designed to enhance your problem-solving skills and deepen your understanding of advanced material science. This project focuses on the development of low losses waveguide based on barium titanate sol-gel.



The project gives the possibility to spread from the synthesis of barium titanate (BTO) using solution-based methods to the characterization of the device. Following the synthesis, the material will be characterized using X-Ray analysis and Scanning Electron Microscopy (SEM).

The next phase involves:

1. Optical Simulations:

- To optimize the dimensions of the waveguide, the grating coupler design, and the resonator used for loss measurements.

2. Waveguide Fabrication:

- Basing on soft-nano imprinting lithography, a bottom-up technique essential for creating scalable and cost-effective nanostructures.

Finally, you will carry out extensive optical characterizations of the fabricated waveguides to assess their performance and potential applications.

This project is designed not only to advance your technical skills but also to foster critical thinking, creativity, and collaborative problem-solving abilities. We look forward to seeing the innovative solutions and insights you will bring to this exciting field of research.

For this project is preferred a background in physics or material science.

If you are interested in this project and you want to join it for a semester project or a bachelor / master thesis please contact Dr. Virginia Falcone at vfalcone@phys.ethz.ch.