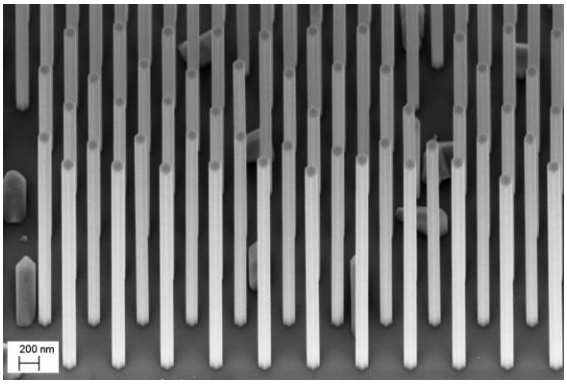
WALTER SCHOTTKY INSTITUT
Center for Nanotechnology and Nanomaterials

Technische Universität München

MASTER THESIS

"GaAsSb nanowires for advanced optoelectronics"

Nanowires are considered to be an important building block for next generation nanostructured electronic and optoelectronic devices, including single photon sources, field effect transistors, solar cells, lasers and light emitting diodes, due to its one-dimensional geometry. Additionally nanowires allow the possibility for the integration of lattice mismatched materials as well as being an effective test bed for physical phenomena. Ternary antimonide (GaAsSb) nanowire semiconductors have generated interest in recent years due to the many extraordinary properties that improves material quality and behavior compared to GaAs nanowires.



Goal of Thesis: This project stems from the recently developed position controlled, vertically aligned GaAsSb nanowires with high yield and uniformity. These nanowires are grown with versatile growth control using selective area epitaxy (SAE). Primarily you will lead investigation into morphological, structural and optical properties of such ternary nanowires. You will study several aspects arising from the growth of such semiconducting nanowires including aspect-ratio, Sb diffusion, doping and its dependence on optical and electronic properties. State of the art advanced characterization techniques will be used in understanding the properties of SAE nanowire ensembles as well as single nanowires. You will work closely with several teams within the WSI group that deals with the growth of these nanowires and the tailoring of nanowire properties for fabricating lasers, light emitting diodes and single photon sources.

You will gain & learn:

- Solid understanding of semiconductor nanostructures
- Low temperature and room temperature micro-photoluminescence of nanowire ensembles and single nanowires
- Correlated microscopy methods (SEM, He-Ion Microscopy) and x-ray diffraction measurements

Good knowledge in physics, semiconductors, as well as previous experience with lab work related to characterization of nanomaterials are a benefit, but secondary to motivation and commitment. Applications should be sent to Gregor.Koblmueller@wsi.tum.de or akhil.ajay@wsi.tum.de. Please include your CV, and a transcript of records (Bachelor & Master). Last date: 15 April 2021