

Diploma/Master Thesis

Title: Electrical and Optical Characterization of Ultra-Thin Ge Nanomembranes

Institute: Institute of Solid State Electronics

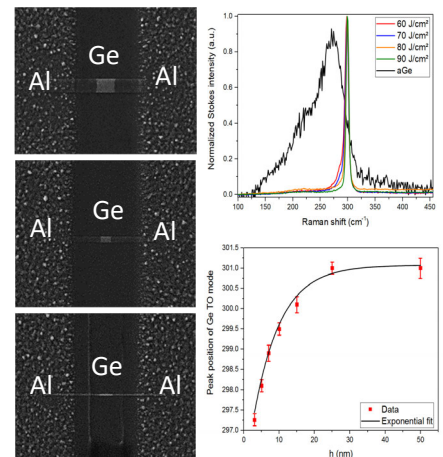
Supervisor: Prof. Walter M. Weber

Languages: German, English

Description:

The performance of nanoscale electronic and photonic devices critically depends on size and geometry and may significantly differ from those of their bulk counterparts. With a high and almost symmetric electron and hole mobility, Ge is considered a key material extending device performances beyond the limits imposed by miniaturization.

We have developed a process to fabricate ultra-thin Ge nanostructures down to 2 nm by crystallizing amorphous Ge via flash lamp annealing (FLA). Contacting these nanostructures with Al and utilizing a thermally induced exchange reaction by rapid thermal annealing (RTA) enables axial metal-semiconductor-metal heterostructures. Tuning the parameters of this heterostructure formation technique allows the fabrication of devices with ultra-short channel lengths beyond lithographic limitations, interesting for the exploration of novel electrical and optical transport phenomena. The duration of the master thesis is 6 months with a payment according to the FWF scholarship (438,05 €/month).



Scope of the work:

- Optical characterization (Raman spectroscopy, photoluminescence...)
- Electrical characterization at ambient conditions and cryogenic temperatures

Who can apply:

The cross-disciplinary nature of the projects invites students with background in microelectronics, physics and chemical engineering.

Contact:

Prof. Walter M. Weber
Institute of Solid State Electronics, TU Wien
Email: walter.weber@tuwien.ac.at

Dr. Masiar Sistani
Institute of Solid State Electronics, TU Wien
Email: masiar.sistani@tuwien.ac.at