Semester project, Bachelor Thesis, Master Thesis

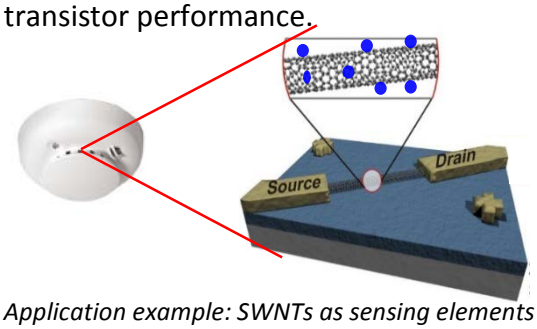
Monitoring Single Walled Carbon Nanotubes decoration by Raman spectroscopy and electrical measurements

Motivation

Modern time requests small sized sensors with low energy consumption, high sensitivity and selectivity to specific stimuli. These requirements could be fulfilled with utilization of individual semiconducting Single Walled Carbon Nanotubes (SWNTs) as channels in a field effect transistor (FET) configuration of sensing elements in nanodevices, for example gas sensors.

Goal

This project will focus on the functionalization of SWNTs integrated into field effect transistor devices (CNFETs), especially on optimization and reproducible fabrication of nanotube decoration by preselected nanoparticle types and on determination of the impact of the material onto nanotube characteristics and transistor performance.



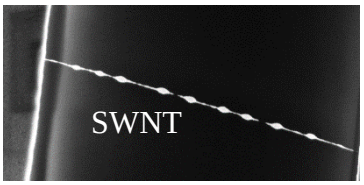
Application example: SWNTs as sensing elements in future fire detectors.

Learning Opportunities

Become familiar with SWNTs and CNFET gas sensors. Use of state-of-the-art characterization methods and equipment (Raman spectroscopy, AFM, SEM).

Work Description

1. Characterization of SWNT and CNFETs, e.g. by Raman spectroscopy
2. Investigation of the effect of deposit thickness, different nanoparticle types onto nanotube properties and CNFET performance changes
3. Investigation of reproducibility of deposit impact onto SWNT and CNFETs
4. Writing and defense of a scientific report



SEM image of decorated SWNT.

Your profile

You are a student of micro process engineering, mechanical engineering, material science, physics or chemistry with an interest in carbon nanotubes, sensors, nanotechnology and Raman spectroscopy. You should be able to work independently in an organized manner. Creativity, responsibility, eagerness to learn, self-motivation, persistence, and enjoying working in laboratory and with technical equipment are desired personal qualities.

Contact

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