Institut für Festkörperelektronik

TECHNISCHE UNIVERSITÄT WIEN

FKE-SEMINAR

Progress in fabrication of clean electrical contacts to individual SWCNTs and monitoring their integration process into sensors

Dr. Miroslav Haluska

Micro and Nanosystems, ETH Zürich

Date and Time: **August 10th, 2016, 15:00**

Location: **Seminar Room Floragasse 7, 1040 Wien**

Host: D. Pogany

Abstract

Exceptional properties of Single-Walled Carbon Nanotubes (SWCNTs) promote them to be used in a future generation of sensors with ultra-low detection limit, ultra-low power consumption and small size. On the way to reach large scale fabrication of these sensors several challenges remain to be solved. Well known bottlenecks for sensors based on individual SWCNTs is the low quality of contacts between SWCNT and metal leads as well as irreproducible synthesis of SWCNTs.

In this talk, progress made in synthesis of SWCNTs with targeted characteristics will be reviewed because of their strong influence on performance and fabrication efficiency of devices based on individual SWCNTs. Further, different approaches in fabrication of field-effect transistors with individual SWCNT channels (CNFETs) used by our group will be presented including a scalable process for CNFETs fabrication resulting in electrical contacts with long lifetime and narrow distribution of device on-resistances. The latter approach is based on combination of a sacrificial layer protecting as-grown SWCNTs during CNFETs fabrication, plasma oxidation to remove photoresist residuals from contact areas and deposition of optimized thickness of the Cr adhesion layer prior to noble metal deposition for electrical contacts. The approach will be illustrated on fabrication of NO_2 gas sensors.