



Temperature impact to carbon nanotubes

Task formulation:

Carbon nanotubes are graphene sheets rolled over into cylinders with diameters in the order of one nanometer. The so called multi-walled carbon nanotubes consist of up to several tens of graphitic shells with adjacent shell separation of $\sim 0.34\text{nm}$. They've been discovered accidentally by Suijo Iijima in 1991 observing a sample of synthesized fullerenes with TEM. Two years later, Iijima and Ichihashi synthesized single-walled carbon nanotubes (SWCNTs). The lengths of CNTs can be up to hundreds of microns or even centimeters. CNTs are used in several sensors and actuators, such as chemical sensors and optical sensors. The versatility of CNTs and their interesting properties show a big potential for advanced nanosensors and nanoactuators.

For the above-mentioned application is the influence of temperature very important. Mainly, there are two different kinds of CNTs, CNTs, which are aligned between electrodes or CNTs, which are randomly distributed in a network. For the second case CNTs have to be dispersed in a solution/dispersion. Therefore, different surfactant is needed. In this work the emphasis lays on the investigation of the influence of the surfactants. The measurements are carried out by use of a climate chamber. The results lead to an improvement of developed sensors or devices in later applications.

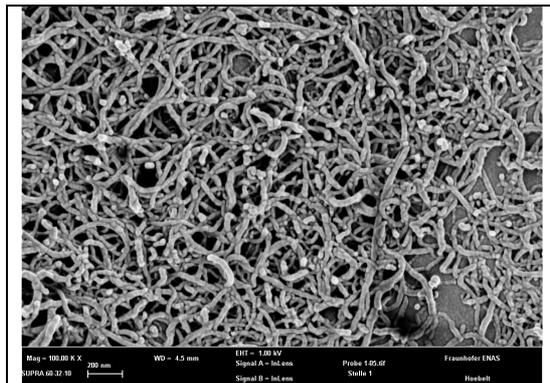


Fig. 1: SEM picture of spin coated MWCNT film

Investigation subject:

- Theoretical investigation
- Manufacturing of test structures
- Determining the resistance by varied temperature
- Analysis of the measured results

The investigation subjects can be widened or shortened depending on the work requirement. The document can be written in English or in German / Die schriftliche Arbeit an auf Englisch oder auf Deutsch verfasst werden.

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