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Hörsaal für Physik

”Cellulosic Substrates as Supports for Advanced Materials”

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There is hardly any single material that offers such a wide range of applications like cellulose, the most abundant biopolymer on earth. Cellulose is a polysaccharide consisting of glucose units that are arranged in a $\beta(1\rightarrow4)$ glycosidic fashion. This polymer exhibits a wide range of properties such as low unspecific protein binding, high hydrophilicity, biocompatibility while being rather stable in terms of chemistry even over a long period of time. However, one of its drawbacks is its low solubility in common solvents and water, making a processing involving standard techniques working in homogeneous media difficult. This problem can be circumvented by employing a soluble cellulose precursor, namely trimethylsilyl cellulose (TMSC), which after processing (e.g. by spin coating or electrospinning), can be easily converted back to cellulose by acid vapor treatment.

In this talk, our recent achievements in the preparation of nanomaterials based on TMSC will be shown. Such materials comprise matrices for biomolecules detection (e.g. ss-DNA, proteins) as well as potentially semi-conductive films that contain in-situ generated metal sulfide nanoparticles. Some surface sensitive methods will be discussed in detail such as multi-parameter surface plasmon resonance spectroscopy as well as special techniques used for sample preparation such as needleless electrospinning.