Contribution ID: **11** Type: **On-site project**

Sustainable spraying of functional nanoparticles and polymers diluted in green solvents for flexible electronics

Cellulose is a sustainable material with many beneficial properties which makes it a suitable candidate as carrier material in multilayered systems. Part of our work is to functionalize thin films of cellulose nanofibrils (CNF) with various materials dispersed in different solvents via spray deposition. The majority of polymers are dissolved in toxic solvents like chloroform. We aim to exchange toxic standard solvents against safe and sustainable green solvents.
In the first step of this project, sprayable inks of various combinations of green solvents, functional polymers, and nanoparticles shall be prepared and tested. In the second step, the inks shall be sprayed on cellulose layers. The best spray parameters shall be investigated. Finally, the electronic properties and structure of the most promising samples shall be investigated using four-point measurements, atomic force microscopy, and grazing incidence wide-angle X-ray scattering.

Literature:
Q. Chen, M. Betker, C. Harder, C. J. Brett, M. Schwartzkopf, N. M. Ulrich, M. E. Toimil-Molares, C. Trautmann, L. D. Söderberg, C. L. Weindl, V. Körstgens, P. Müller-Buschbaum, M. Ma, and Stephan V. Roth: "Templated Deposition of Ordered and Polymorph Titanium Dioxide Thin Films for Improved Surface-Enhanced Raman Scattering Sensitivity", Adv. Funct. Mater., 2108556 (2021)

Field

A3: Soft-matter sciences (application oriented)

DESY Place

Hamburg

DESY Division

FS

DESY Group

FS-PE (beamline P03)

Special Qualifications:

Student should have basic knowledge (bachelor) in chemistry or physics, some experience in practical work/lab work and enjoy hands-on work.

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