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Flexible electronics and photovoltaics: Retrieving real-space structures from scattering pattern

In modern flexible electronics and photovoltaics, spray coating plays a crucial role in fabricating flexible electronics and photovoltaics. The complex interface and multilayer structures are extracted from surface-sensitive scattering methods, using grazing incidence X-ray scattering and X-ray reflectivity [1,2,3]. Here, we apply spray coating to create functional layers, from novel latex colloids to complex biomaterials templates for recyclable electronics and solar cells. Due to the complex and rough interfaces of real-life solar cells and electronic devices, new and advanced approaches for extracting the real-space and buried structures are needed. In detail, the real-space structure is modeled (size and distribution of the nanostructures in three dimensions), the scattering pattern is calculated and compared to the experimental data. Hence, the goal of this project is to test a novel approach extracting the multilayer 3D structure by simulating the scattering pattern based on advanced algorithms and based on our results recently obtained [2,3,4]. The project includes image analysis as well as establishing reliable and feedback fitting routines. The simulations will be compared to previously acquired data [2,3,4]. Ultimately, the project participates in establishing a digital twin of the real experiments.

Literature:

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Group

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Project Category

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Special Qualifications

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