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## In situ GISAXS printing of biotemplated titania nanostructures

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Biotemplating is an effective method of nanostructuring hybrid inorganic-organic materials. This approach allows the tuning of material properties like porosity or domain sizes. Therefore, parameters like the electronic conductivity can be adjusted for different applications. In this work, differently structured Titania thin films are investigated for application in thermoelectric generators. Beta-lactoglobulin is a bovine whey protein that is used as a template during sol-gel synthesis. The Seebeck effect allows the conversion of waste heat into electrical energy. State of the art thermoelectric materials are rare, toxic and expensive. Biotemplated titania could provide a non-toxic and abundant alternative. To investigate the different titania morphologies, in situ GISAXS, GIWAXS and SEM are used. In situ GISAXS printing enables a time resolved investigation of the structure formation, domain sizes and domain distances. UV-Vis and PI are used to analyze differences in the optical properties of the thin films. These structural and optical changes are then correlated with measurements of the Seebeck coefficient and the electrical conductivity.

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