

Doctoral student in Polymer Physics

“All charged up about nanostructured thin films”

08.01.2024, Wissenschaftliches Personal

A position for a doctoral student in the field of experimental polymer physics is open at the TUM School of Natural Sciences. Aim of the project is to investigate the charge-dependent nanostructures in block copolymer thin films.

PhD Position (TV-L E 13 position, 50%, for three years) in “Tuning thin film nanostructures with charged block copolymers” at Technical University Munich (TUM School of Natural Sciences, Physics Department)

Group: The Soft Matter Physics Group at Technical University of Munich investigates complex polymer systems, e.g. nanostructured polymer films, responsive polymers, polymer gels and polymers for medical applications. For studies of the structure, dynamics and kinetics of these systems, we mainly use scattering methods and do experiments at large facilities. Time-resolved scattering experiments at large-scale facilities allow us to investigate rapid structural changes. These experiments are complemented by laboratory methods, such as atomic force microscopy and light scattering. We are looking for a PhD student for the project “Tuning thin film nanostructures with charged block copolymers”.

Topic: The research project addresses the possibilities to manipulate the thin film morphologies of block copolymers having charged blocks, which are of interest for energy applications. Not only the polymer architecture and charge state can be exploited for structure control, but also solvent vapor annealing.

Planned project: The candidate shall prepare thin films and investigate the film morphologies using optical microscopy, atomic force microscopy and grazing-incidence small-angle X-ray scattering (GISAXS) at the synchrotron, also *in situ* and in real time during solvent vapor treatment. Modeling of the GISAXS data will be carried out using existing software. The unique combination of complex polymers, advanced methods for structural investigations and quantitative modeling of the scattering data will provide comprehensive insight into the behavior of multiblock polymers with charged blocks and the possibilities for structuring thin films. These lay the ground for applications as energy materials.

Requirements: M. Sc. in physics with experience in polymer science, solid state physics or scattering methods, fluent English, understanding of German and commitment to work in a highly diverse and multicultural research group. Applications from underrepresented groups and women are strongly encouraged. Applicants with disabilities are treated with preference given comparable qualification.

Background information:

www.ph.nat.tum.de/softmatter

Macromolecules **53**, 6255 (2020). <https://doi.org/10.1021/acs.macromol.0c01151>

Adv. Funct. Mater. **31**, 2102905 (2021). <https://doi.org/10.1002/adfm.202102905>

J. Applied Crystallogr. **56**, 1330 (2023), <https://doi.org/10.1107/S1600576723006520>

Application: Please send your full CV, motivation letter, reference letter and transcript of records to Prof. Christine M. Papadakis, Technical University of Munich, TUM School of Natural Sciences, Physics Department, Soft Matter Physics Group, James-Franck-Str. 1, 85748 Garching, Tel. +49 89 289 12447, papadakis@tum.de, www.ph.nat.tum.de/softmatter