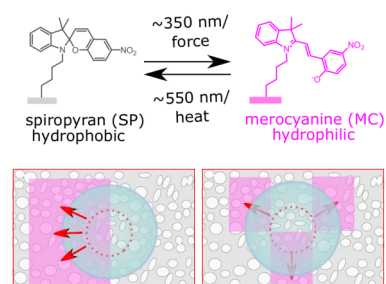


PhD Position – Chemistry and Materials Science – Analysis of wetting behaviour on spiropyran surfaces

Spiropyrans are a class of molecules well-known for switching between hydrophobic spiropyran (colourless) and hydrophilic merocyanine form (purple), e.g. through photoswitching by light. Spiropyran-containing materials are a useful tool for studying the wetting behaviour of droplets on soft, adaptive as well as switchable surfaces. This project aims at generating such surfaces to consecutively study the movement of droplets on these surfaces- with a special focus on the movement of the three-phase contact line - the line where surface, droplet and air are in contact. Based on previously reported spiropyran syntheses and surface functionalization protocols, you will generate spiropyran-containing polymeric substrates and gels to test their wetting properties. You will study the behaviour of droplets on substrates previously patterned with hydrophilic/hydrophobic patches, as well as upon switching underneath the three-phase contact line.



Photoswitch of spiropyrans, triggered by light or heat, resulting in an intense purple colour of the substrate. A droplet on the substrate moves due to the change in wetting properties upon the switch.

Your Tasks

Based on previously reported spiropyran syntheses and surface functionalization protocols, you will generate spiropyran-containing polymeric substrates and gels to test their wetting properties. You will study the behaviour of droplets on substrates previously patterned with hydrophilic/hydrophobic patches, as well as upon switching underneath the three-phase contact line. You will:

- synthesize mono- and bifunctional spiropyran monomers to produce spiropyran-containing polymers by co-polymerization or surface functionalization
- production of foamed spiropyran containing polymers
- production of spiropyran gels and analysis of the gel properties
- test switching of the surfaces under UV light, test the formation of patterns, determine wetting properties
- Analyse droplet movement on patterned surfaces and upon switching
- Analysis and tracking of the three phase contact line

Your Qualification

- Master's degree and Studies in chemistry, chemical engineering or materials science or similar subjects
- Profound knowledge of polymer chemistry and wetting theory is required
- Knowledge of surface analysis is beneficial.
- Excellent academic track record
- Excellent English skills in reading and writing
- You should be a team player with ambition
- You should be able to conduct research projects independently and feel comfortable with new challenges
- You should be able to structure and document your work properly
- You should be a creative mind, developing your own ideas and willing to go the extra mile to generate outstanding scientific results

Who we are

The NeptunLab at IMTEK is the highly interdisciplinary research group of Prof. Bastian E. Rapp at the University of Freiburg. Research interests include the development of novel materials, material structuring and industrial applications. The work of the NeptunLab is published in the most important international journals including Lab-on-a-Chip, Advanced Materials, Angewandte Chemie and Nature and has been featured in national and international radio and print media including the BBC, the New York Times and the Discovery Channel.



What we offer

- An interdisciplinary work environment with a team of motivated scientists that strive to develop clever solutions for scientific as well as industrial problems
- Well-funded projects with access to excellent state-of-the art infrastructure, generous lab space and scientific equipment

- An aspiring young team with great emphasis on publications and publicity
- A lab structure that promotes the development of the individual members and fosters open-minded scientific discussions
- A strong focus on the career development of the candidate including submitting to and attending the most relevant international conferences and summer schools
- An environment that supports start-up mentality – if your research is industrially applicable and promising, we will move towards commercialization of your solution
- Payment of TV-L 13 75% (full time)
- Depending on the performance of the candidate the PhD degree is generally finished within three years

Contact: dorothea.helmer@imtek.de

Please provide motivation letter, CV, academic track record (grades, publications)