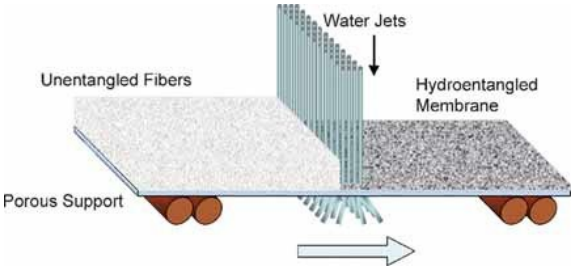
Characterisation of hydroentangled meltblown nonwovens

POLYMER PHYSICS AND PROCESSING

supervisor: R. Halamicek M. Sc. (robin.halamicek@fau.de)
Prof. Dr. D. W. Schubert



main topics:

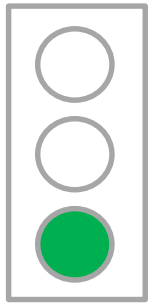
- Hydroentanglement of various meltblown nonwovens
- Process parameter variation
  - Meltblown: Variation of fibre diameter, basis weight, fibre orientation
  - Hydroentanglement: Influence of water pressure, time, number of cycles
- Characterisation of nonwoven properties (optical, mechanical) before and after hydroentanglement

aim:

- Evaluation of hydroentanglement (SOP)
- Optimisation of mechanical properties of meltblown nonwovens

start: March 2024

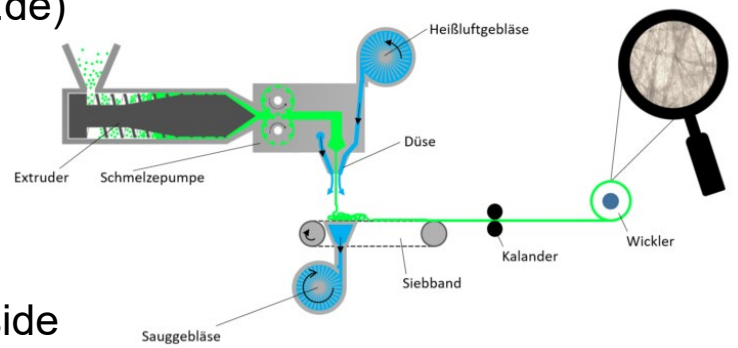
status



Characterisation of typical nonwoven properties in the BiCo meltblown process

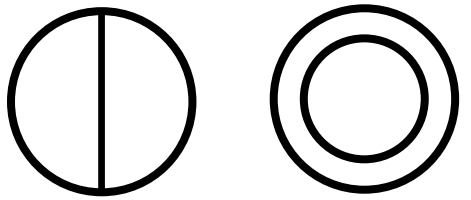
POLYMER PHYSICS AND PROCESSING

supervisor: R. Kröner M. Sc. (richard.kröner@fau.de)
Prof. Dr. D. W. Schubert



main topics:

- PP-based BiCo meltblown nonwovens (side-by-side fibre geometry) with different additive proportions
- Variation of the additive concentration
- Optical and mechanical characterisation



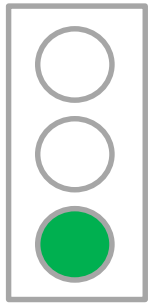
Side by Side Kern/Mantel

aim:

- General understanding of the effect of process parameters on fibre properties
- Optimisation of additive concentration and component content

start: immediately

status



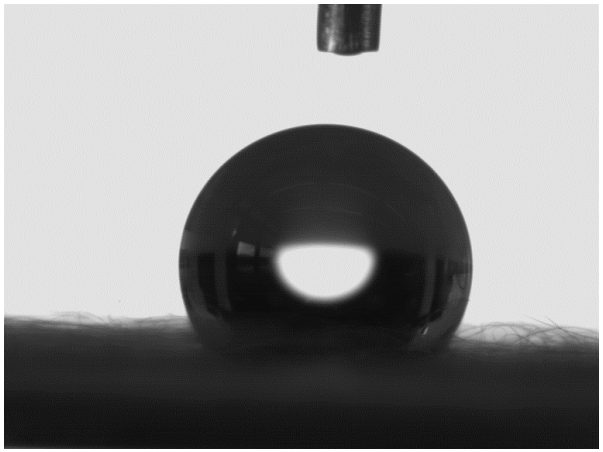
Investigation of the water absorption and nonwoven properties of PP and PLA

POLYMER PHYSICS AND PROCESSING

supervisor: C. Wiesmann M. Sc. (carolin.wiesmann@fau.de)
Prof. Dr. D. W. Schubert

main topics:

- General investigation of low viscosity meltblown polymers (PP, PLA)
- Characterisation of the contact angle and hydrophobicity using manufactured nonwovens and sheets
- Carrying out water penetration tests ("strike-through test") on nonwovens

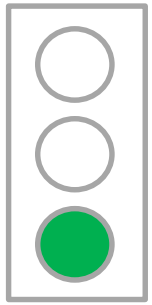


aim:

- Evaluation of the correlation of contact angle and hydrophobicity to nonwoven fabric properties

start: April 2024

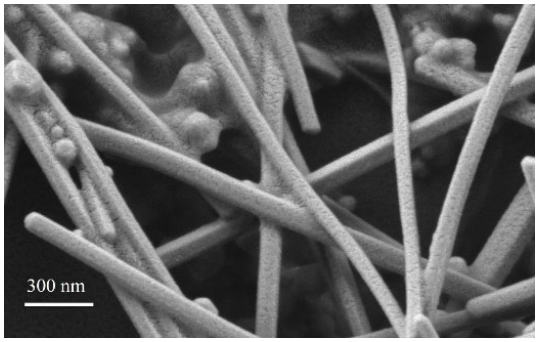
status



Characterisation of the reversible bending behaviour of monofilament coarse fibres

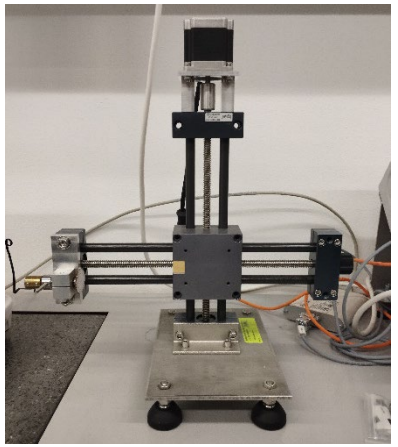
POLYMER PHYSICS AND PROCESSING

supervisor: M. Redel M. Sc. (michael.redel@fau.de)
Prof. Dr. Dirk W. Schubert



main topics:

- Determination of the bending stiffness as a function of the load duration
- Comparison of different fibre types (e.g. toothbrush bristles)
- Investigation of the influence of post-treatment

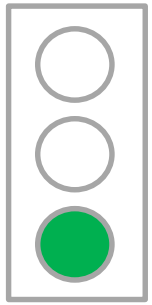


aim:

- Determination of factors influencing the bending stiffness
- Optimisation based on material parameters

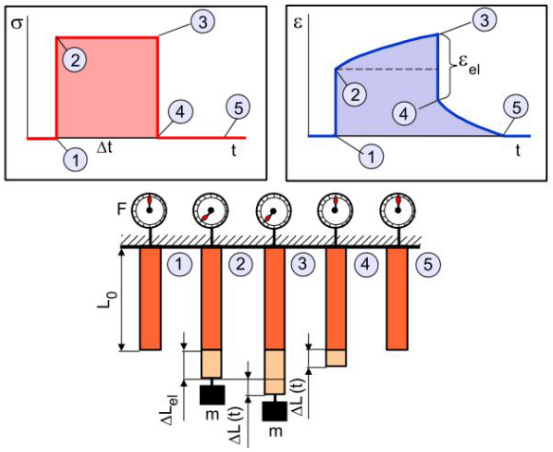
start: immediately

status



Process-, temperature- and time-dependent deformation behaviour of standard plastics

supervisor: M. Kellner M. Sc. (michael.mickel.kellner@fau.de)
M. Redel M. Sc.
Prof. Dr. D. W. Schubert



main topics:

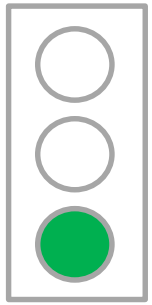
- Production of pressed polymer films of different crystallinity
- Optical and thermal characterisation (FTIR, DSC)
- Time-dependent thermal and mechanical characterisation (creep curves, tensile tests)

aim:

- Parameter-dependent evaluation of the "SOP" for strain creep tests
- Understanding process-dependent shape-property relationships

start: immediately

status



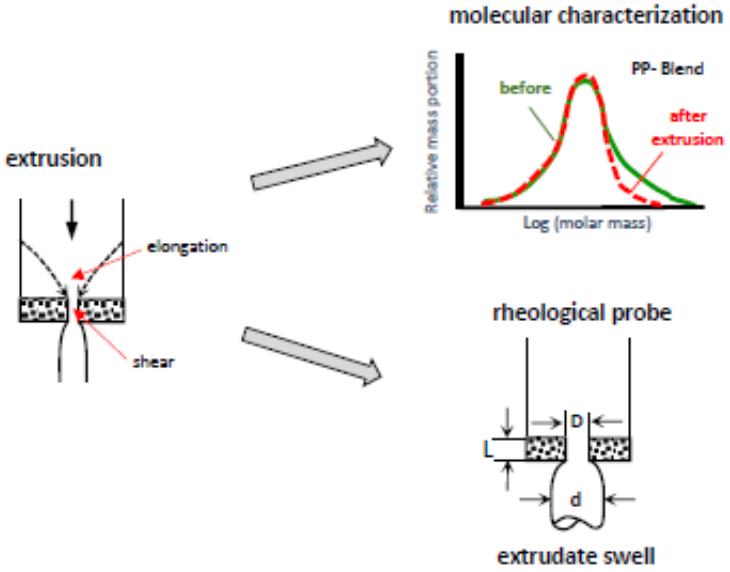
Molecular architecture and extrudate swell

POLYMER PHYSICS AND PROCESSING

supervisor: Dr. J. Kaschta (joachim.kaschta@fau.de)

main topics:

Dependence of elastic recoil of polymer melts on the amount of Long-Chain Branches (LCB)



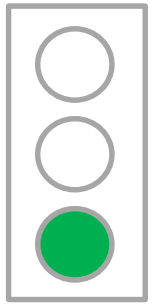
- change of amount of LCB by blending
- Blending of linear and LCB-PP by kneading
- Extrusion of blends under various conditions
- Extrudate swell in equilibrium
- Control of molar mass of blends by GPC-MALLS

aim:

- Measure of elastic recoil via extrudate swell on extruded strands
- Scaling law with respect to LCB content

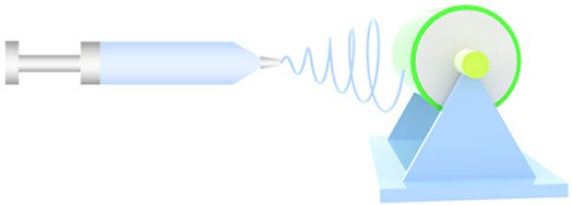
start: immediately

status



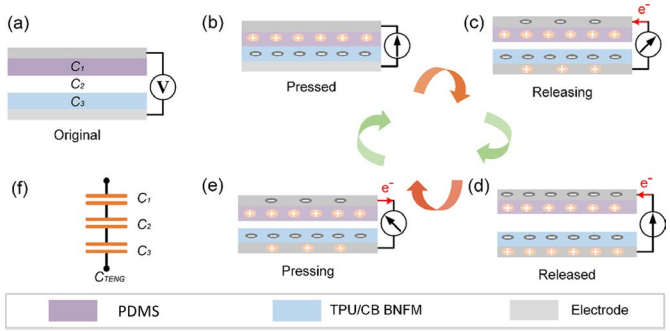
Electrospun TPU/CB Nanofiber Membranes for Self-Powered Wearable Sensors

supervisor: Q. Gao M. Sc. (qingsen.gao@fau.de)
Prof. Dr. D. W. Schubert



main topics:

- Preparation of TPU/CB nanofiber membranes with different CB contents
- Preparation of PDMS films with different surface roughness
- Assembling triboelectric nanogenerator (TENG) for self-powered sensing performance testing

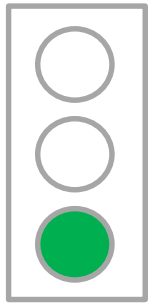


aim:

- Explore the impact of different roughness and CB contents on the output performance of self-powered sensors

start: immediately

status



Influence of water containing salts on the magnetic removal of micro- and nanoplastics

Organic Materials & Devices

supervisor: Linda Rockmann (linda.rockmann@fau.de)
Prof. Dr. Marcus Halik

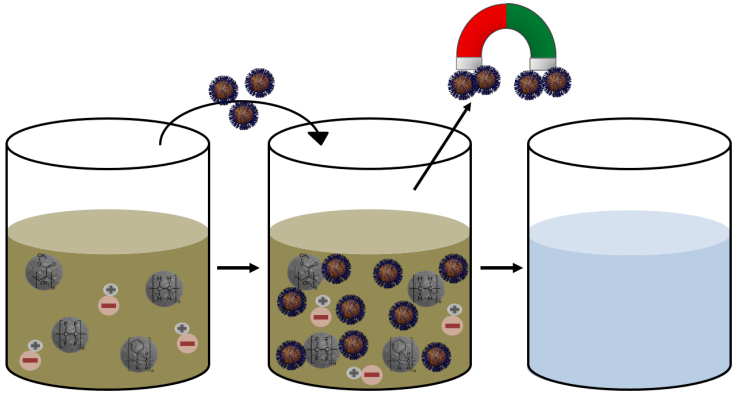
©https://www.sfchronicle.com/bayarea/article/california-microplastic-test

motivation:

- Accumulation of micro-/nanoplastics in the environment (e.g. in water bodies)
- Real water samples contain various substances (sediments, minerals, salts, biofilm, microorganisms, ...)
- Possible solution:
  surface modified superparamagnetic iron oxide nanoparticles for „selective“ extraction of contaminants

content of the work/your challenges and goals:

- Functionalizaiton and characterization of SPIONs
- Evaluate the influence of salts on pH value and ζ-potential and therefore on the extraction capability
- Extract micro-/nanoplastics from water in the presence of salts



Magnetic removal of PFAS from water using nanoparticles

Organic Materials & Devices

supervisor: Johannes Voß (jo24.voss@fau.de)
Prof. Dr. Marcus Halik

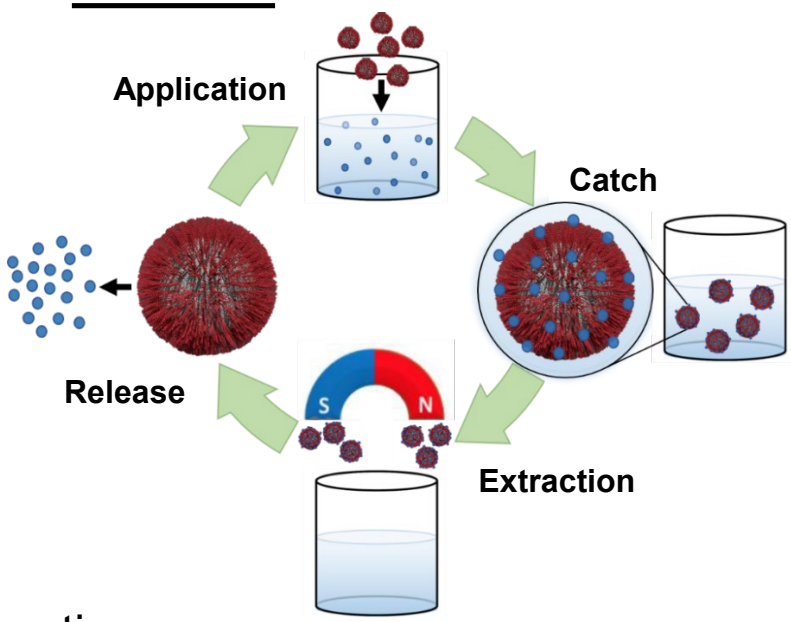
problem:

EXKLUSIV Giftige Chemikalien
Wo PFAS überall Deutschland verschmutzen
Stand: 23.02.2023 06:00 Uhr
[1] www.tagesschau.de/investigativ/ndr-wdr/pfas-chemikalien-deutschland

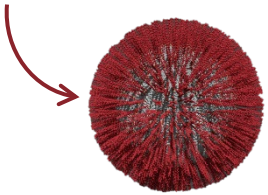
WIE GEFÄHRLICH IST DAS JAHRHUNDERT-GIFT PFAS?
19. Oktober 2023, 16:17 Uhr
[2] www.brisant.de/gesundheit/pfas

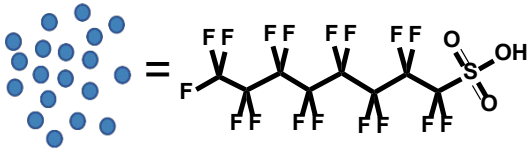
21.07.2023
PFAS verringern Aktivität von Immunzellen
[3] A. Maddalon et al., Chemosphere, 2023

solution:



task: Help developing surface-fuctionalized magnetic nanoparticles to clean water





caution: Contains chemistry ;)

Institute of Polymer Materials
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Prof. Dr. rer. nat. habil. Dirk W. Schubert