

Better Membranes for Water Electrolysis: High-

Throughput Testing with Blend Membranes in Roll-to-Roll Coater

Chemistry, Chemical Engineering, Process Engineering, Material Sciences or related fields...

The Challenge

Electrolyzers and fuel cells are an essential part of our energy transition to renewable resources. In many systems membranes are the heart of the electrochemical cell. Hence, there is a high demand of innovative membrane materials. Nowadays PFSA based materials are state of the art. These so called for ever chemicals have some short comings (toxicity, environmental hazards, etc...). Blend membranes are a promising alternative to substitute PFSA membranes. To find an optimal composition of these blend membrane many parameters have to be considered.

Because of the high number of parameters, we derive a High Throughput approach for producing graded blend membranes with an inline mixing of the components. The main challenge is to assure a proper mixing of both polymer solutions in the inline mixing process.

Your Tasks

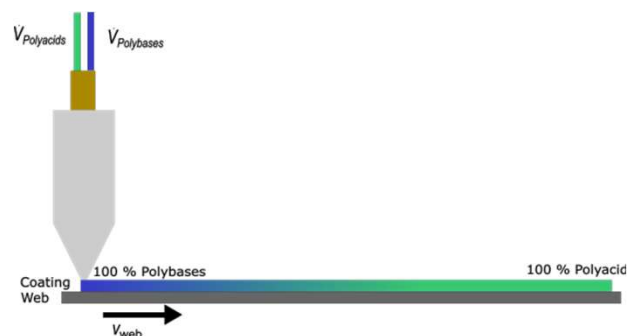
- ▶ Literature study about PFSA free (blend) membrane materials and their processing
- ▶ Investigation of different inline mixing concepts for viscous solutions
- ▶ Fabrication of blend mixtures/membranes with respect to a Roll-to-Roll coating process
- ▶ Characterisation of mixing/mixed polymer solution
- ▶ Coating of graded blend membranes in a Roll-to-Roll process
- ▶ Electrochemical characterization of the blend membranes

We Offer

- ▶ Outstanding working conditions in an interdisciplinary team of motivated young researchers
- ▶ Interdisciplinary supervision in the fields of polymer science and coating technology
- ▶ Freedom to test ideas and extend beyond the scope
- ▶ Industry applicable experience
- ▶ Being a part of a German project on acceleration of renewable energy research
- ▶ Working at our site in Erlangen (Cauerstraße 1) along with flexible working hours (within legal limitations)
- ▶ Home-office option for non-experimental parts
- ▶ Master's thesis can be written in German or English

Your Profile

- ▶ Student of Chemistry, Chemical Engineering, Process Engineering, Material Sciences or related field...
- ▶ DIY mindset
- ▶ Ability to work independently
- ▶ Experience in work in a chemical lab (e.g. organic chemistry)
- ▶ Experience in one of the following fields would be good:
 - ▶ Rheology/ Mixing technology
 - ▶ Fluid dynamics
 - ▶ Polymer science



For applications* and questions:

g.paetzold@fz-juelich.de – George Pätzold

*please attach a cover letter along with your transcript