i3 Membrane USE CASE

FLEX FUNCTION 2 SUSTAIN

Revolutionizing Separation: Electrically Switchable Filter Membranes

i3 Your Companion
Life Science Filtration

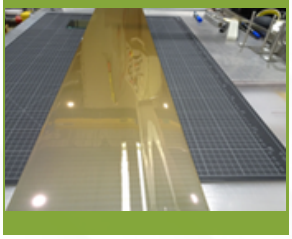
Polymeric membranes are a challenging material for industrial high-volume coating technologies (roll-to-roll processing). The State of the art (SoA) is sheet-to-sheet production (5 membranes in 8 hours) with limited yield (75%). Electrically switchable membranes were not available to the market until now. Specific adsorption / desorption by chromatography is usually done by time intensive salt or pH shift processes. In the Use Case, i3 Membrane developed double-sided roll-to roll membranes to create with conductive layers which enables them to be electrically switchable for purification in the high growth biotechnology industry.

i3 Membrane´s Digital Membrane Chromatography (DMC) bioseparation technology has conductive layers on the membrane's surface. Roll-to-roll sputter technology enabled high process yields, an attractive conversion cost compared to the SoA evaporation techniques, and most importantly, gentle processing of thermally sensitive modified membranes. Different processes were developed for various membrane types such as PES, PA, PET and PC. Beyond these process developments, environmental sustainability has been validated. The recovery of the conductive material through incineration gives a recovery yield of 100% Solvation and electrowinning recovered 74% of the material.

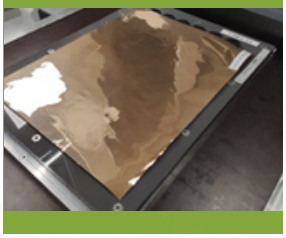
Syringe filter with coated membrane inside

Functionalized PA membrane with Au-coating

Au coating on both sides of PC membrane without wrinkle formation by using the pilot coater



Cutting an A4 sheet



Punching out 25 mm filter discs for asbestos analytics

CUSTOMER TESTIMONIAL

i3 Membrane aims at next generation membrane techniques as we believe that membranes can do more than just filter. Combining the potentials of polymer membranes and conductive metal coatings, we strive for the creation of digital membrane chromatography (DMC) solutions that enable higher product throughputs with lower buffer media consumption compared to the state of the art.
Being a use case partner in the FlexFunction2Sustain project, offered us the unique opportunity to get access to leading edge ultra-thin film technologies and co-develop new processes with technology leaders. More specifically, the project has enabled us to accelerate the development of our DMC technology and accessing larger membrane configurations at higher quality and lower costs. It has offered us technological expertise and development that would not been possible otherwise. *Dr. Florian Schmitt, CTO*

OITB SERVICE PROVIDERS

- *R2R sputter coating on LabFlex200 and CoFlex600 with gold targets (Fraunhofer FEP)*
- *Trials with diverse layer-by-layer deposition techniques such as Atomic layer deposition (ALD) and electroplating (Fraunhofer IAP)*
- *Life cycle analysis and recycling tests (IPC)*

www.i3membrane.de/en/

www.flexfunction2sustain.com

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