

Our Technology
for Your Innovations

Tailormade Smart Membranes

With our **smart nanofiber membranes**, we offer a **modular design principle** that allows materials to be tailored to specific needs. The membranes consist of ultrafine fibers, offering an **exceptional surface-to-volume ratio** and an inherent ultra porous structure. With a high degree of freedom, we can **customize polymers** or blends, incorporate **dopants** such as salts, charges, particles or dyes and apply **surface modifications** like biofunctionalization or carbonization. With this we can define chemical and physical properties like hydrophilicity, conductivity, fiber and pore size or membrane thickness. Produced in a **roll-to-roll process**, the membranes are easy to handle and easy to integrate into existing systems.

As a result, they can be applied in a wide range of applications, including **sample preparation**, analyte **preconcentration**, **filtration**, **biosensing**, and **diagnostic assays**.

TRL-Level: 3 - 5
Open for R&D Collaboration

Industry



Biotech



Diagnostics



Food &
Water Safety



Medtech



Public Health

Further information

Grotz et al. 2025, *ApplMatInterfaces* 17,46: 63009-63019
 Wieberneit et al. 2024, *AdvMatInterfaces* 11,30: 2400329
 Wongkaew 2019, *AnalBioanalChem* 411: 4251-4264
 Perju et al. 2023, *ApplMatInterfaces* 15, 38: 44641-44653
 Perju et al. 2022, *MicrochimActa* 189, 424

<https://s.fhg.de/izi-bb-SmartMembranes>

www.izi-bb.fraunhofer.de



Key Features

Tailored material

Ultra-porous,
lightweight
and flexible

High surface-
to-volume
ratio of the
fibers

Versatile
functionalities

Roll-to-roll
production

Modular Design

Development of Smart Membranes

- **Hydrophilic Polymers**
nylon, PVP, cellulose acetate
- **Hydrophobic Polymers**
matrimid, PS, PMMA
- **Biodegradable Polymers**
PLA, PVA, PBAT, PBS
- **Additives**
charges, particles, salts, dyes, biomolecules

Applications

From Sample Preparation to Analysis in Laboratory or Field Application

- Pre-concentration of Analytes
- Equipment-free Breath Analysis
- Environmental Analysis
- Point-of-Care and Rapid Testing
- Flexible and Porous Electrodes
- Reagent Stabilization

Contacts



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