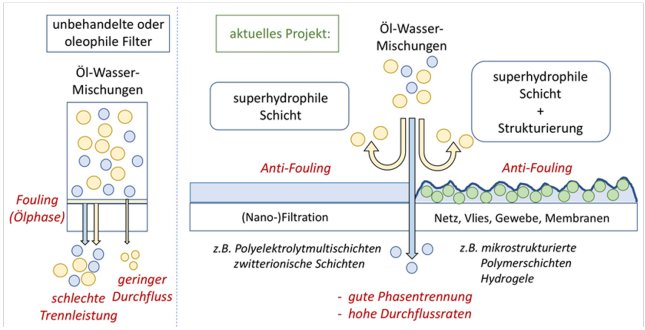
Improving the anti-fouling properties and separation performance of oil-water mixtures

Filter materials for liquid filtration represent an important product segment in the field of technical textiles. Here, the separation of oil-water mixtures is a growing field of application for corresponding special filters for the purification of wastewater, soil and natural waters.
Currently used filter materials with hydrophobic finishes are often not able to efficiently separate two-phase oil-water mixtures and show fouling by the oil phase. Superoleophobic finishes based on fluoroalkanes circumvent this problem, but are no longer future-proof due to the debate on the environmental persistence of fluorine compounds.

Therefore, the development of new filter materials with sufficient selectivity for one of the two components (oil or water) is an active research field with great industrial potential. At the beginning of the project implementation, superhydrophilic finishes of filters were in focus. These finishing are achieved in different ways: by the application of polyelectrolytes, the use of hydrogels, the use of zwitterions. Most of the components used are inexpensive and can also be classified as environmentally compatible, so that these approaches have great potential for application.
The following objectives are to be achieved, which are shown schematically in the following figure:



- Production of superhydrophilic filter materials and superoleophobic filter materials in the wet state.
- Identification of the most promising finishing variants for prompt industrial implementation
- Investigation of the efficiency and lifetime of the obtained filters
- Optimization of the most promising approaches based on the observed effects, process feasibility and economic efficiency

In addition to an economic strengthening of the German textile industry, the provision of environmentally friendly starting materials will lead to an improved purification of oil-contaminated water, which represents an overall economic benefit.

Project Information:

Title (German):	Vielseitige Funktionalisierung von Textiloberflächen durch lichtinduzierte Propfung dünner Schichten
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