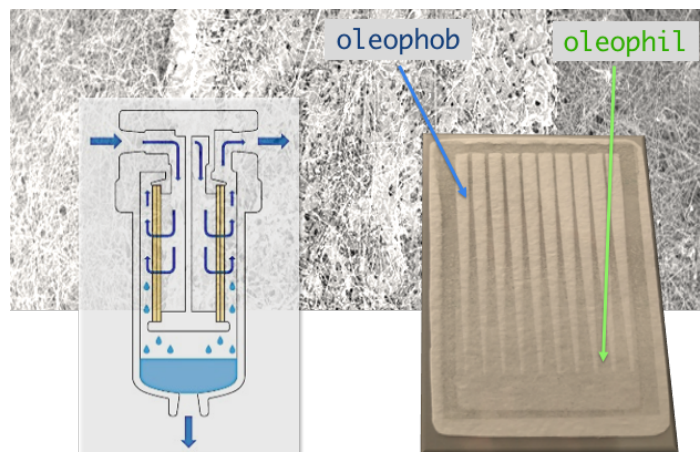


## Improving the drainage behavior of coalescing filter media through patterned functionalization

Droplet transport and wetting phenomena play a decisive role in the operating behavior of coalescing filters. The research objective of the completed project was to enable the acceleration of fluid transport by patterned functionalization of the filter layer of compressed air filters. The acceleration of drainage ultimately leads to a lowering of the backpressure within the media and to an increased permeability of the saturated filter media to the gas flow. Thus, a lowering of the pressure drop and corresponding improvement in the energy efficiency of the system can be expected.

To achieve the goal, a patterned modification, primarily with photo- as well as thermally induced processes, of the oil wetting properties of conventional filter media was targeted, which generates the wetting patterns with the largest possible differences and sharp transitions between oleophilic and oleophobic regions.



The research results show that by applying alternating geometric patterns (triangles, stripes, circles) of alternating oleophilic and oleophobic areas, a significant influence on the drainage behavior of coalescing filter media can be achieved. Both the dimensions and the ratio of oleophobic/oleophilic areas were varied by the use of masks. In particular, the triangular patterns showing a gradient increase of the oleophilic regions in the direction of gravity showed a particularly large effect on oil drainage. This modification made it possible to lower the differential pressure of some media by up to 35% compared to the initial media after saturation was reached. In addition, results indicate an improvement in particle separation due to the modification. A sufficient durability of the differential pressure reducing effect could be demonstrated.

These remarkable results open promising perspectives for users in the field of textile production and textile finishing, as well as in filtration technology, since a considerable improvement of low-cost filter fleece media can already be generated by the application of simple samples with the help of a thermally curing reagent.

Joint project with Institute for Energy and Environmental Technology e.V.

<https://www.iuta.de/vernetzung/igf-forschungsprojekte/aif-nummer/19918/>

### Angaben zum Forschungsvorhaben:

Titel: Verbesserung des Drainageverhaltens von Koaleszenzfiltermedien durch gemusterte Funktionalisierung

Kennwort: VEDKOF

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**Contact DTNW:** Dr. Habil. Larisa Tsarkova, Tel.: +49-2151-843-2016,  
E-Mail: [tsarkova@dtnw.de](mailto:tsarkova@dtnw.de)