

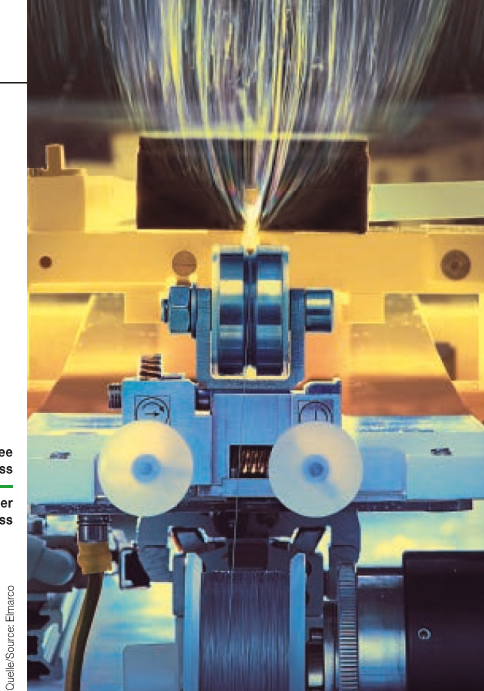
Nanofibers for the future

Nanofibers are becoming increasingly common in layered composite media, used together with a functional layer for numerous applications.

Elmarco presented new electrode designs for improved uniformity and flexibility in nanofiber production, as well as advanced functionality, at Filtech 2018 in Cologne, Germany. After almost 15 years, the market is maturing; customers are posing new questions and requesting new applications; and the production technologies have improved. New electrospinning technologies have emerged, using various principles of fiber formation. Combining a nanofiber layer with another material is a common way to get a composite that achieves the desired performance.

The number one and most developed application is air filtration, followed by liquid filtration, an area with high potential and no regulatory barriers. Interest is growing in the areas of medical drug delivery and blood separation. EU regulations for pharmaceuticals are promising, especially for drug delivery. Active ingredients can be administered to the body, which must be controlled, but regulations may prove a hurdle in tissue engineering and regeneration. Industrial applications are ready for high volumes and final products. Nanofibers can also be custom-produced at high volumes.

Nanospider needle-free electro-spinning process
Nanospider- nadelfreier Elektro-spinnprozess



Quelle/Source: Elmarco

The invisible danger

Micro plastics are high on the environmental agenda as they contaminate both air and water. Micropollutants, multi-resistant germs and microplastics in treated waste water represent a danger to humans and the environment. Mann+Hummel and its subsidiary Microdyn-Nadir meet this challenge with modern membrane technology and a pilot project is showing the first results. "In the past, one thought that if you can't see it, it can't hurt you. Today we know that isn't true. In fact, the reverse is true,"

so Werner Ruppricht, Senior Sales Director at Microdyn-Nadir. "The air contains harmful gases and particulates. Water contains micropollutants, multi-resistant germs and microplastics. They are not visible to the naked eye but can represent a big risk to the environment and human health", he explains. Today, the operators of sewage treatment plants usually use a process that is a combination of activated carbon and a sand filter to separate micropollutants. Activated carbon and sand filters reduce trace substances, such as pharmaceutical residues and microplastics. But they are not a barrier to multi-resistant germs. In addition, the sand filter is not able to fully separate activated carbon. The objective of the development from Microdyn-Nadir is to remove this limitation of the process.

Filters in automotive

Filters are the silent heroes in automotive engineering. In cars, clean combustion requires clean fuel and the job of the filter is to clean the fuel and provide continuous, high-level performance. Modern injection systems with minute nozzles, high pressures of up to 2,500 bar and cycle times in the millisecond range are highly sensitive. If the fuel contains even the smallest dirt particle, it can act like a projectile in the system and cause substantial damage. Here a Mann+Hummel triple layer filter medium meets the challenge. The first layer is a synthetic fiber layer. It increases the capacity to hold dirt. The second layer is made of a combination of cellulose and ultra-fine glass fibers. It ensures high separation efficiency to maximize the number of particles the filter can retain. A final support-

layer of cellulose prevents the escape of glass fibers.

Demand for air filtration

The growing demand for high-quality air filtration in residential, commercial, and industrial areas, as well as the continuous developments in sustainable power generation standards, drives the need for technical innovation in air filtration media. Filtration manufacturing companies rely on uniform reliable nonwoven media to provide robust filtration solutions. Purification media can be damaged in production and installation and lose their filtration effectiveness in humid and hazardous environment. For end-users, most of the cost of an air filter lies in energy consumption (75 percent), which means they need an efficient filter that can offer optimal performance without increasing energy consumption.

In response to the increasing need for high-quality filtration materials, Berry Global, Inc. a leader in nonwoven materials developed Everist, a nanofiber filter technology with a special composite structure consisting of three layers. The first layer consists of a nanofiber for the purification of air-borne particles. The second layer is a charged pre-filter for the larger air-stream particles, and the final support layer provides for easy processing of the media. The unique Everist structure provides the strength needed to help prevent damages, improves purification performance, and reduces pressure drops, leading to lower energy consumption.

Testing nanoparticles

To ensure the nanoparticles can be monitored, the aerosol experts from Palas have developed several state-of-the-art nanoparticle counters

(CPC) and nanoparticle sizers (SMPS) for filtration, ambient air monitoring, inhalation studies or basic aerosol research down to a few nm. For example, the Palas condensation particle counter ENVI-CPC 200 is designed for environmental ambient air monitoring and the model is appropriate for high concentrations and offers single particle counting up to 2,000,000 particles/cm³ and an integrated drying system. The Palas U-SMPS is a flexible Mobility Particle Size Spectrometer, which measures nanoparticle size distributions from 4 nm to 1,200 nm with high resolution. These instruments are also used in complete filter test rigs made by Palas. |

| Helena Engqvist |

Universal scanning mobility particle sizer (U-SMPS 1050 X/1100 X/1200 X) for various applications of 4-440 nm with integrated X-ray ionization

Universal Scanning Mobility Particle Sizer (U-SMPS 1050 X/1100 X/1200 X) für vielfältige Anwendungen von 4-440 nm mit eingebauter Röntgenstrahlionisation



Quelle/Source: Palas GmbH

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