

# Flexible and breathable nonwovens with superior electrical conductivity

Reference No: B76140

## CHALLENGE

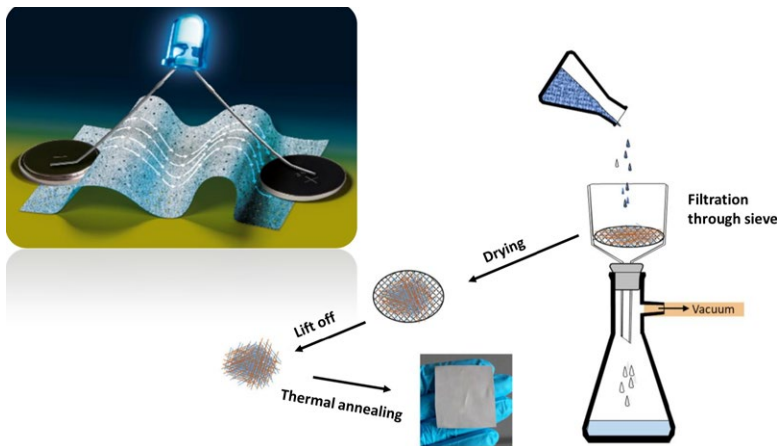
Flexible electrically conductive materials, often polymer-based, are highly important for energy production, energy storage, sensors and actuators. Advantages of polymers are easy processing, low thermal conductivity, high mechanical and chemical stability and light weight. However, the **application of polymers in electrodes is severely limited because most polymers are also electrically insulating**. The challenge is thus to design a material which combines the favorable material properties of polymers with high electrical conductivity.

## INNOVATION

The innovation, developed at the University of Bayreuth, includes a simple wet-laid process that can be up-scaled to industrial dimensions. Using short-cut electro-spun polymer fibers and a low percentage of silver nanowires in suspension, a **homogeneous, bendable nonwoven with superb electrical conductivities** (e.g. 750'000 S/m for 3.35 vol% silver content) can be obtained. The versatile wet-laying allows e.g. roll-to-roll processing as well as the addition of various additives for multifunctional end materials.

Advantages of the new high-tech nonwovens are:

- High, metal-like electrical conductivity, also in bent state
- Simple wet-laid production process
- Breathability and low weight
- Mechanical and chemical stability
- Fast heating & cooling capacity
- Low silver content saves costs



## COMMERCIAL OPPORTUNITIES

The innovative metallized non-woven has a **broad range of potential implementations**, for example:

- Conductive construction parts for automotive, aeronautics and mobile devices
- Battery electrodes
- Supercapacitors
- Functional textiles
- Sensors
- Medical implants

## DEVELOPMENT STATUS

Proof-of-concept. Ready to use.

## REFERENCES:

- 1 [www.nature.com/articles/s41528-017-0018-5](http://www.nature.com/articles/s41528-017-0018-5)