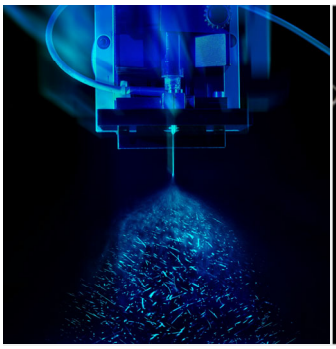
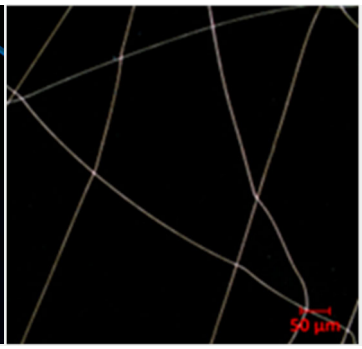
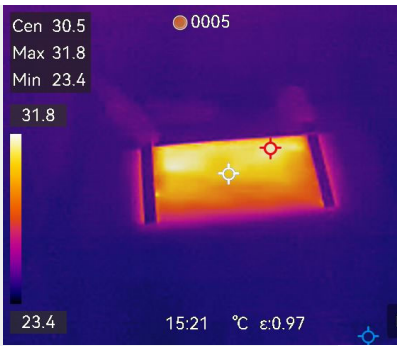


Electrospinning process



Electroless metallized fibers



Transparent Heater

PILOT TECHNOLOGY

ELECTROSPUN FLEXIBLE TRANSPARENT ELECTRODES

OBJECTIVES

- Development of a scalable cost-efficient alternative to expensive indium tin oxide (ITO) or CNT, or silver nanowires electrodes by electrospinning conductive transparent fibers on glass and polymer foils.
  - Cost efficient
  - Flexible, conductive and highly transparent
  - Large-area coating

RESULTS

- Electrospinning allows the deposition of fibers in the nanometer to micrometer range with a very high aspect ratio on glass substrates or foils. The wide-meshed fiber deposition stands out for high transparency and low haze. The fibers can be spun from intrinsically conductive polymers or can be made conductive by post-treatment. The electrospinning process was implemented in a roll-to-roll plant. Thus, continuous fiber deposition on flexible foils is feasible.
  - High range of chemical components
  - Sheet resistance: < 5 Ω/sq
  - Transmission: up to > 90%
  - Haze: down to < 1%
  - Heating was demonstrated
  - Stretchability of approx. 10% was already shown
  - Feasibility of roll-to-roll manufacturing was already demonstrated

APPLICATIONS

- Transparent Heaters
- Proximity Sensor
- Flexible transparent Displays, Touchscreens
- Photovoltaics
- Internet of Things (IoT)
- Wearables

INM
Leibniz Institute
for New Materials

Substrates:

- **Glass**
- **Polymers (foils)**

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