



Centre for Nanotechnology
and Smart Materials

CeNTI – Centre for Nanotechnology and Smart Materials

Smarter technology.

Custom. For you.

Agenda

- ① About CENTI;
- ① Figures;
- ① Competences;

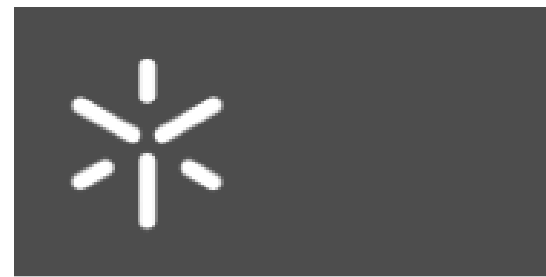




About CeNTI







Universidade do Minho



Focus

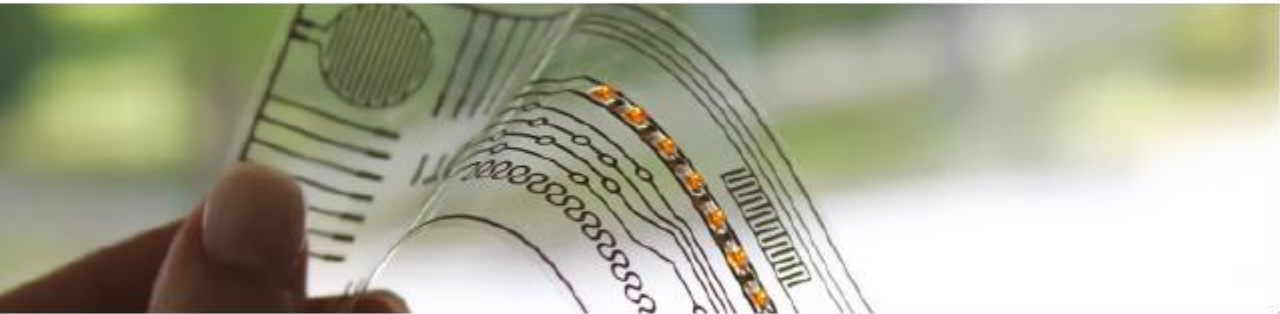
- ① Three Main Competence Pillars
- ① Three Main Targets
- ① 'Three steps' philosophy
- ① Many Base Materials / Substrates
- ① One focused mission

The logo for Nano4industry. It features a stylized blue 'n' inside a circle, followed by the text 'ano4industry' in a dark blue sans-serif font. The '4' is a large, bold, blue number. A registered trademark symbol (®) is at the end.

Three Main Competence Pillars



① Functional Materials & Solutions



② Smart Materials & Systems



③ Design & Engineering



Three main targets

Automotive & Aeronautics



Architecture & Construction



Sports, Health, Protection & Well-being





'Three steps' philosophy

R&D

Proof-of-concept
1st Process approach
1st Cost Assessment



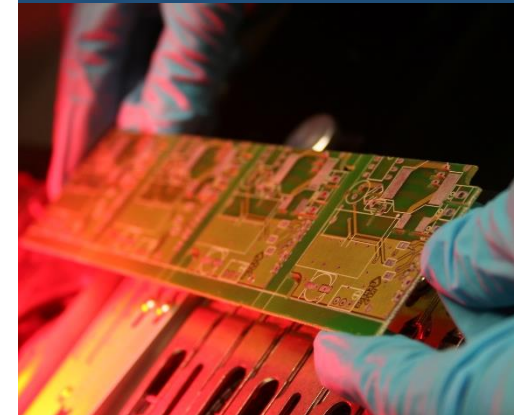
Prototyping

Product Design
Process Refining
Cost Assessment



Pre-series co-production

Market Proof
Pre series





Many Substrates





Figures



Multidisciplinary Team



98

FULL TIME RESEARCHERS
STAFF



15-20

MASTER / PhD
STUDENTS



3400

CAMPUS (m2)



Projects



ONGOING



52

NATIONAL FOUNDED
PROJECTS



16

H2020 R&D PROJECTS



34

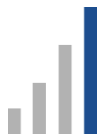
DIRECT CONTRACTS



>150

ACTIVE CLIENTS

2008-2017



90

INDUSTRY DRIVEN
PROJECTS



9

SCIENCE DRIVEN
PROJECTS



9

7FP R&D
PROJECTS



Intellectual Property



52

**ACTIVE PATENT
APPLICATIONS**

40* pending, 12 granted



20

JOINT OWNERSHIP APPLICATIONS

18* pending, 2 granted



5

**CeNTI OWNERSHIP
APPLICATIONS**

3* pending, 2 granted



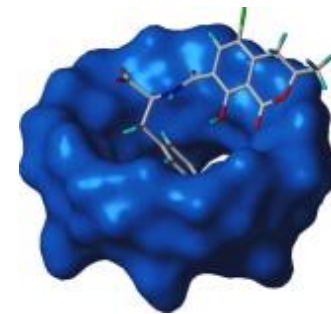
Competences



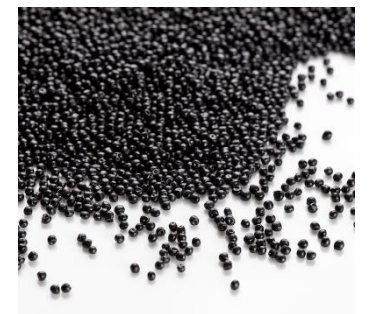
Nanoparticles and Nano capsules

Synthesis and processing capabilities

- Pilot and Semi-Industrial Scale Nano particle Manufacturing
- R2R UV Surface Modification
- Ozone Surface treatment
- Wet Coating / Nanoparticle Dispersion
- Plasma Surface Modification;
- Polymeric Composite nano-coatings
- Metal vapour deposition



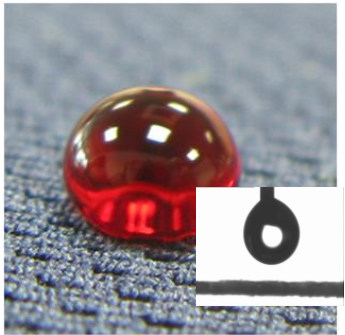
Functional Nano Additives



Matrix Dispersion



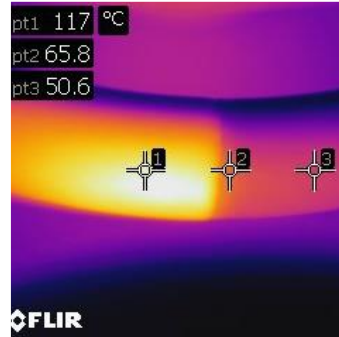
Easy/Self Cleaning



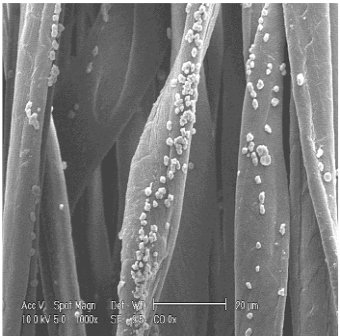
Drug Release



Thermal Management



Anti Microbial



Cosmetotextiles



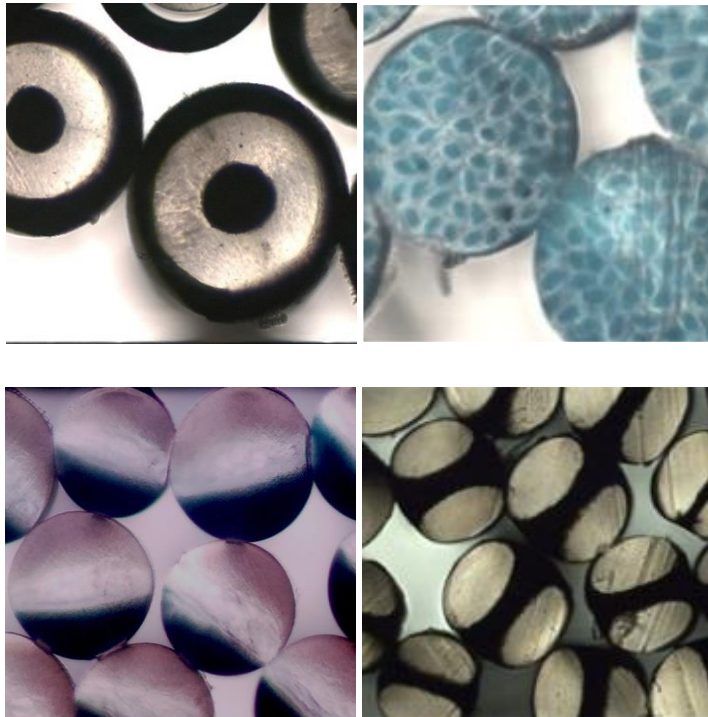
Fire Retardance



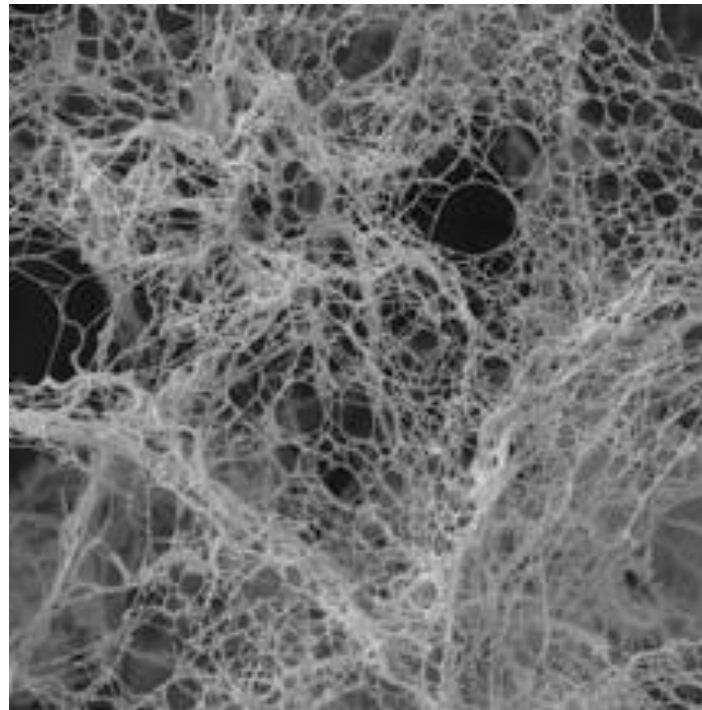
- Integration of nanomaterials and functional polymers without hindering or altering the traditional “feel and flavor” of materials:
- Self and Easy Cleaning surfaces;
- Anti-microbial, anti-virus and mite repellent;
- IR and UV reflective materials;
- Biomonitoring systems directly printed onto materials surface;
- Monitoring of VOC and interior air quality;



Bi / tri component fibers doped
with nanomaterials

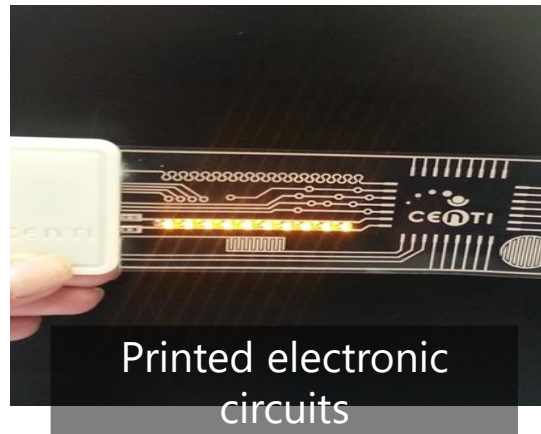
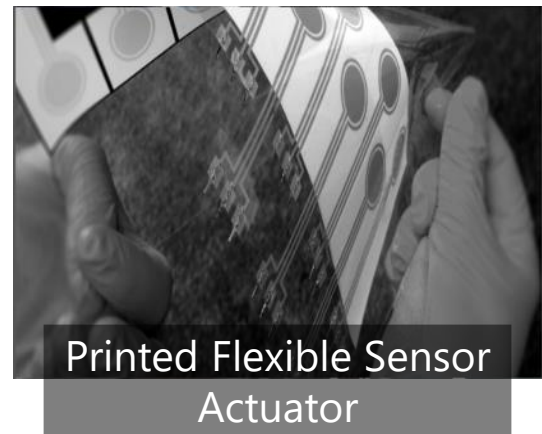


Cellulose based advanced
fibres



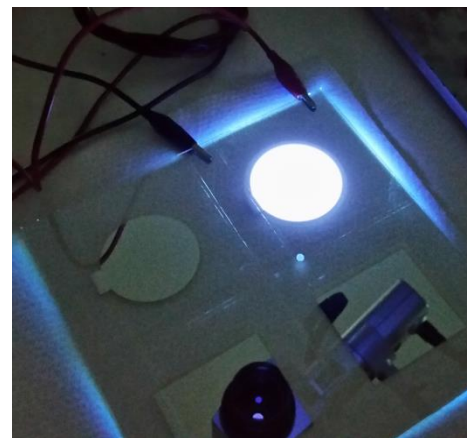
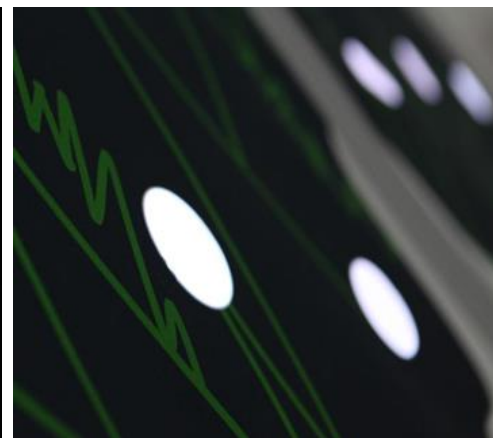
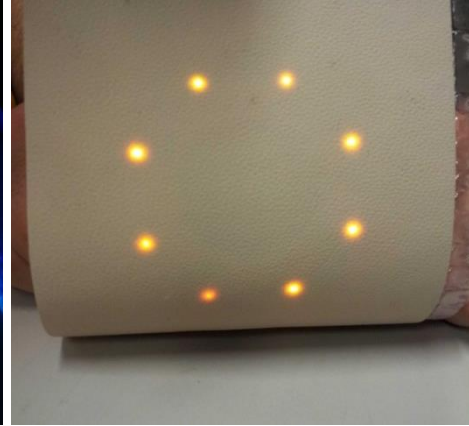
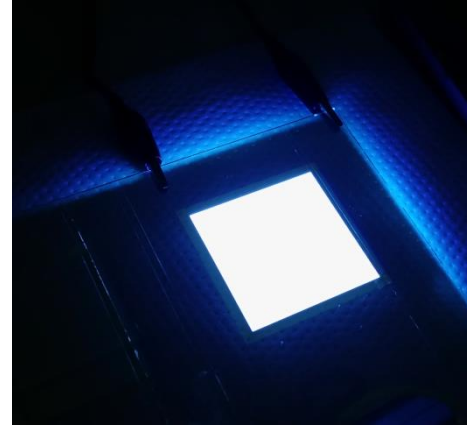
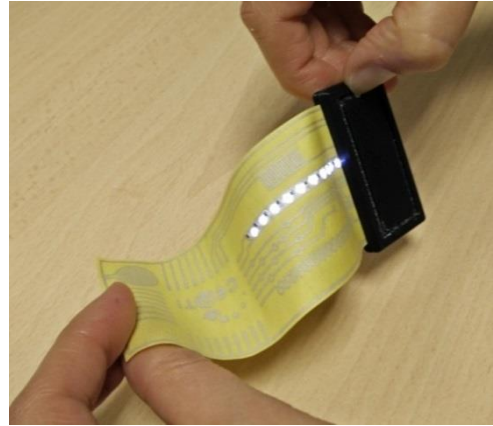
Compounding and Polymer
Coatings

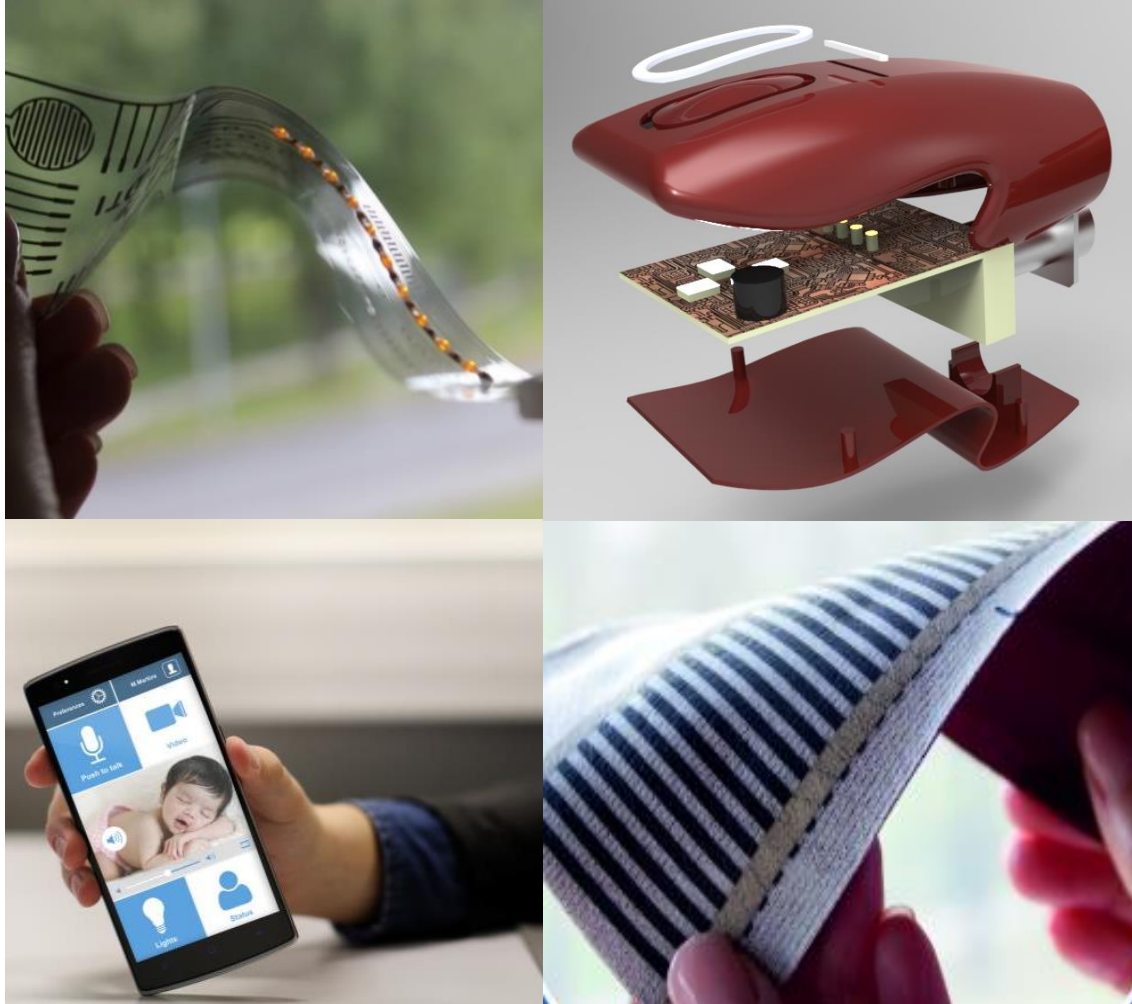




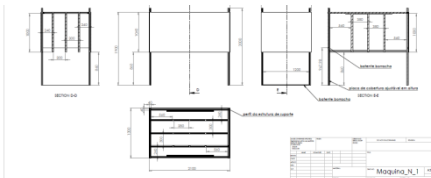


Printed Lighting





- ① Printed Sensors integrated onto non-conventional and flexible substrates;
- ① Development of printed-bulk electronics hybrid systems integrated onto and into flexible and rigid structures;
- ① Combination with Integrated/Printed lighting Elements;
- ① Hardware and software development – Mobile App;
- ① Printing and coating process development for rigid and flexible structures;



- ① 360° design solutions;
- ① Additive and subtractive digital fabrication;
- ① Thermoforming and Finishing;
- ① Rigid-flexible Integration;
- ① Conceptual RTD approach:
 - ① **From conceptual design to product;**
 - ① **Pre-series and market test manufacturing;**

Other services



- ① Support to apply for grants: H2020, PT2020, ...
- ① Support to companies to integrate international networks and consortia
- ① Support on patent applications
- ① Cross Sectoral partnerships development



Outputs



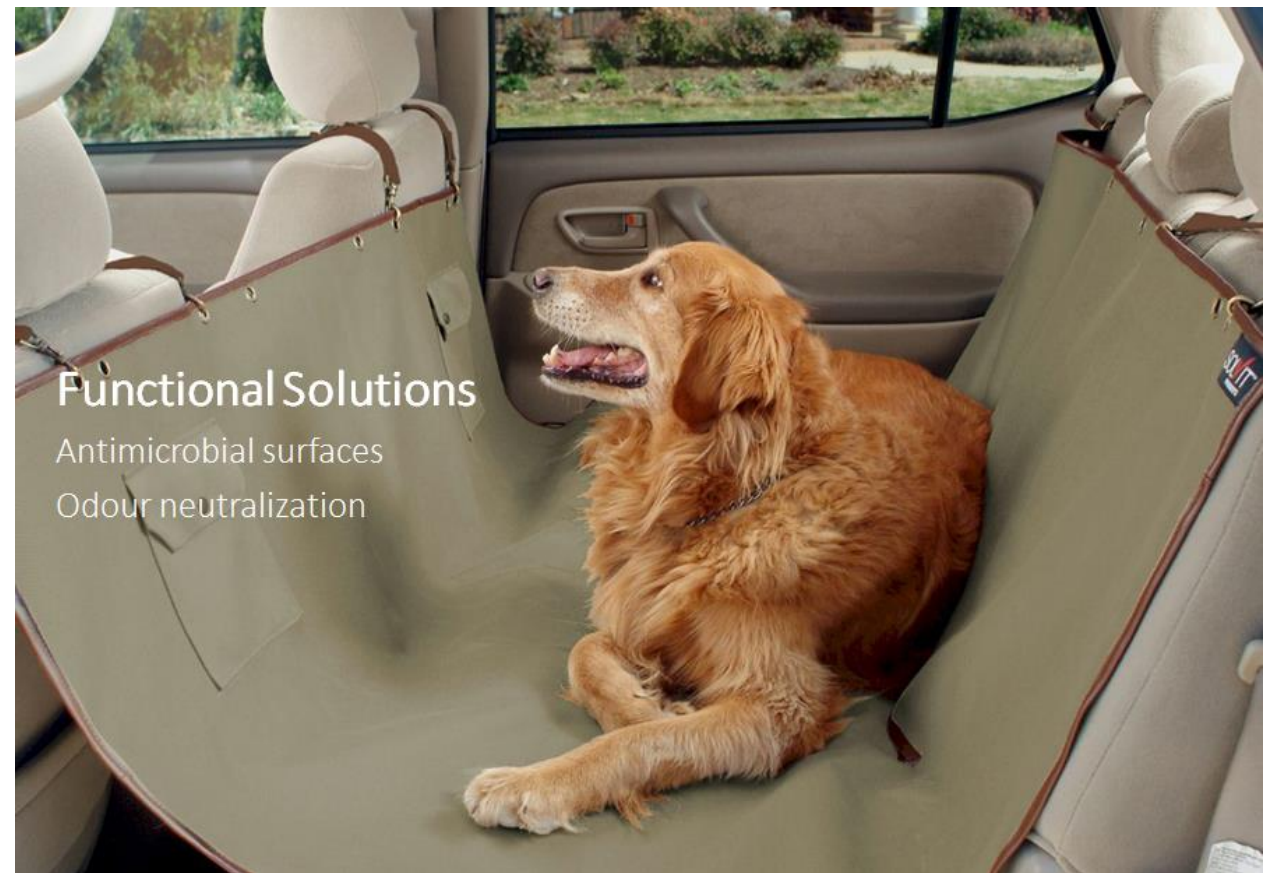
Surface Functionalization



Functional Solutions

Water repellent

Oil repellent



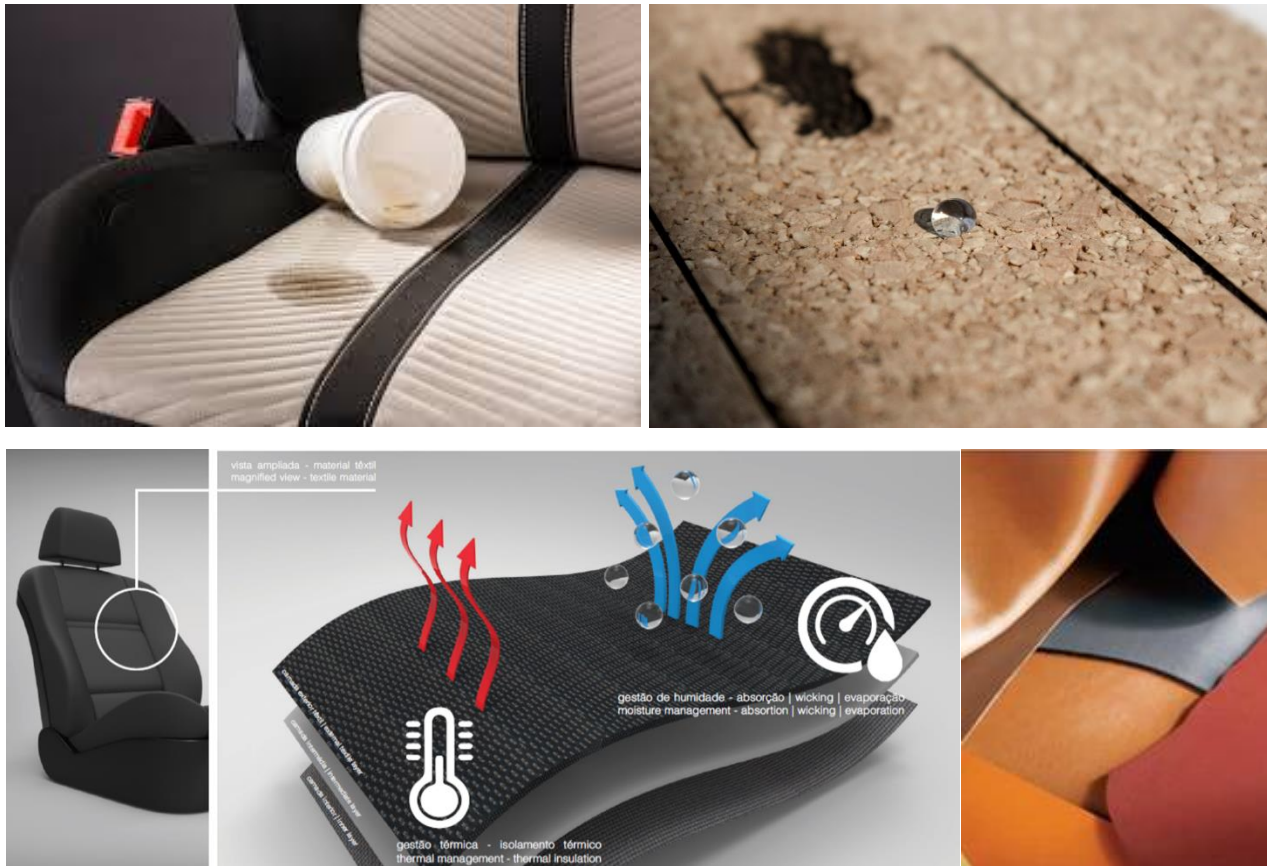
Functional Solutions

Antimicrobial surfaces

Odour neutralization



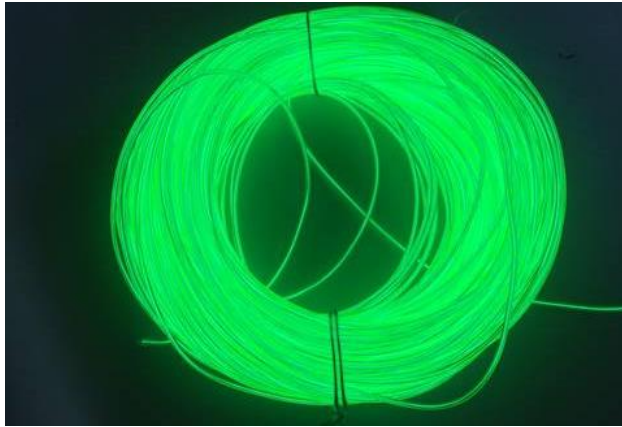
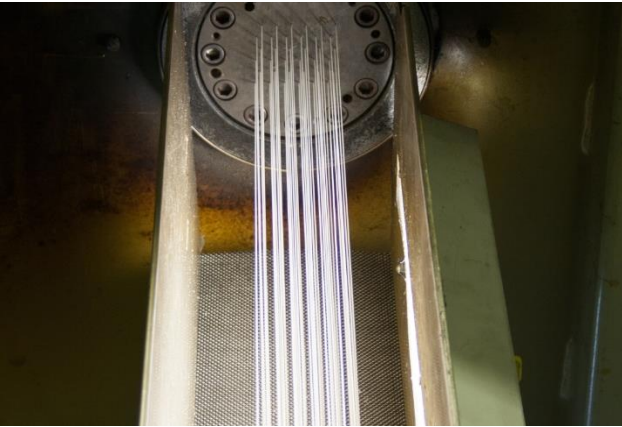
Functional Coatings



- ① Super-hydrophobic and super-oleophobic;
- ① Anti-Slip & Grip-Enhanced Surfaces;
- ① Self-cleaning materials;
- ① Abrasion resistant & anti-scratch
- ① Controlled Drug release or retention
- ① Fire Retardancy;
- ① Thermal Management;
- ① Bio Colouring Processes;



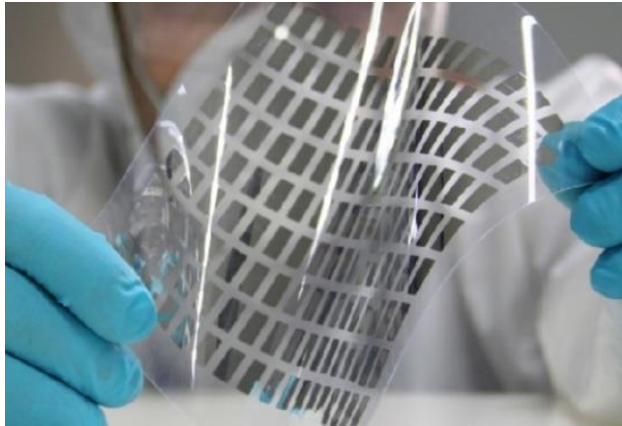
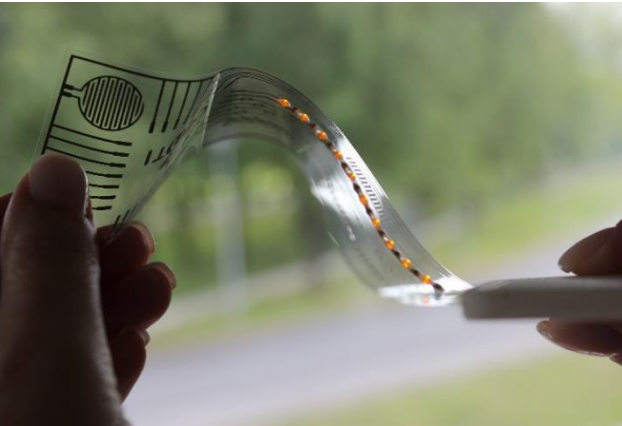
Composite Fibres and Films



- ① Tricomponent Fibres and filaments;
- ① Conductive fibres and films;
- ① Supercapacitors;
- ① Piezoelectric Fibres;
- ① High insulation coatings;
- ① Low weight thermoplastic & thermoset composites;



Outputs - Printed Electronics



Energy harvesting elements

Organic solar cells

Inorganic solar cells

Piezoelectric materials

Light emission elements

Organic LEDs

Electroluminescent materials

Electrochromic materials

Sensors

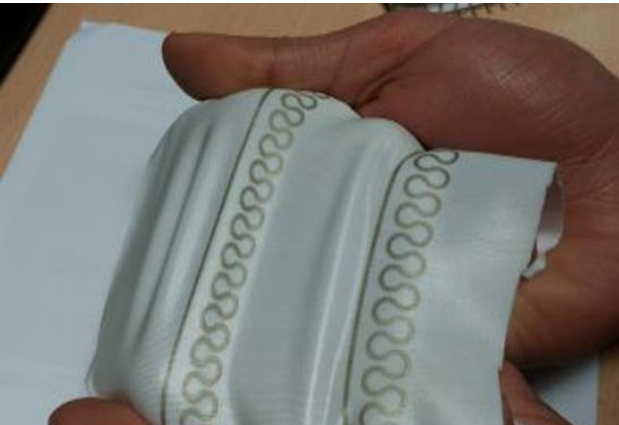
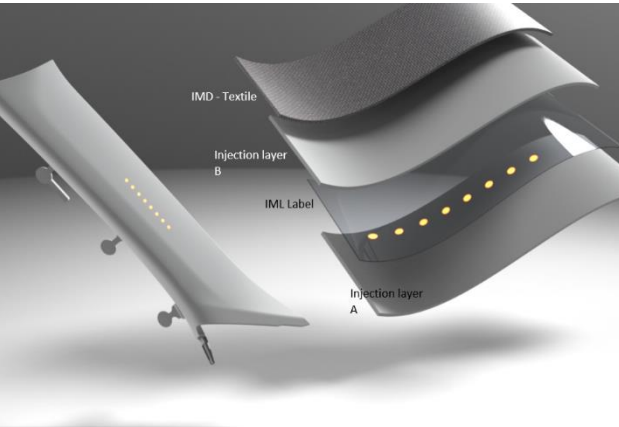
temperature, heart-rate, motion,
gas, touchpads/keypads,...

Actuators

Heating elements, ...



In Mold Thermoplastic Integration



- ① IML Integration of Haptic & Sensor Actuators;
- ① Active Matrix integration:
 - ① In Mold Labelling, In Mold Forming;
 - ① Printing Haptic and Sensor Components;
 - ① Integrated Hardware;
- ① In Mold Integration of Lighting – Decorative and Functional;
- ① Printed Lighting;
- ① Predictive actuation systems and gesture control;
- ① A.I. for predictive/adaptative interiors;





Memberships







Centre for Nanotechnology
and Smart Materials

Thank you for your attention!



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