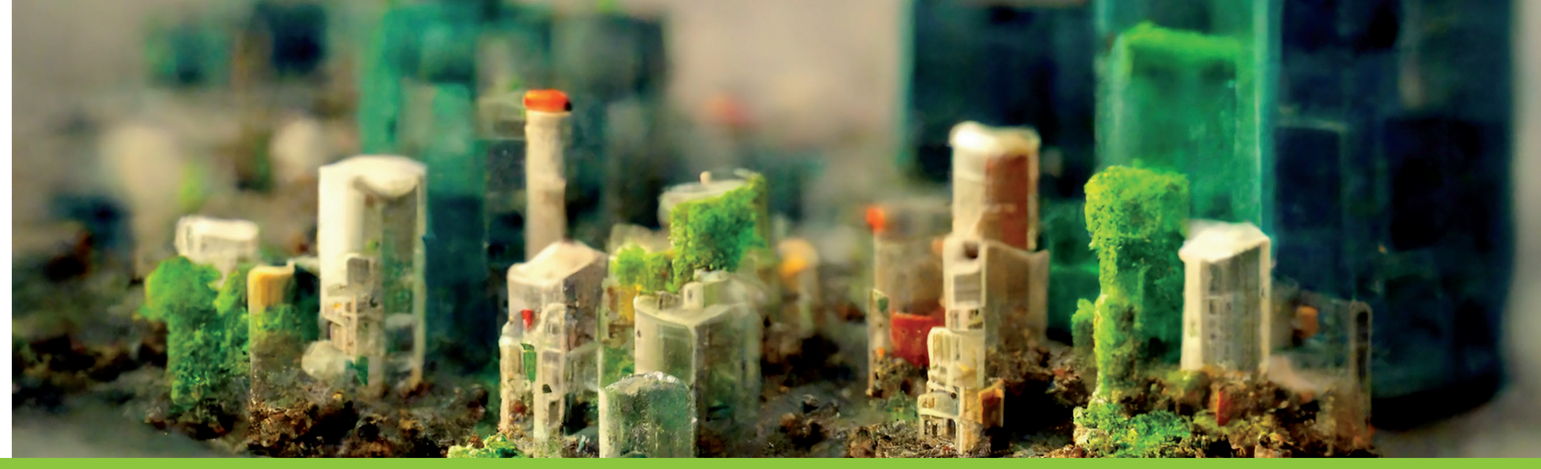
# SUPREME



**SUstainable nanoPaRticles Enabled antiMicrobial surfacE coatings**

Textiles | Metal | Alloys | Ceramics | Tiles | Marble | Stone slabs | Paper | Cardboard | Plastics

## THE PROJECT

The catastrophic ongoing pandemic caused by SARS-CoV-2 in 2020 has attracted our the attention of the general public towards the spread of harmful pathogens facilitated by high traffic surfaces, highlighting the importance and urgency of an economically and environmentally sustainable solution for antimicrobial surface as a potential strategy to mitigate the spread of disease outbreaks.

Nanoparticle (NP) filled coatings, with recognised effectiveness against bacteria, viruses, and fungi, are could be valuable candidates for developing antimicrobial surface and minimising the surface adhesion of pathogens. However, due to the many technical challenges, including difficulty to develop nanocoatings with a long-term antimicrobial capability, durability under real conditions, and safety assurance, their application at industrial level is stillremains limited.

The SUPREME consortium will develop a platform of efficient and multifunctional antimicrobial nanocoatings, building upon bespoke TiO2 nanoparticles that have demonstrated an exceptional antimicrobial ability at lab scale (TRL3). Two sustainable routes: 1) customised core/shell and advanced functional nanoparticles and 2) hybrid fibre-nanoparticles (using sustainable bio-based cellulose materials and nanoparticles,) will be pursued in this project. Bearing in mind the specific requirements of individual applications, the SUPREME consortium will coordinate the antimicrobial testings to its effectiveness against a wide range of pathogens. The production of the SUPREME coating will follow a sustainable-by-design approach that considers both toxicity and environmental impact from outset to guarantee both market acceptance and sustainability of the overall process whilst having a robust safety assurance in place for human health. The scaling-up production of these sustainable materials and their validation according to the industrial requirements will enable to reach the TRL6 by the end of the project.

## IMPACT

SUPREME's project results will make offer a unique contribution towards the following impacts:

1. Minimise the risk of spread of infections from harmful pathogens arising from everyday human activities.
2. Create a healthier living and working environment and offer holistic solutions to people with health.
3. Improve citizen health and enhance the EU's reputation as a public health best practice region.
4. Enhance economic benefits through reduction of lost hours of work through illness.
5. Boost research, development and innovation in the EU.
6. Provide business opportunities especially for SMEs.
7. Sustainable synthesis of nanocoatings (including bio-based materials) especially with effectiveness against a range of pathogens.
8. Industrial leadership and increased autonomy in key strategic value chains with security of supply in raw materials, achieved through breakthrough technologies in areas of industrial alliances, dynamic industrial innovation ecosystems and advanced solutions for substitution, resource and energy efficiency, effective reuse and recycling and clean primary production of raw materials, including critical raw materials, and leadership in the circular economy.
9. New sustainable-by-design materials with enhanced functionalities and applications in a wide range of industrial processes and consumer products.
10. Leadership in producing materials that provide solutions for clean, toxic/pollutant free environment, decarbonising industry, and safeguarding civil infrastructures.
11. Leadership in circular economy that strengthens cross-sectorial cooperation along the value chain and enable SMEs to transform their activities and business models.
12. Increased adoption of key digital and enabling technologies in industrial value chains and strategic sectors, paying particular attention to SMEs and start-ups.

#supreme-coating  @supreme_eu_proj  www.supreme-project.eu

## CONTACT US


**PROJECT COORDINATOR**

**Jan Van Impe**
jan.vanimpe@kuleuven.be

**Monika Polanska**
monika.polanska@kuleuven.be

**Zhenyu Zhang**
z.j.zhang@bham.ac.uk



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