



Covestro And Heraeus Precious Metals Collaborate To Enable Safer, More Sustainable Antimicrobial Textile Coatings

Laboratory tests reveal that AGXX antimicrobial surface technology from Heraeus Precious Metals is fully compatible with Impranil® PU dispersions which are part of the waterborne INSQIN® textile coating technology from Covestro, paving the way for more sustainable antimicrobial textile coatings.

This discovery comes at a key moment for the textile coatings industry. As the sharing economy continues to grow, more people are coming into regular contact with high-use surfaces, creating ideal conditions for bacteria, viruses, and other microorganisms to thrive. Applications range from office furniture used in shared offices to car interiors, which are frequently used in car sharing, to public transport.

At the same time, according to the review process of the European Chemicals Agency (ECHA), conventional antimicrobial silver technologies face the challenge of meeting the requirements of the BPR due to concerns over potential harm to human, animal, and ecological health. Many are now set to be phased out in the years ahead. To address the demand for more sustainable antimicrobial surface

coatings, Heraeus Precious Metals created AGXX: a system that eliminates a wide range of bacteria, fungi, and viruses without releasing harmful silver-ion components. AGXX works due to a catalytic reaction of two precious metals that converts oxygen into reactive oxygen species (ROS) using moisture derived from air humidity. These ROS eliminate microbes by disrupting their outer cell membranes, organelles, and DNA.

Martin Danz, Global Head of Antimicrobial Technologies at Heraeus Precious Metals said: "AGXX is skin-friendly,* BPR-compliant, and suitable for a wide range of applications. Results from our joint tests with Covestro now show that AGXX can be combined with Impranil® PU dispersions to add long-lasting antimicrobial properties to textile coatings for synthetic materials."

Tests also revealed that incorporating AGXX with INSQIN textile coatings technology from Covestro does not impact manufacturing processes. "We found that AGXX could be mixed with our Impranil products without dulling the performance or properties of either solution or requiring any changes to manufacturing processes for coated textiles," said Dr. Torsten

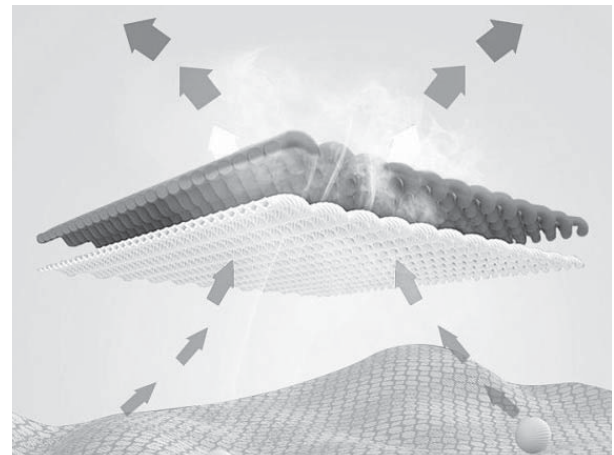
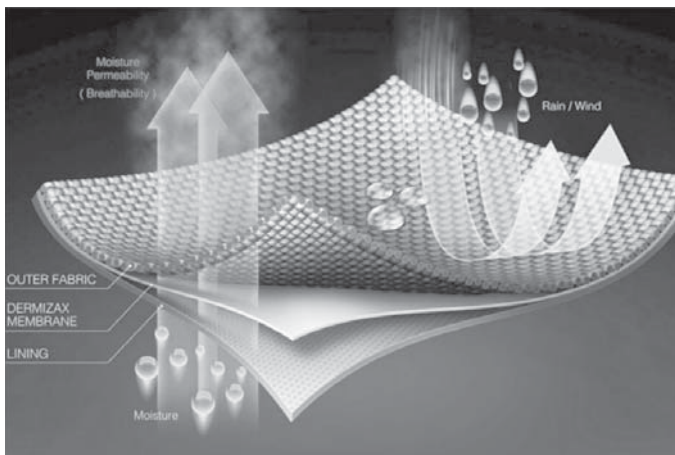


Pohl, Global head of Textile Coatings at Covestro.

"When combined with AGXX, our INSQIN technology maintains its cleanability, flexibility, and ability to withstand usage over long periods. For textile coating manufacturers, this tried-and-tested guide formulation offers a fast and effective way to infuse their coatings with safer and more sustainable antimicrobial properties and still gain the sustainability improvements of our low-VOC waterborne PU dispersions."

With demand for hygienic, reliable, BPR-regulation-compliant, and safer textile coatings expected to increase, the combination of AGXX and INSQIN technology will enable textile manufacturers to quickly adapt to the rapidly evolving needs of the sharing economy.

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spreading and evaporation

- Provide antimicrobial properties and odor control
 - Enhance UV resistance and dimensional stability
- However, durability over washing cycles and environmental concerns remain challenges.

*Fabric Structure Design and Fiber Selection

A suitable strategy includes hydrophobic base fibers with small diameters (e.g., polyester microfilaments, polyamide), engineered fiber cross-sections (like COOLMAX) to increase active surface area, and 3D or multilayer structures. The inner layer can be hydrophilic to absorb moisture, the middle layer to facilitate transfer, and the outer layer hydrophobic for evaporation.

*Equations and Models

Key equations include Fick's law for vapor diffusion: $J_v = -D_{eff} \frac{dC}{dx}$
 And an approximate wicking model: $Q = (k A \Delta P) / (\mu L)$
 Combined mass conservation: $\partial(\epsilon \rho_w)/\partial t + \cdot(J_{vapor} + J_{liquid}) = S$
 Coupled energy equations including latent heat of evaporation are considered when heat transfer is

significant.

*Testing and Performance Indicators

Evaluations should include WVTR (ASTM E96 or ISO equivalents), OMMC (MMT tester), wetting time, absorption rate, spreading speed, maximum wetted radius, and antimicrobial tests (AATCC 100 or ISO 20743), as well as durability after multiple wash cycles.

*Industrial Case Studies

Several global brands utilize moisture-wicking and specialized finishes in sportswear across various disciplines:

- Nike Dri-FIT: Football, basketball, and running apparel optimizing moisture transfer.
- Invista COOLMAX fibers: Engineered for enhanced wicking and rapid drying, used in running and base-layer garments.
- Lululemon Silverescent: Uses silver ions for antimicrobial effect in yoga and running apparel.
- Schoeller NanoSphere: Nanotechnology finishes for self-cleaning, water repellency, and dirt resistance in cycling and outdoor sportswear.
- GORE-TEX Active membranes: Breathable and waterproof

performance in cycling, running, and outdoor sports.

*Conclusion

In conclusion, designing and producing sports fabrics suitable for humid regions requires a combination of fiber selection, fiber cross-section design, multilayer structures, and nanomaterial/chemical finishing. Nanomaterials enhance moisture transport and antimicrobial performance. Industrial examples such as Nike Dri-FIT, Lululemon Silverescent, and GORE-TEX membranes demonstrate that integrating academic research with industrial development can produce durable performance apparel even in highly humid climates. However, challenges such as production cost, durability after repeated washing, and environmental impact of nanomaterials remain. Future research should focus on sustainable production, recyclable and environmentally friendly methods, multi-physics simulations, precise experimental data, and extensive field testing in high-humidity regions to standardize and improve sportswear quality.



Dr. F Nayeb Morad



Design and Production of Highly Breathable Sportswear Fabrics

*Abstract

In humid regions, sportswear must effectively wick sweat away from the skin and facilitate evaporation to maintain thermal comfort. The incorporation of nanomaterials and advanced chemical finishes during fabric finishing can enhance wicking, vapor transmission, microbial resistance, and drying speed.

This paper presents the fundamentals of moisture transport, mathematical models, material and structural design, and industrial case studies.

*Introduction

In tropical and humid climates, high relative humidity reduces the vapor pressure difference between the skin and the environment, limiting sweat evaporation. Selecting fibers, fabric structures, and chemical or nanomaterial finishes that enhance liquid and vapor transport is crucial to maintain athlete comfort and performance.

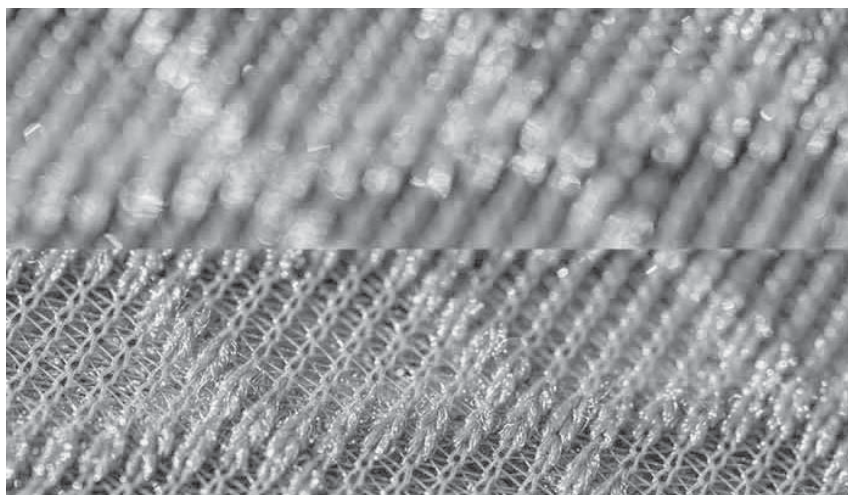
*Moisture Transport Fundamentals

Moisture transport occurs through two main pathways: vapor diffusion (Fickian diffusion) and liquid transport (wicking/capillary flow). Combined mass conservation equations and coupled heat and mass transfer models are employed to simulate real conditions. Key parameters include WVTR, OMMC, wetting time, spreading speed, and moisture retention capacity.

*Role of Nanomaterials and Chemical Finishes

Nanomaterials (SiO_2 , TiO_2 , ZnO nanoparticles, silver nanoparticles, nanofibers) and chemical finishes (hydrophilic/hydrophobic coatings, antimicrobial agents, silicon or copolymer-based coatings, plasma treatments, and grafting) work synergistically to:

- Increase capillary permeability and wicking rate
- Reduce surface resistance for better





Sunbrella Launches Sunbrella Interiors: Performance Never Felt So Soft

Sunbrella, the global supplier of performance fabrics, today announced the launch of Sunbrella Interiors, a new sub-brand dedicated to elevating the design, comfort, and durability of fabrics and products for interior spaces.

Debuting at High Point Market this October, Sunbrella Interiors offers fabrics created specifically for the home, weaving trusted performance with luxurious textures and lasting style.

The portfolio features plush chenilles, refined bouclés and other soft, textural fabrics, as well as products including window treatments, throws, and more — all designed to elevate everyday living.

Each reflects the latest innovations from Sunbrella's vertically integrated

manufacturing process, including advancements at its North Carolina-based novelty yarn plant that deliver new levels of softness and sophistication.

Every fabric and product is stain-resistant, easy to clean, and engineered to last — qualities that have long defined the Sunbrella name.

"Consumers and the trade have always trusted Sunbrella for its durability and cleanability," said Suzie Roberts, Vice President and General Manager of Furnishings at Sunbrella. "With Sunbrella Interiors, we're bringing that same uncompromising performance indoors, now paired with the comfort and style people want inside their homes."

Recent research further reinforced

the opportunity: Sunbrella is more widely recognized than its leading competitors for attributes like quality, comfort and style.

In testing, participants were pleasantly surprised to learn that the ultra-soft fabrics they loved were Sunbrella — underscoring demand for a brand they already trust, now reimagined for interiors.

Following this introduction to the trade, Sunbrella Interiors will be available at retailers in 2026.

The brand is investing in a full-scale program including sampling, signage, point-of-purchase displays, training resources, and consumer-facing marketing across print, streaming, digital, and events.

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