Sol-Gel Antimicrobial Coating for Automotive or Home Appliance Components

A durable, factory-applied antimicrobial coating enabling long-lasting and easy-to-clean contact surfaces

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POLYRISE

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RELIANCE

Challenge Addressed

Industrial appliance and automotive manufacturers face increasing demand for built-in hygiene solutions that are durable, safe and compliant with evolving chemical regulations. Many conventional antimicrobial coatings rely on silver, fluorinated compounds or volatile organic biocides that raise concerns related to sustainability, aesthetic characteristics, long-term stability and regulatory acceptance.

The Solution

An innovative antimicrobial coating formulation based on sol-gel inorganic chemistry combined with copper-doped mesoporous silica nanoparticles (Cu-SMIN). It provides a stable and enduring antimicrobial effect while preserving transparency, surface aesthetics and mechanical durability.

Key Benefits

Long-lasting antimicrobial protection on high-touch surfaces while simultaneously delivering hydrophobic and oleophobic properties that improve cleanability.	Free of silver, fluorine and volatile antimicrobials, aligning with regulatory and **sustainability requirements** while remaining cost-effective for large-scale production.
Reduced maintenance effort and extended product lifetime due to its durability under humidity, temperature fluctuations and repeated cleaning.	Avoids common limitations of organic biocides, such as odor, volatility and short lifespan, enabling **consistent quality** without the need for consumer reapplication.

Application Areas

Designed for factory application, the coating integrates seamlessly into existing manufacturing workflows and is compatible with materials such as metals, plastics and glass.

- The primary application area is automotive industry and home appliances
- Suitable for professional and industrial equipment.

Validation - TRL 6-7

The coating is validated on representative appliance components through pilot-scale production and testing. Validation includes antimicrobial performance, durability, resistance to cleaning agents and compliance with food-contact safety requirements, supported by industrial and laboratory testing.

Sustainability & Safety

Developed in line with Safe-by-Design principles, the coating minimizes environmental impact by reducing hazardous substances and extending surface lifetime. Its durability lowers the need for aggressive cleaning chemicals and frequent replacement, contributing to more sustainable use and manufacturing.