

PhotoNANOX™

Nanocomposites and photosensitisers

“Light-Activated Nanocomposite for Water Purification.”

Technology

PhotoNANOX™ is a cutting-edge photosensitising nanocomposite material engineered to deactivate microbial biofilms and degrade organic contaminants in water systems. The material combines porphyrin-based photosensitisers—specifically indium derivatives—with semiconductor metal oxide nanoparticles such as titanium dioxide (TiO₂). Upon exposure to visible or actinic light, PhotoNANOX™ generates reactive oxygen species (ROS) that destroy microorganisms and break down pollutants at the molecular level.

The nanocomposite can be applied as a surface coating or integrated within polymer matrices (e.g., polystyrene), creating self-disinfecting materials for use in water treatment infrastructure and public health environments. Developed using green synthesis techniques, including orange juice-assisted nanoparticle fabrication and room-temperature processing, this technology represents a sustainable advance in photocatalytic purification and antimicrobial surface design.

Market need

The global demand for clean, safe water is rising, especially in low and middle-income countries facing:

- Biofilm formation in storage tanks and pipelines
- Organic and microbial contamination
- Inadequate or expensive water treatment chemicals
- Energy-intensive or environmentally harmful disinfection methods

The traditional disinfection methods (e.g., chlorine) often fail to address biofilms or produce toxic by-products. There is a strong need for sustainable, effective, and affordable antimicrobial solutions and materials that can be easily deployed in decentralised or infrastructure-limited settings.



Features

- Supports both chemical and physical bonding modes.
- Reacts under specific wavelengths, minimising unintended effects.
- Chemically robust for long-term water infrastructure use.
- Can be used as coatings, embedded in polymer films, or incorporated into filtration systems.



Benefits

- Dual-action technology: deactivates microbes and degrades pollutants
- Operates under visible light: no need for UV activation
- Green synthesis process using eco-friendly reagents
- Versatile integration as coating or polymer additive
- Low-cost, scalable, and energy-efficient for widespread deployment



Industry

Water

Potential applications

- Water purification and disinfection systems
- Antimicrobial coatings for pipes, filters, and tanks
- Self-cleaning surfaces in healthcare, food, and industrial facilities
- Photocatalytic wastewater treatment under visible light

Creators

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Stage of development

Early stage

Intellectual property

Patent Protection

Desired relationship

Co-development, Investor