By Dermott Reilly

Inspired by Light, Science and Sustainable Care

Introduction: What If Your Home Could Help You Stay Clean?

For years, you've been told that a clean home means hard work:
Scrubbing grout on your hands and knees.
Wiping counters after every meal.
Masking odors with sprays that sting your eyes.
Worrying if today's "disinfectant" will harm your child's lungs tomorrow.

But what if your **walls, countertops, toilet, and even your pet's bed** could stay cleaner—*on their own*?

This isn't magic. It's **green hygiene**: a quiet revolution powered by **titanium dioxide (Tio2)** and **ordinary light**—sunlight or your ceiling LED. Once applied, these smart surfaces work 24/7 to break down bacteria, viruses, mold, odors and grime—without chemicals, wipes, or plastic.

This book is for **you**: the woman (or man) who holds her home together, who cares deeply about her family's health, and who deserves a break from the endless cycle of scrub, spray, repeat.

Here, you'll discover how to build a **self-cleaning sanctuary**—room by room—so you can spend less time cleaning and more time living.

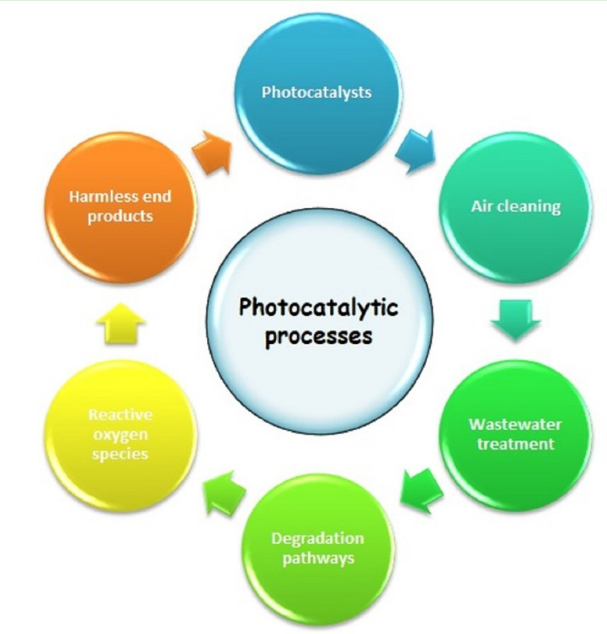
This technology won't take the place of regular cleaning, but it does give you a head start. Every time light touches a surface, it breaks down tiny bits of dust and germs, so the air stays fresher between clean-ups. When you do tidy up, a quick wipe with a damp microfiber cloth is usually all that's needed—works on floors, furniture, even carpets.

Chapter 1: How it works

A Gentle, Green Helper

Imagine your house could clean itself—like magic—but it's actually science. A special coating made of something called **titanium dioxide (Tio2)** can help make that happen and it works a bit like how plants use sunlight to stay healthy.

You've probably heard of **photosynthesis**—that's how green plants use sunlight to turn water and air into food and oxygen. Well, titanium dioxide is a bit like a "solar helper" for your house. When sunlight (especially the invisible ultraviolet part) hits this coating on your walls or windows, it wakes up the titanium dioxide, just like sunlight wakes up a plant.



Once "awake," the coating does two clever things:

It breaks down dirt and grime – Things like bird droppings, soot, oil from cooking, or mold that land on the surface get broken into tiny, harmless pieces by the activated coating—kind of like how a compost pile breaks down food scraps over time, but much faster and with sunlight.

It makes water spread out evenly – Normally, raindrops bead up and roll off, leaving streaks. But with this coating, rainwater spreads into a thin sheet that washes away the broken-down dirt without leaving spots—like a gentle, automatic rinse cycle for your house!

So, just like solar panels use sunlight to make electricity, this Tio2 coating uses sunlight to keep surfaces clean—no scrubbing needed! It's not magic, but it's pretty close—and it's already being used on things like windows, tiles and even some outdoor paints. Indeed, in Japan companies apply this coatings to artificial indoor plants to maintain air quality.

Think of it as giving your house a pair of self-cleaning sunglasses—only these ones polish themselves with sunlight and fresh air, no elbow grease required.

Chapter 2: Cleaning Indoors with Sunlight's Cousin—Visible Light

So far, we've talked about how a titanium dioxide (Tio2) coating can help your house clean itself **outside**, using sunlight—especially the invisible ultraviolet (UV) rays. But what about **inside your home**, where UV light is very weak or almost nonexistent? After all, your kitchen walls, bathroom tiles, or even your fridge door could really use some self-cleaning help too!

Here's the good news: scientists have found clever ways to "teach" titanium dioxide to work **not just with UV light, but with ordinary visible light**—the kind that comes from sunlight through your windows or even from your LED or fluorescent lamps.

How? A Little "Doping" Goes a Long Way

Think of pure titanium dioxide like a solar-powered robot that only wakes up when it hears a very high-pitched whistle (UV light). But most indoor light is more like soft talking or gentle music—lower energy, in the **visible range** (the colors we can see).

To help the robot "hear" this softer sound, scientists add tiny amounts of other elements—like nitrogen, carbon, or even silver—into the titanium dioxide. This process is called **"doping"** (not the sports kind—think of it like adding a pinch of spice to a recipe to make it work better). These added bits change the robot's "ears" so it can now respond to visible light.

What Happens Indoors?

Once the modified Tio2 coating is applied to indoor surfaces—say, your kitchen backsplash or bathroom wall—it quietly waits for light. When your room lights are on or daylight comes through the window, the coating activates:

- It **breaks down cooking grease, soap scum, mold spores, and even odors** from pets or food.

- It can **kill bacteria and viruses** on surfaces—helping keep your home healthier.

- And if a little moisture is present (from cooking, showering, or even humid air), it helps wash away the broken-down dirt when you wipe or when condensation forms.

It's like having a **tiny, invisible cleaning crew** working 24/7—powered only by the light you already use!

Best of all, this process doesn't use harsh chemicals. It doesn't wear out quickly. And it doesn't need batteries or electricity—just light, air and a bit of humidity. It's a quiet, eco-friendly way to keep your home fresher and cleaner with less scrubbing.

So while your outdoor walls sunbathe and self-clean with UV light, your indoor surfaces can now join the team—thanks to smart science that lets titanium dioxide "see" the light all around us, even inside your cozy home.

Chapter 3: The Kitchen – Where Freshness Meets Freedom

Your kitchen feeds your family—but it's also a hotspot for invisible threats: *Salmonella* from raw chicken, *E. coli* on cutting boards, biofilm in sink drains.

Light Clean Upgrades for Real Life:

- **Self-Sanitizing Countertops**: Tio2-(titanium dioxide) infused surfaces break down foodborne pathogens the moment they land—activated by your overhead light.

- **Odor-Free Trash Bin**: Tio2 outer coating neutralises decay gases—no more "kitchen stink," even in summer. No odor less flies!

- **Smart Cutting Boards**: Embedded with food-safe TiO2, they destroy microbes between chops—no bleach soak needed.

- **Fresher Produce**: Tio2-coated fruit trays break down ethylene gas, slowing spoilage. Berries last 2–3 days longer. Let's address food wastage. If we apply this coating to our fridges and storage areas, we help food shelf-life.

- Dishcloths and other kitchen fabrics can quickly develop unpleasant odors. Treating them with Tio2 (titanium dioxide) solution while clean keeps them fresh for up to 10 washes.

- High-touch surfaces—such as kitchen knife handles, microwave buttons, door handles, and even phones and tablets—are common hotspots for cross-contamination. Applying protective coatings to these areas helps prevent them from becoming vectors of infection.

- Additionally, coating your kitchen walls and fixtures not only minimises lingering post-cooking smell (like curry) but also offers added protection against airborne allergens like hay fever triggers and harmful pathogens.

- **Your Win**: Fewer foodborne scares, less waste and no toxic residues near your meals.

It's like your furniture took a spa break in Grindelwald—immune to red wine drama and breathing alpine-fresh air all day long.

Chapter 4 : Why Tio2 Self-Cleaning Technology Is a Game-Changer for Your Bathroom

Bathrooms are among the most humid, enclosed and frequently used spaces in the home—ideal conditions not only for comfort but also for the rapid growth of mold, mildew, bacteria and viruses. Traditional cleaning methods and air fresheners offer only temporary relief: sprays and gels mask odors with overpowering fragrances, tricking our senses without addressing the root cause. Worse still, they do nothing to reduce the high concentrations of airborne and surface-based pollutants that pose real health risks—especially for children, the elderly, or those with respiratory or immune sensitivities.

Enter titanium dioxide (Tio2)—a scientifically proven, non-toxic photocatalytic technology that transforms your bathroom into a self-sanitizing, self-cleaning sanctuary.

The Bathroom

When activated by ambient light, Tio2-coated surfaces initiate a natural oxidative process that breaks down organic pollutants at the molecular level. This includes ammonia from urine, volatile organic compounds (VOCs), mold spores and pathogenic microorganisms. Independent studies and standardised tests (such as ISO 27447 and ISO 22197) confirm that properly applied Tio2 coatings can eliminate up to 90% of airborne and surface pathogens, including E. coli, C. difficile, and common fungi—preventing them from reproducing in the warm, moist environment of a bathroom.

Surfaces That Protect Themselves—Effortlessly

Toilet Bowl & Seat: Tio2-glazed ceramics continuously decompose odor-causing compounds and harmful bacteria. The hydrophilic surface allows water to sheet off cleanly—eliminating drips, stains, yellowing and the need for harsh scrubbing.

Toilet Brush: A Tio2-coated brush features a light-activated surface that resists biofilm formation. Its modified hydrophilic molecular structure reduces dripping when moved from bowl to holder, minimising cross-contamination.

Anti-Fog Mirrors: Tio2 prevents condensation from forming droplets. Instead, moisture spreads into a thin, transparent film—no fog, no wiping with potentially dirty towels.

Shower Walls & Grout: Say goodbye to black mold and stubborn soap scum. Tio2-treated tiles and grout break down organic buildup, allowing rinsing water to wash away residue with minimal effort.

Walls & Ceilings: These become active air purifiers, neutralizing airborne mold spores, ammonia and other irritants—creating a safer breathing environment, especially vital for households managing asthma, allergies or people with compromised immune systems.

The Result? A Bathroom That Breathes—and Stays Clean—On Its Own

With Tio2, freshness isn't manufactured—it's generated naturally through photocatalysis. There's no need for chemical sprays, abrasive cleaners, or constant maintenance. The technology works silently, 24/7, as long as there's light. And because Tio2 is non-toxic, water-based and not classified as a biocide, it's safe for homes, children, the environment and pets.

In a space often associated with dampness, odors and hidden germs, Tio2 brings clarity, calm and confidence. Your bathroom becomes more than a functional room—it becomes a hygienic haven that actively supports your family's health, every single day.

Tio2 gives your bathroom the brilliance of Invisible Housekeeping—always on duty, quietly keeping things spotless and fresh, without the daily scrub-down routine.

Chapter 5: Self-Cleaning Surfaces for Kids' Spaces Powered by Tio2

Gentle, Always-On Protection Where Little Hands Explore

Kids Touch Everything.
They crawl, chew toys, share snacks—and their immune systems are still learning.
Keeping their world clean shouldn't mean constant scrubbing, harsh chemicals, or worry.

Introducing **Tio2, self-cleaning technology**—a safe, natural way to help keep your child's play areas, toys and feeding spaces cleaner **all day long**, without the daily hygiene drag.

Tio2 is a harmless mineral (also used in toothpaste and sunscreen!) that, when applied as a coating, uses **light**—even indoor light—to activate a gentle cleaning action.
When light hits the surface, Tio2 creates a natural reaction that:
- **Breaks down germs** like flu, norovirus and Staph
- **Neutralizes odors** from spit, food and sweat
- **Prevents mold, mildew and dust mites** from taking hold

Real-Life Benefits for Your Child's World

Self-Cleaning Play Tables
Snack crumbs, sticky fingers, shared toys—no problem. Tio2-treated surfaces destroy common viruses and bacteria on contact. Safe for toddlers, even if they lick the table (we know they might!).

Antimicrobial Stuffed Animals & Soft Toys
Special Tio2 fabric coatings resist saliva buildup, dust mites, and odors—so Teddy stays huggable, not musty.

Toy Bins That Stay Fresh
No more "gym sock" smell from forgotten blocks or plastic figures. The coating keeps bins cleaner between washes.

Crib Rails, High Chairs & Teething Toys
Babies chew, drool and touch constantly. Tio2 provides continuous sanitization—ideal for teething little ones, without bleach or endocrine-disrupting chemicals.

Food Trays & Kids' Tableware
Plates, bowls and snack trays stay cleaner longer, reducing germ transfer during meals and snack time.

Parents win peace of mind, naturally. No harsh disinfectants. No endocrine disruptors (like BPA, phthalates, or triclosan). No guilt about missed cleanings. This technology is always working—even while you're busy with bedtime stories or school runs.

Tio2 doesn't replace handwashing or basic hygiene—but it adds a smart, invisible layer of protection where kids need it most.

Chapter 6: Pet Zones – How Light-Activated Tio2 Keeps Cat Corners, Dog Zones and Fish Tanks Fresh

Pets are family, but they come with a invisible cloud of ammonia, dander, hair-oil residue and zoonotic bacteria. Scrubbing, spraying and plugging in yet another carbon filter is a daily chore—and still the "pet smell" creeps back. A titanium-dioxide (Tio2) surface coating turns every ray of daylight into a non-stop cleaning crew, giving you a three-way win: fresher air, healthier animals and almost zero extra effort.

Litter boxes: the ammonia trap

Cat urine releases ammonia the moment it hits the litter. Standard hoods and liners only trap the gas until the next scoop; Tio2-coated walls break the molecule apart before it ever becomes airborne. The box still needs scooping, but the sharp, eye-watering pong never builds up, so both human nose and feline lungs stay irritation-free. Users report going from daily odor complaints to "I forgot to check yesterday's scoop."

Dog beds that de-stink themselves

Dog fur is an oil factory. Add saliva, rain-soaked coat residue and the occasional "accident" and you have a mattress that smells like wet carpet within a week. A Tio2-treated bed cover oxidizes urine traces, skin oils and dander into odorless CO_2 and water vapor every time the sun hits it. Shake off the hair, spritz with plain water and the bed smells like new—no Febreeze cloud around your toddler five minutes later.

Food & water bowls minus the slime

Biofilm (that slippery pinkish layer) is a buffet list of E. coli, salmonella and algae. Tio2 under the glaze keeps the bowl's surface hostile to bacterial colonization, so the slime ring takes days, not hours, to re-appear. Less scrubbing, fewer tummy-upsets, and no chemical disinfectants that make pets walk away from their dinner.

Pet Zones

Grooming table & air around it

Even “mild” dog shampoos release VOCs that linger for hours. A Tio2-painted wall or a ceiling tile above the grooming station grabs those vapors plus airborne dander and breaks them down on contact. Blow-dry without the chemical haze; allergy-prone owners notice fewer sneezes before the brush even comes out.

Fish tanks: clear glass, clearer air

A tank’s glass lid and nearby wall are magnets for water spots, protein film and that unmistakable “pond” smell. A transparent Tio2 coating on the panels stops algae from taking hold and neutralizes the ammonia that escapes when you lift the lid for feeding. The view stays crystal, the room doesn’t smell like a lakeside dock and you cut back on glass scrubbing by half.

The safety check

Tio2 works only when light is present, so it never “runs out” or leaches into water. It’s already used in medical implants and food packaging; the reaction happens on the surface, not in the air, so paws, fins or curious toddlers never touch active chemistry—just a clean, dry finish.

Bottom line

You still scoop, wash and vacuum, but the heavy lifting is done by daylight. Less ammonia, fewer allergens, no fake-flower sprays, and a home that smells like you have no pets—until one jumps on your lap.

Aspect	Traditional Cleaning	Photocatalytic Cleaning
Labour	High intensity, frequent manual effort	Low intensity, self-cleaning via light activation
Water Usage	High consumption	Minimal usage
Cleaning Frequency	Regular manual cleaning needed	Continuous cleaning with less intervention
Chemical Usage	Harsh chemicals, potential health risks	Low-toxicity agents, safer for health and environment
Efficacy	Limited to surface removal	Breaks down pollutants, disinfects effectively
Energy Consumption	High (equipment, heating, etc.)	*Zero*
Environmental Impact	Significant due to chemicals and water waste	Low impact, sustainable and eco-friendly

From fur to floor—less mop, more smart top!

Chapter 7: Bedrooms – Breathe Easy, Sleep Deep

Tio2 in the Bedroom: Clean Air, Quiet Comfort

Most of us don't realise that the air inside our homes—especially bedrooms—is often more polluted than the air outside. But with Tio2 (titanium dioxide) built into walls, fabrics and surfaces, your bedroom quietly works overtime to keep you healthy.

Think of it as an invisible team of guardians:

- Walls that clean the air—breaking down fumes from furniture and cooking.
- Curtains and cushions that fight off allergens like dust mites and pet dander.
- Mattress covers that stop mold and bacteria—a big win for anyone with asthma or eczema.
- Light switches and remotes that stay cleaner longer, reducing the spread of germs.

The result? Fewer coughs at night, deeper sleep and waking up without that stuffy nose feeling. It's like giving your bedroom a silent health upgrade—no noise, no fuss, just fresher air and better rest.

Chapter 8: Living Within Earth's Means – Less Plastic, Fewer Chemicals, More Health

Imagine a city that cleans the air as it functions—a living, breathing urban ecosystem powered by smart materials. Titanium dioxide (Tio2) photocatalytic coatings offer precisely this potential. When applied to solar panels, for instance, Tio2 enables self-cleaning surfaces that repel dust, grime and organic pollutants—boosting energy output by maintaining optimal light absorption while simultaneously breaking down airborne contaminants like nitrogen oxides and volatile organic compounds.

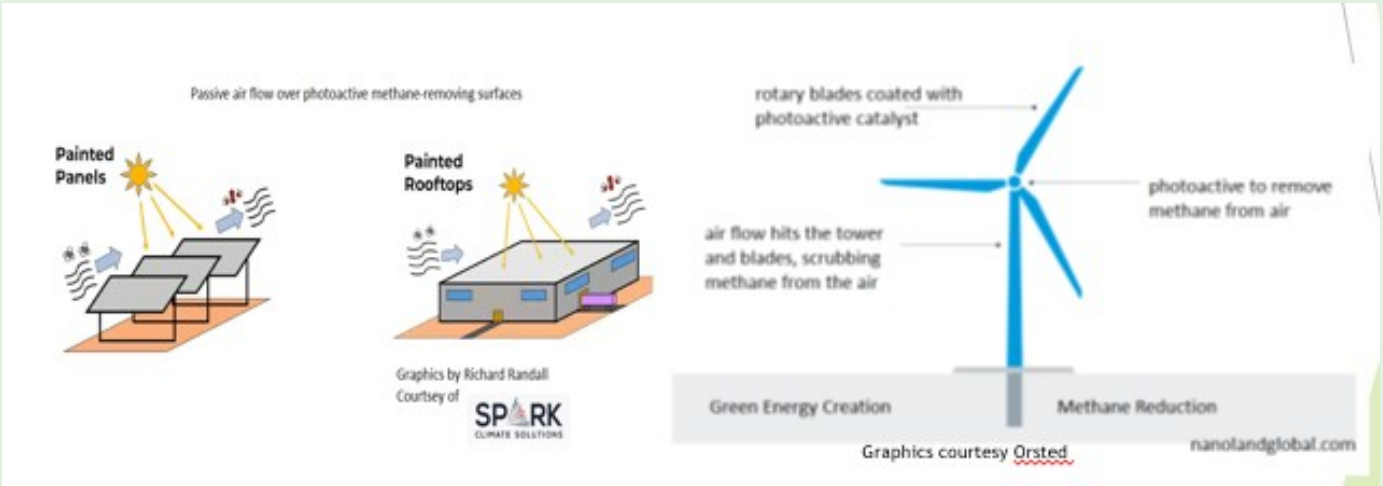
But the vision extends far beyond energy infrastructure. Exterior building façades, rooftops, public transport—buses, trains, even aircraft—can all become active agents of environmental purification. Every coated surface becomes a silent guardian, harnessing sunlight to neutralise pollutants, reduce urban smog, and improve air quality at scale. In this way, our built environment doesn't just occupy space—it actively contributes to planetary health, turning passive structures into dynamic tools for cleaner air and a more sustainable future.

You don't just care for your family—you care for the future.

The Ripple Effect of Choosing Light Over Chemicals:

- **Zero single-use wipes**: One coating replaces hundreds of plastic cloths.
- **No toxic runoff**: Safe for groundwater, gardens, and aquatic life.
- **Lower carbon footprint**: No recurring shipping, manufacturing, or chemical disposal.
- **Breaks the sickness cycle**: Fewer household infections = less antibiotic overuse = slower antimicrobial resistance.

Your Win: A home that heals your family *and* the planet.



Chapter 9: Sustainability at Home

Sometimes, the smartest solutions are the most obvious—once you understand the science behind them.

Incorporating sustainability into homes, schools, factories, or office buildings demands a careful balance of energy efficiency, smart design and innovative material choices. Traditional approaches typically focus on efficient water management systems—such as rainwater harvesting and greywater recycling—as well as harnessing renewable energy sources like solar and wind power. Moreover, the integration of smart technologies to monitor and optimise energy consumption, along with thoughtfully designed green spaces that boost biodiversity and well being, forms the backbone of sustainable development.

Now, imagine adding an often underappreciated value enhancer into the mix—titanium dioxide coatings. When activated by light, these coatings offer not only self-cleaning surfaces but also superior air-quality benefits by breaking down pollutants, toxins and VOC irritants. This innovation supports both internal and external applications, making it an ideal complement to existing sustainable strategies.

In effect, Tio2 coatings enable some of the most sustainable hygiene methods available while remaining cost-effective compared to traditional cleaning and maintenance techniques. By weaving the use of Tio2 into property sustainability plans, home owners can achieve enhanced environmental quality and operational efficiency. This approach not only preserves indoor air quality and minimises upkeep, but it also reinforces a commitment to green building practices—a true win-win for both the environment and long-term health and economic benefits.

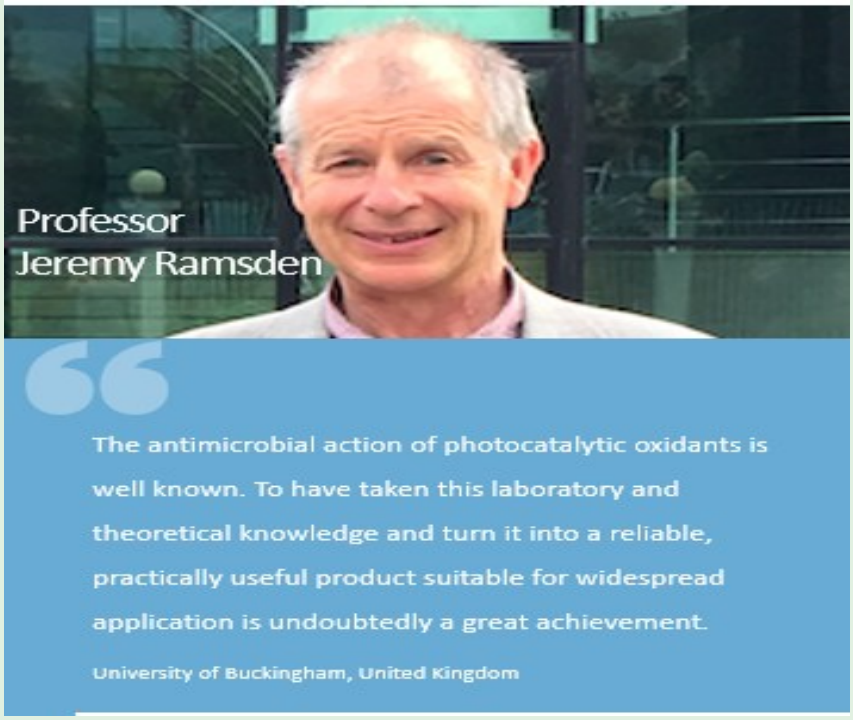
Just as the vibrant red of a ripe apple isn't inherent to the fruit itself, but emerges from how light interacts with its surface chemistry, the power of Tio2 lies not in added chemicals or artificial fragrances, but in its innate physical properties. When light—natural or artificial—strikes a Tio2-coated surface, it triggers a harmless photocatalytic reaction that actively breaks down odors, bacteria, viruses and organic grime at the molecular level.

This isn't speculative science. Tio2's self-cleaning and antimicrobial efficacy is backed by decades of peer-reviewed research, international standards (including ISO 22197 and ISO 27447), and real-world use in hospitals, food facilities and public infrastructure worldwide. Yet in the home, it works so quietly and seamlessly—like colour appearing on a sunlit surface—that you might forget it's there.

That's the beauty of Tio2: it's not a product you use—it's a surface that works for you, turning everyday fixtures into passive guardians of cleanliness, freshness and health. No sprays. No scrubbing. Just smart surface science, activated by light.

Sometimes, the obvious choice is also the most advanced.

Chapter 10: The Science & Certification



Water-based titanium dioxide (Tio2) formulations contain no toxic or hazardous chemical additives and, as such, do not meet the regulatory definition of a biocidal product under the EU Biocidal Products Regulation (BPR) or similar international frameworks. Consequently, they are not classified or registered as biocides. This is analogous to common household substances such as beer, which—while capable of attracting and eliminating garden pests like snails through physical or environmental mechanisms—are not regulated as insecticides due to their non-toxic mode of action and composition. Despite the absence of formal biocidal classification, the photocatalytic antimicrobial efficacy of Tio2 under appropriate light activation is well-documented in scientific literature and supported by standardised testing protocols (e.g., ISO 27447, ISO 22197).

Tio2, particularly in its photocatalytic anatase form, is backed by extensive scientific research and global hygiene certifications validating its efficacy as an antimicrobial, self-cleaning and air-purifying agent. Organisations such as the International Organization for Standardisation (ISO) have established test methods—like ISO 27447 and ISO 22197—for evaluating the photocatalytic activity of Tio2-based materials. In Japan, the Photocatalyst Industry Association (PIAJ) certifies products meeting rigorous standards for antibacterial and deodorizing performance. The European Union's Biocidal Products Regulation (BPR) and the U.S. Environmental Protection Agency (EPA) also recognise Tio2's role in surface disinfection under appropriate light conditions. Hundreds of peer-reviewed studies from institutions worldwide, along with real-world applications in hospitals, food processing facilities and public transport, further substantiate its safety and effectiveness when properly formulated and activated.

Tio2 enjoys robust scientific credibility worldwide, with decades of peer-reviewed research, validation through international standards such as ISO 22197 and ISO 27447, and endorsement by regulatory bodies across the EU, Japan, the U.S., and beyond for its photocatalytic, antimicrobial and air-purifying properties.

SCIENTIFIC CREDIBILITY

Robust testing & positive clinical evidence

Advanced Technology & IP Development

- Benefit from 10+ years of licensed IP development.
- Ongoing tests, research & studies, tech & IP collaborations.
- Patents filed.
- Approvals Registrations & Certificates.

Academic Collaborations

- University of Cambridge.
- Addenbrooke's Hospital.
- King's College London.
- Danish Technological Institute.

Robust Evidence

- Research supported by prestigious foundations and institutions (The Welcome Trust, University of Cambridge - Cambridge Institute of Therapeutic Immunology & Infectious Disease, King's College London – The Randall Centre for Cell and Molecular Biophysics, University of Manchester. – Manchester Institute of Biotechnology, University of Buckingham.
- Technologies are supported with robust laboratory evidence
- Extensive independent testing.

Thorough Processes

- World class advisory board ensures rigorous review process.

Cleaning our cities with Tio2: see Heidelberg Materials in Italy

TX Active® - The smog-eating photocatalytic active ingredient | Heidelberg Materials

Chapter 11 Getting Started with Tio2– Your 30-Minute Light Clean Plan

Tio2 is a remarkable photocatalyst that, when exposed to light, breaks down organic matter, neutralises odors and inhibits microbial growth. It's a low-effort, high-impact way to elevate hygiene and reduce maintenance across your home. The best part? You don't need to renovate. Start small, think smart.

Step 1: Prioritise High-Impact Zones Indoors

Begin with the areas that see the most activity and grime. In the kitchen, apply TiO2 to backsplashes, countertops and around the fruit bowl—this slows fruit ripening by neutralising ethylene gas. In the bathroom, coat shower walls, toilet surfaces and tiles to prevent mold and eliminate odors.

Children's play tables benefit from a light misting to reduce germ buildup. If you have teenagers, their bedrooms—especially desks, gaming gear and door handles—are ideal starting points. Don't forget the pet feeding area, where spills and smells are common. For sports gear, spray inside running shoes, boots and coat cupboards to keep bacteria and odor at bay.

Step 2: Expand to Utility and Storage Spaces

Move into the garage, where Tio2 can help reduce oil stains and neutralise fumes. Apply it to workbenches, tool handles and storage bins. In the loft or attic, it's ideal for controlling dust mites and mildew—especially on insulation, beams and stored boxes.

Step 3: Outdoor Surfaces and Garden Structures

TiO2 truly shines outdoors. Use it on external walls, window frames and painted surfaces to prevent algae, mildew and pollution stains. Coating these areas not only keeps them cleaner longer but also extends the life of exterior paintwork by protecting it from UV degradation.

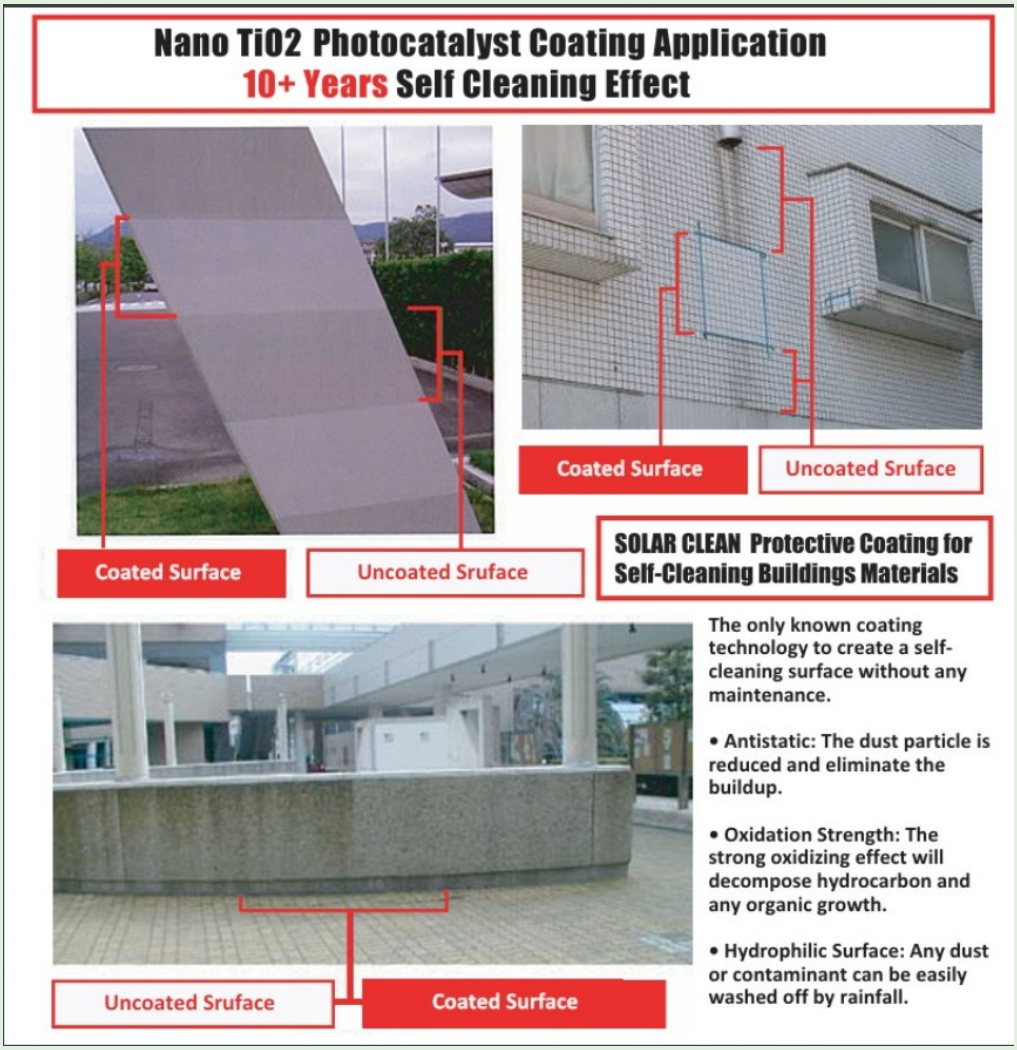
In garden rooms, greenhouses and glasshouses, TiO□ helps maintain clarity and cleanliness. Apply it to glass panels, shelving and plant pots to reduce algae buildup and organic staining. It's especially effective in damp environments where mold and moss thrive.

Why It's Worth It

Tio2 offers more than cleanliness—it's a long-term investment in your home's upkeep. Surfaces stay cleaner for longer, reducing the need for harsh chemicals and frequent scrubbing. UV light activates the coating, meaning the sun does the work for you. Over time, this translates to lower maintenance costs, fewer cleaning hours and a fresher, healthier living space.

In just 30 minutes, you can begin transforming your home—one surface at a time.

Important Considerations Before Purchasing TiO2 Coatings



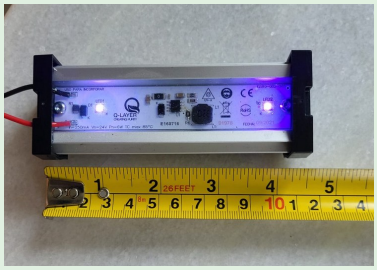
Let ambient light do the rest—no UVC lamps needed

Courtesy of https://www.greenmillennium.com/

While Tio2 photocatalytic coatings offer powerful self-cleaning, antimicrobial and air-purifying benefits, their performance depends on several key factors. To ensure optimal results, consider the following before selecting and applying a product:

1. Light Activation Requirement: Home Interiors

Tio2 requires light energy—primarily UVC or visible light—to activate its photocatalytic function. In low-light or dark environments (e.g., windowless bathrooms or closets), efficacy is significantly reduced. Choose coatings formulated for visible-light activation if UVC exposure is limited, and assess the typical light conditions in your space. Alternatively, one can fit LEDs which radiates violet/ blue light, the cost of which is around £45 and will last three years, covering an area of 40sqm. A smaller version for restrooms without light or with a heavy bacterial load or smell can be deployed too for approximately £18.75.



2. Surface **Type – Absorbent vs. Non-Absorbent:**

Tio2 adheres and performs best on non-porous, non-absorbent surfaces such as glass, glazed ceramic, metal, or sealed stone. On absorbent materials like untreated wood, drywall, or fabric, the coating may soak in unevenly, reducing its active surface layer and effectiveness. For porous substrates, a primer or specialised formulation may be required.

3. Application Method & Coverage:

Use a fine-mist, low-pressure electrostatic sprayer or HVLP (High Volume Low Pressure) spray gun for uniform, thin-layer application—brushing or rolling often leads to uneven distribution and reduced performance. Typical coverage ranges from 11–100 mL per m², but always follow the manufacturer's technical data sheet, as concentration and nanoparticle dispersion vary by product. Ideally, use a water-based

4. **Curing & Maintenance:**

After application, Tio2 coatings (ie., Pure F712 / InvisiSmart, MVX ,etc) require ½ h of drying to fully cure, depending on humidity and airflow. Once cured, they are generally maintenance-free—but avoid abrasive cleaners or scrubbing, which can degrade the substrate. Occasional rinsing with water is sufficient to maintain function. Tio2 coatings without nanoparticles is advised. As a general rule the coating composition is 99% demineralised water plus 1% Tio2 (good quality).

5.Curing & Maintenance:

After application, Tio2 coatings require 24–72 hours to fully cure, depending on humidity and airflow. Once cured, they are generally maintenance-free—but avoid abrasive cleaners or scrubbing, which can degrade the substrate. Occasional rinsing with water is sufficient to maintain function.

6.Storage & Shelf Life:

Store unopened Tio2 solutions in a cool, dark place (ideally 5–25°C). Exposure to heat, direct sunlight, or freezing temperatures can destabilise the colloidal suspension. Most water-based formulations remain effective for 6–12 months when sealed properly.

7. Define Your Functional Goal:

Not all Tio2 coatings are equal. Some are optimised for odor decomposition, others for antimicrobial action, anti-fogging, or self-cleaning. Clarify your primary need—e.g., mold prevention in showers vs. air purification in living areas—and select a product validated for that specific function via independent testing (e.g., ISO or JIS standards).

Many companies have been selling Tio2 products for years. Perhaps the most notable are TOTO Ltd in Japan who have been deploying photocatalysts in their products and services for years. TOTO GLOBAL SITE In the US Puretu PURETi I Use the Power of Light and Green Millennium What is Photocatalyst? - Green Millennium Inc are significant ambassadors for innovations in photocatalytic products. In Italy Heidelberg Materials, the cement conglomerate are transforming the built environment with their clean-air construction materials:TX Active® - The smog-eating photocatalytic active ingredient | Heidelberg Materials For insights and testimonials see Photocatalysis Industry Assoc of Japan - 光触媒工業会 where remarkable reduction in cleaning times and bacterial counts are confirmed. For example Tokyo Metro & Keio Plaza , Japan 2023 data Tio2 photocatalytic door handle +lift button + toilet seat = 98.5% reduction.

Would you like to test these materials in your own home? Perhaps protect a room for a new baby or someone with allergy or asthma condition. Why not try a sample kit?

Proactive hygiene kits provide continuous cleaning with light to disinfect air and surfaces using photocatalytics. These kits are the most advanced hygiene solution available and are specifically designed for homes with elderly residents or those who have restricted sight or physical mobility, making daily hygiene tasks challenging. Once applied to walls or surfaces, these coatings work automatically to help maintain high hygiene standards. While they do not replace regular cleaning methods, they significantly contribute to a cleaner and safer living environment.

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Conclusion: A Home That Cares—So You Don't Have To

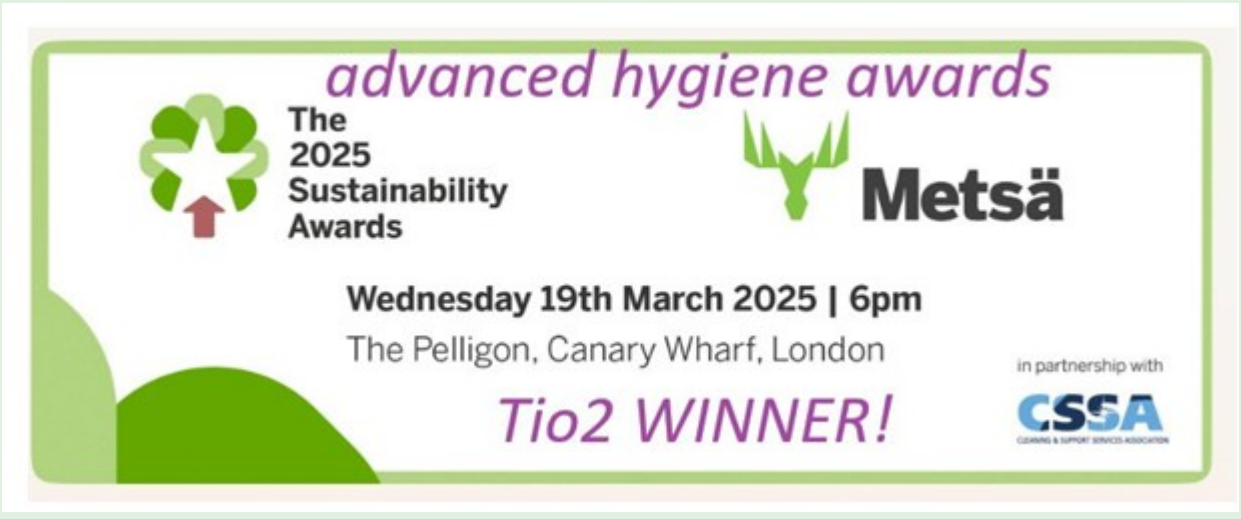
In a world that demands more of our time, energy and attention than ever before, true innovation isn't just about smarter gadgets—it's about smarter environments. Tio2 represents a quiet revolution in home hygiene: a green, non-toxic, light-activated technology that works continuously in the background, much like solar panels silently harvest energy from the sun. But instead of generating electricity, Tio2 generates cleanliness—breaking down odors, neutralising pathogens and preventing mold without chemicals, scrubbing, or supervision.

This isn't about achieving spotless perfection. It's about reclaiming freedom—the kind that matters most. Freedom from the guilt of "not cleaning enough." Freedom from the anxiety of exposing your children to harsh disinfectants and synthetic fragrances. Freedom from the endless cycle of wiping, scrubbing and re-cleaning surfaces that never seem to stay fresh. With Tio2, your bathroom tiles, kitchen countertops, mirrors and even walls become active participants in your family's health, working 24/7 whenever light is present.

Think of Tio2 as your home's invisible ally—a free agent of advanced hygiene that requires no payroll, no reminders and no extra effort. It doesn't replace your care; it amplifies it. You're not "just a housewife" or "just a homeowner." You're a steward of wellness, a guardian of your family's daily environment and now, a pioneer of sustainable, science-backed care. And the best part? Your home finally helps you do what you do best: nurture, protect and love—without burning yourself out.

Welcome to a new standard of healthy living—where hygiene isn't a chore, but a consequence of smart design. Where light does the work… so you can live fully.

"When human diligence falters, titanium-dioxide surfaces keep silently oxidising pathogens—so a moment's oversight needn't become a lifetime's infection."
— Unknown



About the Author

Dermott Reilly is a visionary innovator with over 20 years in sustainable hygiene technology. As CEO of Nanoland Global, HygieniaTouch and IngeniaTouch, he champions Tio2-based solutions that protect people and planet—without compromise.

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