

The Global Market for Photocatalytic Materials and Coatings 2022-2032

<https://marketpublishers.com/r/G9A5C7CB380DEN.html>

Date: April 2022

Pages: 125

Price: US\$ 950.00 (Single User License)

ID: G9A5C7CB380DEN

Abstracts

The development of photocatalytic processes, materials, and chemicals offers opportunities to solve environmental issues such as clean air, pollutant degradation and provide a clean and sustainable environment via environmental remediation, CO₂ photoreduction to fuels, water splitting, H₂ production, interior bacterial and viral disinfection and suitable organic syntheses. Photocatalytic materials and chemicals offer environmentally-friendly disinfectant methods that are safe and effective for home use.

Of the many semiconductor heterogeneous photocatalysts, titanium dioxide (TiO₂) is the most widely used due to its photostability, intrinsic electronic and surface properties, non-toxicity, cost-effectiveness, and environmental friendliness. However TiO₂ photocatalysis suffers from several drawback. leading to the development of other materials such as nanoscale zinc oxide, carbon nitride g-C₃N₄, metal-organic framework (MOF) compounds., graphene-based photocatalysts, BiOCl, black phosphorus. ZnFe₂O₄, all of which are covered in this report.

Applications of photocatalytic materials and coatings include:

Self-sterilising, long-lasting clear coatings that kill viruses and bacteria for application in the home, corporate offices, restaurants and bars, healthcare facilities, industrial workplaces, hospitality and retail stores.

Degradation of pollutants and maintaining air quality.

Self-cleaning architectural glass.

Processes for treating industrial emissions.

Self-cleaning automotive glass.

Roof coatings to reduce pollution through the degradation of sulfur and nitrogen oxides.

Road and tunnel coatings.

Medical (self-disinfecting coatings)

Self-cleaning exterior paints

Coatings for the elimination of VOCs and odours in public spaces.

Water purification

Air purification (indoor)

Self-cleaning solar cell coatings.

Applications make use of the self-cleaning, anti-fogging, antimicrobial or water cleaving properties. Antimicrobial use of photocatalysis involves three components: exposure to light, a photosensitizer, and molecular oxygen. These three components combine to produce reactive oxygen species that effectively kill a wide variety of microorganisms. Their use is growing in household applications to provide long-term disinfection.

In indoor environments, most surfaces, e.g. ceramic tiles, windows glass or paper, are gradually covered with organic matter such as oils, dirt, and smoke residue and become fouled. Use of photocatalytic coatings that are activated under visible light irradiation can address these issues. Companies are now actively seeking solutions that kill bacteria using light sources commonly present in homes (near UV and visible light) including Photocatalytic processes that kill bacteria using light sources commonly present in homes (near UV and visible light); Photocatalytic processes that produce powerful sanitizers (e.g. ClO₂); and Combinations of photocatalytic processes with other chemicals that increase antimicrobial activity, particularly substances commonly used in cleaning products like chelants and surfactants.

Report contents includes:

Market drivers and trends.

Latest product and technology developments 2020-22.

Anti-viral and anti-microbial applications.

Photocatalytic coatings in glass, building and construction, pollutant degradation, indoor air filtration, water treatment, medical facilities.

In depth assessment of photocatalytic materials including titanium dioxide, zinc oxide, metal-organic frameworks (MOF), ZnFe₂O₄, carbon nitride, silica carbide, graphene oxide, BiOCl and black phosphorus.

Global market revenues, historical and forecast to 2032.

More than 60 company profiles. Companies profiled include Advanced Materials-JTJ s.r.o., AM Technology Ltd., Daicel FineChem Ltd., Envision SQ, MACOMA Environmental Technologies, LLC, Maeda Kougyou Co Ltd., Nanoksi Finland Oy, ProfMOF AS, Pureti, Swift Coat Inc and more.

Contents

1 INTRODUCTION

- 1.1 Aims and objectives of the study
- 1.2 Market definition

2 EXECUTIVE SUMMARY

- 2.1 Photocatalytic processes, materials, and chemicals
- 2.2 High performance materials and coatings
- 2.3 Nanomaterials
 - 2.3.1 Advantages
 - 2.3.2 Applications
 - 2.3.3 Antimicrobial coatings and surfaces
- 2.4 Market drivers and trends for photocatalytic materials and coatings
 - 2.4.1 New functionalities and improved properties
 - 2.4.2 Reducing emissions and air pollution
 - 2.4.3 Mitigating the spread of disease
 - 2.4.4 Need for more effective protection and improved asset sustainability
 - 2.4.5 Photocatalytic coatings to inhibit microbial contamination
 - 2.4.6 Sustainable coating systems and materials
 - 2.4.7 Need to improve outdoor air quality
 - 2.4.8 Need to improve indoor air quality
 - 2.4.9 Building protection
- 2.5 Challenges
 - 2.5.1 Building materials
 - 2.5.2 Self-cleaning surfaces

3 COATINGS REGULATIONS RELATED TO PHOTOCATALYTIC COATINGS AND NANOTITANIUM DIOXIDE

- 3.1 Europe
- 3.2 United States
- 3.3 Asia

4 TYPES OF PHOTOCATALYTIC MATERIALS

5 TITANIUM DIOXIDE PHOTOCATALYSTS

- 5.1 Nano-TiO₂ based photocatalytic oxidation processes
- 5.2 Glass coatings
- 5.3 Interior coatings
- 5.4 Outdoor coatings and building materials
- 5.5 Improving indoor air quality
- 5.6 Disinfecting paints & coatings

6 OTHER METAL BASED PHOTOCATALYSTS

- 6.1 ZNO
- 6.2 Bi-based photocatalysts
- 6.3 Binary or Ternary sulfides
- 6.4 Metal-organic frameworks (MOFs)
- 6.5 WO₃

7 METAL FREE PHOTOCATALYSTS

- 7.1 Carbon nitride g-C₃N₄
- 7.2 Silica carbide (SiC)
- 7.3 Graphene oxide
- 7.4 Two-dimensional (2D) layered materials
 - 7.4.1 Transition-metal dichalcogenide MoS₂
 - 7.4.2 Germanene
 - 7.4.3 Graphdiyne
 - 7.4.4 Bismuth oxychloride (BiOCl)
 - 7.4.5 Black phosphorus

8 THE MARKET FOR PHOTOCATALYTIC MATERIALS AND COATINGS

- 8.1 Market and technical summary
- 8.2 Development of photocatalytic coatings
- 8.3 Benefits of photocatalytic self-cleaning coatings
- 8.4 Applications
 - 8.4.1 Coatings
 - 8.4.1.1 Self-Cleaning glazing
 - 8.4.1.2 Self-cleaning coatings-building and construction surfaces
 - 8.4.1.3 Photocatalytic oxidation (PCO) indoor air filters
 - 8.4.1.4 Self-sterilizing coatings and paints

8.4.2 Non-coatings applications

8.4.2.1 Photocatalytic wastewater treatment

8.4.2.2 Water Splitting

8.5 Global market size

8.5.1 Market segmentation

8.5.2 Market revenues 2010-2032

8.6 Regional demand

9 COMPANY PROFILES 65 (64 COMPANY PROFILES)

10 EX-PRODUCERS AND PRODUCTS

11 REFERENCES

Tables

TABLES

Table 1. Properties of nanocoatings.

Table 2. Photocatalytic Paints used in pathogenic disinfections.

Table 3. Properties and applications of functionalized germanene.

Table 4. Market and technical summary.

Table 5. Development of photocatalytic coatings, by generation.

Table 6. Photocatalysts used in building materials to reduce pollution.

Table 7. Market assessment for self-cleaning photocatalytic coatings.

Table 8. Markets for photocatalytic materials and coatings.

Table 9. Revenues for photocatalytic materials and coatings, 2010-2032, conservative, medium and high estimates. Millions USD.

Table 10. Photocatalytic coatings-ex producers and products.

Figures

FIGURES

Figure 1. Schematic of anti-viral coating using nano-actives for inactivation of any adhered virus on the surfaces.

Figure 2. Schematic of TiO₂ photocatalysis.

Figure 3. Organic pollutants removed from the air in the process of photocatalysis with TiO₂.

Figure 4. Schematic indoor air filtration.

Figure 5. Schematic showing photocatalysis and photothermal catalysis promoted by MOFs.

Figure 6. MOF derived nanocomposites for photocatalytic applications.

Figure 7. Graphitic carbon nitride.

Figure 8. Schematic of germanene.

Figure 9. Graphdiyne structure.

Figure 10. Schematic of a monolayer of rhenium disulfide.

Figure 11. Mechanism of photocatalysis on a surface treated with TiO₂ nanoparticles.

Figure 12. Schematic showing the self-cleaning phenomena on superhydrophilic surface.

Figure 13. Schematic of photocatalytic air purifying pavement.

Figure 14. Self-Cleaning mechanism utilizing photooxidation.

Figure 15. Photocatalytic oxidation (PCO) air filter.

Figure 16. Mechanism of photocatalysis on a semiconductor particle surface for microbial treatment.

Figure 17. Schematic of photocatalytic water purification.

Figure 18. Markets for photocatalytic materials and coatings 2021-2032, by market share of product type by revenues.

Figure 19. Revenues for photocatalytic materials and coatings, 2010-2032, conservative, medium and high estimates. Millions USD.

Figure 20. GermStopSQ mechanism of action.

Figure 21. NO_x reduction with TioCem.

Figure 22. V-CAT photocatalyst mechanism.

Figure 23. Applications of Titanystar.

I would like to order

Product name: The Global Market for Photocatalytic Materials and Coatings 2022-2032

Product link: <https://marketpublishers.com/r/G9A5C7CB380DEN.html>

Price: US\$ 950.00 (Single User License / Electronic Delivery)

If you want to order Corporate License or Hard Copy, please, contact our Customer Service:

info@marketpublishers.com

Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click button on product page <https://marketpublishers.com/r/G9A5C7CB380DEN.html>