

# The Global Market for Nanocoatings in Construction, Architecture and Exterior Protection

<https://marketpublishers.com/r/GFA32BD2871CEN.html>

Date: October 2019

Pages: 222

Price: US\$ 925.00 (Single User License)

ID: GFA32BD2871CEN

## Abstracts

Due to the properties inherent at the nanoscale, nanocoatings are typically multifunctional, exhibiting one or combinations of the following properties:

Scratch and abrasion resistance.

Anti-static.

Anti-fouling.

Self-cleaning (bionic and photocatalytic).

Hydrophobic

Hydrophilic

Oleophobic

Easy-to-clean.

Self-healing.

Anti-reflective.

Anti-microbial activity.

Sensory

Catalytic activity.

Nanocoatings are particularly suited to protecting the surface of various construction materials such as glass, concrete, sand limestone or marble from environmental influences like water staining, moss, algae as well as soot and oil stains; they also function as corrosion inhibitors for reinforced steel. They are also environmentally-friendly and significantly contribute to energy saving compared to conventional cleaning methods.

Paints and surface coatings are commercially available that create a low energy facing thus rendering a building surface highly hydro- and oleophobic, thereby helping to prolong maintenance cycles and to ease cleaning. Dirt repellent protective paints and photocatalytic coatings are the most prominent applications in buildings and exteriors. Types of nanocoatings utilised in construction, architecture and exterior protection include:

Photocatalytic nanocoatings

Self-cleaning nanocoatings

UV-protection nanocoatings

Anti-graffiti nanocoatings

Super-hydrophilic and hydrophobic nanocoatings

Anti-reflection nanocoatings

Electrochromic and photochromic nanocoatings

Smart window nanocoatings

Report contents include:

Nanocoating products in construction, architecture and exterior protection

Market analysis by nanocoatings type

Market drivers, trends and challenges, by end user markets.

In-depth market assessment of opportunities for nanocoatings in construction, architecture and exterior protection including demand by market, growth rates, pricing and applications.

Market in revenues, USD, CAGR 2018-2030

In-depth company profiles, including products and commercial activities.

Detailed forecasts for key growth areas, opportunities and user demand.

90 company profiles.

## Contents

### **1 INTRODUCTION**

- 1.1 Aims and objectives of the study
- 1.2 Market definition
  - 1.2.1 Properties of nanomaterials
  - 1.2.2 Categorization

### **2 RESEARCH METHODOLOGY**

### **3 EXECUTIVE SUMMARY**

- 3.1 High performance coatings
- 3.2 Nanocoatings
- 3.3 Market drivers and trends
- 3.4 Global market size and opportunity to 2030
  - 3.4.1 End user market for nanocoatings
  - 3.4.2 Global revenues for nanocoatings 2010-2030
  - 3.4.3 Global revenues for nanocoatings, by market
    - 3.4.3.1 The market in 2017
    - 3.4.3.2 The market in 2018
    - 3.4.3.3 The market in 2030
  - 3.4.4 Global revenues by nanocoatings, by type
  - 3.4.5 Regional demand for nanocoatings
- 3.5 Market and technical challenges

### **4 NANOCOATINGS TECHNICAL ANALYSIS**

- 4.1 Properties of nanocoatings
- 4.2 Benefits of using nanocoatings
  - 4.2.1 Types of nanocoatings
- 4.3 Production and synthesis methods
- 4.4 Hydrophobic coatings and surfaces
  - 4.4.1 Hydrophilic coatings
  - 4.4.2 Hydrophobic coatings
    - 4.4.2.1 Properties
- 4.5 Superhydrophobic coatings and surfaces
  - 4.5.1 Properties

- 4.5.2 Durability issues
- 4.5.3 Nanocellulose
- 4.6 Oleophobic and omniphobic coatings and surfaces
  - 4.6.1 SLIPS
  - 4.6.2 Covalent bonding
  - 4.6.3 Step-growth graft polymerization
  - 4.6.4 Applications

## **5 TYPES OF NANOCOATINGS IN CONSTRUCTION, ARCHITECTURE AND EXTERIOR PROTECTION**

### **5.1 ANTI-FINGERPRINT NANOCOATINGS**

- 5.1.1 Market drivers and trends
- 5.1.2 Benefits of anti-fingerprint nanocoatings
  - 5.1.2.1 Spray-on anti-fingerprint coating
- 5.1.3 Applications
- 5.1.4 Global market size
  - 5.1.4.1 Nanocoatings opportunity
  - 5.1.4.2 Global revenues 2010-2030
- 5.1.5 Companies

### **5.2 ANTI-BACTERIAL NANOCOATINGS**

- 5.2.1 Market drivers and trends
- 5.2.2 Benefits of anti-bacterial nanocoatings
- 5.2.3 Applications
- 5.2.4 Global market size
  - 5.2.4.1 Nanocoatings opportunity
  - 5.2.4.2 Global revenues 2010-2030
- 5.2.5 Companies

### **5.3 ANTI-CORROSION NANOCOATINGS**

- 5.3.1 Market drivers and trends
- 5.3.2 Benefits of anti-corrosion nanocoatings
  - 5.3.2.1 Smart self-healing coatings
  - 5.3.2.2 Superhydrophobic coatings
  - 5.3.2.3 Graphene
- 5.3.3 Applications
- 5.3.4 Global market size
  - 5.3.4.1 Nanocoatings opportunity
  - 5.3.4.2 Global revenues 2010-2030
- 5.3.5 Companies

## 5.4 ANTI-FOULING AND EASY-TO-CLEAN NANOCOATINGS

### 5.4.1 Market drivers and trends

### 5.4.2 Benefits of anti-fouling and easy-to-clean nanocoatings

### 5.4.3 Applications

#### 5.4.3.1 Antigrffiti

### 5.4.4 Global market size

#### 5.4.4.1 Nanocoatings opportunity

#### 5.4.4.2 Global revenues 2010-2030

### 5.4.5 Companies

## 5.5 SELF-CLEANING NANOCOATINGS

### 5.5.1 Market drivers and trends

### 5.5.2 Market drivers and trends

### 5.5.3 Benefits of self-cleaning nanocoatings

### 5.5.4 Global market size

#### 5.5.4.1 Nanocoatings opportunity

#### 5.5.4.2 Global revenues 2010-2030

### 5.5.5 Companies

## 5.6 PHOTOCATALYTIC NANOCOATINGS

### 5.6.1 Market drivers and trends

### 5.6.2 Benefits of photocatalytic self-cleaning nanocoatings

### 5.6.3 Applications

#### 5.6.3.1 Self-Cleaning Coatings

#### 5.6.3.2 Indoor Air Pollution and Sick Building Syndrome

#### 5.6.3.3 Outdoor Air Pollution

#### 5.6.3.4 Water Treatment

### 5.6.4 Global market size

#### 5.6.4.1 Nanocoatings opportunity

#### 5.6.4.2 Global revenues 2010-2030

### 5.6.5 Companies

## 5.7 UV-RESISTANT NANOCOATINGS

### 5.7.1 Market drivers and trends

### 5.7.2 Benefits of UV-resistant nanocoatings

#### 5.7.2.1 Textiles

#### 5.7.2.2 Wood coatings

### 5.7.3 Global market size

#### 5.7.3.1 Nanocoatings opportunity

#### 5.7.3.2 Global revenues 2010-2030

### 5.7.4 Companies

## 5.8 ANTI-ICING AND DE-ICING

- 5.8.1 Market drivers and trends
- 5.8.2 Benefits of nanocoatings
  - 5.8.2.1 Hydrophobic and superhydrophobic coatings (HSH)
  - 5.8.2.2 SLIPS
  - 5.8.2.3 Heatable coatings
  - 5.8.2.4 Anti-freeze protein coatings
- 5.8.3 Global market size
  - 5.8.3.1 Nanocoatings opportunity
  - 5.8.3.2 Global revenues 2010-2030
- 5.8.4 Companies
- 5.9 ANTI-REFLECTIVE NANOCOATINGS**
  - 5.9.1 Market drivers and trends
  - 5.9.2 Benefits of nanocoatings
  - 5.9.3 Global market size
    - 5.9.3.1 Nanocoatings opportunity
    - 5.9.3.2 Global revenues 2010-2030
  - 5.9.4 Companies
- 5.10 SELF-HEALING NANOCOATINGS**
  - 5.10.1 Extrinsic self-healing
    - 5.10.1.1 Capsulebased
    - 5.10.1.2 Vascular selfhealing
  - 5.10.2 Intrinsic self-healing
  - 5.10.3 Healing volume
  - 5.10.4 Self-healing coatings
    - 5.10.4.1 Anticorrosion
    - 5.10.4.2 Scratch repair
  - 5.10.5 Companies

## **6 NANOCOATINGS IN CONSTRUCTION IN CONSTRUCTION, ARCHITECTURE AND EXTERIOR PROTECTION**

- 6.1 Market drivers and trends
- 6.2 Applications
  - 6.2.1 Protective coatings for glass, concrete and other construction materials
  - 6.2.2 Photocatalytic nanocoatings
  - 6.2.3 Anti-graffiti
  - 6.2.4 UV-protection
    - 6.2.4.1 Titanium dioxide nanoparticles
    - 6.2.4.2 Zinc oxide nanoparticles

## 6.3 Global market size

### 6.3.1 Nanocoatings opportunity

### 6.3.2 Global revenues 2010-2030

## **7 NANOCOATINGS COMPANIES IN CONSTRUCTION, ARCHITECTURE AND EXTERIOR PROTECTION (90 COMPANY PROFILES)**

## **8 REFERENCES**



## Tables

### TABLES

Table 1: Categorization of nanomaterials

Table 2: Properties of nanocoatings

Table 3. Market drivers and trends in nanocoatings

Table 4: End user markets for nanocoatings

Table 5: Global revenues for nanocoatings, 2010-2030, millions USD, conservative estimate

Table 6: Global revenues for nanocoatings, 2017, millions USD, by market

Table 7: Estimated revenues for nanocoatings, 2018, millions USD, by market

Table 8: Estimated revenues for nanocoatings, 2030, millions USD, by market

Table 9: Global revenues for nanocoatings, 2017, millions USD, by type

Table 10: Estimated global revenues for nanocoatings, 2018, millions USD, by type

Table 11: Estimated revenues for nanocoatings, 2030, millions USD, by type

Table 12: Market and technical challenges for nanocoatings

Table 13: Technology for synthesizing nanocoatings agents

Table 14: Film coatings techniques

Table 15: Contact angles of hydrophilic, super hydrophilic, hydrophobic and superhydrophobic surfaces

Table 16: Disadvantages of commonly utilized superhydrophobic coating methods

Table 17: Applications of oleophobic & omniphobic coatings

Table 26: Anti-fingerprint nanocoatings-Nanomaterials used, principles, properties and applications

Table 27: Market assessment for anti-fingerprint nanocoatings

Table 28: Potential addressable market for anti-fingerprint nanocoatings

Table 29: Revenues for anti-fingerprint nanocoatings, 2010-2030, millions USD

Table 30: Anti-fingerprint coatings product and application developers

Table 31: Anti-bacterial nanocoatings-Nanomaterials used, principles, properties and applications

Table 32: Nanomaterials utilized in Anti-bacterial coatings-benefits and applications

Table 33: Anti-bacterial nanocoatings markets and applications

Table 34: Market assessment of Anti-bacterial nanocoatings

Table 35: Opportunity for Anti-bacterial nanocoatings

Table 36: Revenues for Anti-bacterial nanocoatings, 2010-2030, US\$

Table 37: Anti-bacterial nanocoatings product and application developers

Table 38: Anti-corrosion nanocoatings-Nanomaterials used, principles, properties and applications

Table 39: Market drivers and trends in anti-corrosion nanocoatings

Table 40: Superior corrosion protection using graphene-added epoxy coatings, right, as compared to a commercial zinc-rich epoxy primer, left

Table 41: Anti-corrosion nanocoatings markets and applications

Table 42: Market assessment for anti-corrosion nanocoatings

Table 43: Opportunity for anti-corrosion nanocoatings by 2030

Table 44: Revenues for anti-corrosion nanocoatings, 2010-2030

Table 45: Anti-corrosion nanocoatings product and application developers

Table 46: Anti-fouling and easy-to-clean nanocoatings-Nanomaterials used, principles, properties and applications

Table 47: Market drivers and trends in Anti-fouling and easy-to-clean nanocoatings

Table 48: Anti-fouling and easy-to-clean nanocoatings markets, applications and potential addressable market

Table 49: Market assessment for anti-fouling and easy-to-clean nanocoatings

Table 50: Revenues for anti-fouling and easy-to-clean nanocoatings, 2010-2030, US\$

Table 51: Anti-fouling and easy-to-clean nanocoatings product and application developers

Table 52: Self-cleaning (bionic) nanocoatings-Nanomaterials used, principles, properties and applications

Table 53: Market drivers and trends in Self-cleaning (bionic) nanocoatings

Table 54: Self-cleaning (bionic) nanocoatings-Markets and applications

Table 55: Market assessment for self-cleaning (bionic) nanocoatings

Table 56: Revenues for self-cleaning nanocoatings, 2010-2030, US\$

Table 57: Self-cleaning (bionic) nanocoatings product and application developers

Table 58: Self-cleaning (photocatalytic) nanocoatings-Nanomaterials used, principles, properties and applications

Table 59: Market drivers and trends in photocatalytic nanocoatings

Table 60: Photocatalytic nanocoatings-Markets, applications and potential addressable market size by 2027

Table 61: Market assessment for self-cleaning (photocatalytic) nanocoatings

Table 62: Revenues for self-cleaning (photocatalytic) nanocoatings, 2010-2030, US\$

Table 63: Self-cleaning (photocatalytic) nanocoatings product and application developers

Table 64: UV-resistant nanocoatings-Nanomaterials used, principles, properties and applications

Table 65: Market drivers and trends in UV-resistant nanocoatings

Table 66: UV-resistant nanocoatings-Markets, applications and potential addressable market

Table 67: Market assessment for UV-resistant nanocoatings

- Table 68: Revenues for UV-resistant nanocoatings, 2010-2030, US\$
- Table 69: UV-resistant nanocoatings product and application developers
- Table 70: Anti-icing nanocoatings-Nanomaterials used, principles, properties, applications
- Table 71: Market drivers and trends in anti-icing and de-icing nanocoatings
- Table 72: Nanomaterials utilized in anti-icing coatings and benefits thereof
- Table 73: Anti-icing and de-icing nanocoatings-Markets, applications and potential addressable markets
- Table 74: Market assessment for anti-icing and de-icing nanocoatings
- Table 75: Revenues for anti-icing and de-icing nanocoatings, 2010-2030, US\$, conservative and optimistic estimates
- Table 76: Anti-icing and de-icing nanocoatings product and application developers
- Table 77: Anti-reflective nanocoatings-Nanomaterials used, principles, properties and applications
- Table 78: Market drivers and trends in Anti-reflective nanocoatings
- Table 79: Market opportunity for anti-reflection nanocoatings
- Table 80: Revenues for anti-reflective nanocoatings, 2010-2030, US\$
- Table 81: Anti-reflective nanocoatings product and application developers
- Table 82: Types of self-healing coatings and materials
- Table 83: Comparative properties of self-healing materials
- Table 84: Types of self-healing nanomaterials
- Table 85: Self-healing nanocoatings product and application developers
- Table 86: Market drivers and trends for nanocoatings in the construction market
- Table 87: Nanocoatings applied in the construction industry-type of coating, nanomaterials utilized and benefits
- Table 88: Photocatalytic nanocoatings-Markets and applications
- Table 89: Revenues for nanocoatings in construction, architecture and exterior protection, 2010-2030, US\$

## Figures

### FIGURES

Figure 1: Global revenues for nanocoatings, 2010-2030, millions USD, conservative estimate

Figure 2: Global market revenues for nanocoatings 2017, millions USD, by market

Figure 3: Markets for nanocoatings 2017, %

Figure 4: Estimated market revenues for nanocoatings 2018, millions USD, by market

Figure 5: Estimated market revenues for nanocoatings 2030, millions USD, by market

Figure 6: Markets for nanocoatings 2030, %

Figure 7: Global revenues for nanocoatings, 2017, millions USD, by type

Figure 8: Markets for nanocoatings 2017, by nanocoatings type, %

Figure 9: Estimated global revenues for nanocoatings, 2018, millions USD, by type

Figure 10: Market for nanocoatings 2030, by nanocoatings type, US\$

Figure 11: Market for nanocoatings 2030, by nanocoatings type, %

Figure 12: Regional demand for nanocoatings, 2017

Figure 13: Regional demand for nanocoatings, 2018

Figure 14: Regional demand for nanocoatings, 2030

Figure 15: Hydrophobic fluoropolymer nanocoatings on electronic circuit boards

Figure 16: Nanocoatings synthesis techniques

Figure 17: Techniques for constructing superhydrophobic coatings on substrates

Figure 18: Electrospray deposition

Figure 19: CVD technique

Figure 20: Schematic of ALD

Figure 21: SEM images of different layers of TiO<sub>2</sub> nanoparticles in steel surface

Figure 22: The coating system is applied to the surface. The solvent evaporates

Figure 23: A first organization takes place where the silicon-containing bonding component (blue dots in figure 2) bonds covalently with the surface and cross-links with neighbouring molecules to form a strong three-dimensional

Figure 24: During the curing, the compounds organise themselves in a nanoscale monolayer. The fluorine-containing repellent component (red dots in figure 3) on top makes the glass hydrophobic and oleophobic

Figure 25: (a) Water drops on a lotus leaf

Figure 26: A schematic of (a) water droplet on normal hydrophobic surface with contact angle greater than 90° and (b) water droplet on a superhydrophobic surface with a contact angle > 150°

Figure 27: Contact angle on superhydrophobic coated surface

Figure 28: Self-cleaning nanocellulose dishware

Figure 29: SLIPS repellent coatings

Figure 30: Omniphobic coatings

Figure 57 Nanocoatings market by nanocoatings type, 2010-2030, USD

Figure 58: Anti-fingerprint nanocoating on glass

Figure 59: Market trends and drivers in anti-fingerpring nanocoatings

Figure 60: Schematic of anti-fingerprint nanocoatings

Figure 61: Toray anti-fingerprint film (left) and an existing lipophilic film (right)

Figure 62: Types of anti-fingerprint coatings applied to touchscreens

Figure 63: Anti-fingerprint nanocoatings markets and applications

Figure 64: Current end user markets for anti-fingerprint nanocoatings, %, 2018

Figure 65: Revenues for anti-fingerprint coatings, 2010-2030, US\$

Figure 66: Market drivers and trends in anti-bacterial nanocoatings

Figure 67: Mechanism of microbial inactivation and degradation with anti-microbial PhotoProtect nanocoatings

Figure 68: Schematic of silver nanoparticles penetrating bacterial cell membrane

Figure 69: Antibacterial mechanism of nanosilver particles

Figure 70: Current end user markets for Anti-bacterial nanocoatings, %, based on nanocoatings company sales

Figure 71: Potential addressable market for Anti-bacterial nanocoatings by 2030

Figure 72: Revenues for Anti-bacterial nanocoatings, 2010-2030, US\$

Figure 73: Nanovate CoP coating

Figure 74: 2000 hour salt fog results for Teslan nanocoatings

Figure 75: AnCatt proprietary polyaniline nanodispersion and coating structure

Figure 76: Hybrid self-healing sol-gel coating

Figure 77: Schematic of anti-corrosion via superhydrophobic surface

Figure 78: Current end user markets for anti-corrosion nanocoatings, %, 2018

Figure 79: Potential addressable market for anti-corrosion nanocoatings by 2030

Figure 80: Revenues for anti-corrosion nanocoatings, 2010-2030, US\$

Figure 81: Anti-fouling treatment for heat-exchangers

Figure 82: Removal of graffiti after application of nanocoating

Figure 83: Markets for anti-fouling and easy clean nanocoatings, by %

Figure 84: Potential addressable market for anti-fouling and easy-to-clean nanocoatings by 2030

Figure 85: Revenues for anti-fouling and easy-to-clean nanocoatings 2010-2030, millions USD

Figure 86: Self-cleaning superhydrophobic coating schematic

Figure 87: Markets for self-cleaning nanocoatings, %, 2018

Figure 88: Potential addressable market for self-cleaning (bionic) nanocoatings by 2030

Figure 89: Revenues for self-cleaning nanocoatings, 2010-2030, US\$

Figure 90: Principle of superhydrophilicity

Figure 91: Schematic of photocatalytic air purifying pavement

Figure 92: Tokyo Station GranRoof. The titanium dioxide coating ensures long-lasting whiteness

Figure 93: Markets for self-cleaning (photocatalytic) nanocoatings 2018, %

Figure 94: Potential addressable market for self-cleaning (photocatalytic) nanocoatings by 2030

Figure 95: Revenues for self-cleaning (photocatalytic) nanocoatings, 2010-2030, US\$

Figure 96: Markets for UV-resistant nanocoatings, %, 2017

Figure 97: Potential addressable market for UV-resistant nanocoatings

Figure 98: Revenues for UV-resistant nanocoatings, 2010-2030, US\$

Figure 99: Nanocoated surface in comparison to existing surfaces

Figure 100: NANOMYTE® SuperAi, a Durable Anti-ice Coating

Figure 101: SLIPS coating schematic

Figure 102: Carbon nanotube based anti-icing/de-icing device

Figure 103: CNT anti-icing nanocoating

Figure 104: Markets for anti-icing and de-icing nanocoatings, %, 2017

Figure 105: Potential addressable market for anti-icing and de-icing nanocoatings by 2030

Figure 106: Revenues for anti-icing and de-icing nanocoatings, 2010-2030, US\$, conservative and optimistic estimates. Conservative estimates in blue, optimistic in red

Figure 107: Schematic of AR coating utilizing nanoporous coating

Figure 108: Demo solar panels coated with nanocoatings

Figure 109: Revenues for anti-reflective nanocoatings, 2010-2030, US\$

Figure 110: Schematic of self-healing polymers. Capsule based (a), vascular (b), and intrinsic (c) schemes for selfhealing materials. Red and blue colours indicate chemical species which react (purple) to heal damage

Figure 111: Stages of self-healing mechanism

Figure 112: Self-healing mechanism in vascular self-healing systems

Figure 113: Comparison of self-healing systems

Figure 114: Self-healing coating on glass

Figure 115: Mechanism of photocatalytic NO<sub>x</sub> oxidation on active concrete road

Figure 116: Jubilee Church in Rome, the outside coated with nano photocatalytic TiO<sub>2</sub> coatings

Figure 117: FN® photocatalytic coating, applied in the Project of Ecological Sound Barrier, in Prague

Figure 118 Smart window film coatings based on indium tin oxide nanocrystals

Figure 119: Nanocoatings in construction, architecture and exterior protection, by coatings type %, 2018



Figure 120: Potential addressable market for nanocoatings in the construction, architecture and exterior coatings sector by 2030

Figure 121: Revenues for nanocoatings in construction, architecture and exterior protection, 2010-2030, US\$

Figure 122: Carbon nanotube paint product

## I would like to order

Product name: The Global Market for Nanocoatings in Construction, Architecture and Exterior Protection

Product link: <https://marketpublishers.com/r/GFA32BD2871CEN.html>

Price: US\$ 925.00 (Single User License / Electronic Delivery)

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

[info@marketpublishers.com](mailto:info@marketpublishers.com)

## Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click button on product page <https://marketpublishers.com/r/GFA32BD2871CEN.html>

To pay by Wire Transfer, please, fill in your contact details in the form below:

First name:  
Last name:  
Email:  
Company:  
Address:  
City:  
Zip code:  
Country:  
Tel:  
Fax:  
Your message:

**\*\*All fields are required**

Customer signature \_\_\_\_\_

Please, note that by ordering from marketpublishers.com you are agreeing to our Terms & Conditions at <https://marketpublishers.com/docs/terms.html>

To place an order via fax simply print this form, fill in the information below and fax the completed form to +44 20 7900 3970