

# The Global Market for Anti-Corrosion Nanocoatings 2020

https://marketpublishers.com/r/GA17ED8CCBBEN.html

Date: March 2020 Pages: 180 Price: US\$ 625.00 (Single User License) ID: GA17ED8CCBBEN

# Abstracts

The incorporation of nanomaterials into thin films, coatings and surfaces leads to new functionalities, completely innovative characteristics and the possibility to achieve multi-functional coatings and smart coatings. The use of nanomaterials also results in performance enhancements in wear, corrosion-wear, fatigue and corrosion resistant coatings. Nanocoatings demonstrate significant enhancement in outdoor durability and vastly improved hardness and flexibility compared to traditional coatings.

Advantages of nanocoatings include:

Lower cost for a number of applications.

Improved functionalities over traditional coatings (transparency, improved barrier capabilities, resistant to erosion, spectral control (UV, IR).

Low energy used to produce coatings.

Superior coating characteristics.

Thin and lightweight: Reduces packing, transport and storage costs.

Nontoxic: Environmentally friendly product.

Surface compatibility.

Improved durability/resistance.



Extreme environment corrosion protection.

Cost effectiveness.

Reduced prep, application time/number of coats.

Extended life.

Optimized processing.

The use of nanocoatings allows for improved barrier properties to water and corrosive ion permeation. These protective coating has numerous uses for automotive, aerospace, marine, and industrial applications. There is a market need for a cost-effective non-epoxy-based corrosion resistant coating operable in environments of temperature swings, strong acid, water, and/or road salt. Nanoparticle materials have a very high surface area. When this surface is functionalized, it can deliver high loadings of organic corrosion inhibitors. Thus, tailored nanoparticles are the ideal carrier for delivery of the needed level of active corrosion inhibitors.

Report contents include:

Size in value for the anti-corrosion nanocoatings market, and growth rate during the forecast period, 2019-2030. Historical figures are also provided, from 2010.

Size in value for the End-user industries for anti-corrosion nanocoatings and growth during the forecast period.

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

In-depth market assessment of opportunities for anti-corrosion nanocoatings, by type and markets.

The latest trends in anti-corrosion nanostructured surface treatments and coatings.

Benefits of anti-corrosion nanocoatings, by markets and applications

Estimated market revenues for anti-corrosion nanocoatings to 2030.



60 anti-corrosion nanocoatings company profiles including products and target markets.



# Contents

#### **1 EXECUTIVE SUMMARY**

- 1.1 Why nanocoatings?
- 1.2 Advantages over traditional coatings
- 1.3 Improvements and disruption in coatings markets
- 1.4 End user market for nanocoatings
- 1.5 The nanocoatings market in 2020
- 1.6 Global market size, historical and estimated to 2020
- 1.6.1 Global revenues for nanocoatings 2010-2030
- 1.6.2 Global revenues for nanocoatings, by market
- 1.6.3 Global revenues by nanocoatings, by type
- 1.6.4 Regional demand for nanocoatings
- 1.7 Market challenges

## 2 OVERVIEW OF NANOCOATINGS

- 2.1 Properties
- 2.2 Benefits of using nanocoatings
- 2.2.1 Types of nanocoatings
- 2.3 Production and synthesis methods

## **3 NANOMATERIALS USED IN ANTI-CORROSION NANOCOATINGS**

- 3.1 Graphene
  - 3.1.1 Properties and coatings applications
- 3.1.2 Anti-corrosion graphene coatings
- 3.2 Carbon nanotubes (MWCNT and SWCNT)
- 3.2.1 Properties and applications
- 3.2.2 Anti-corrosion carbon nanotube coatings
- 3.3 Aluminium oxide nanoparticles (Al2O3-NPs)
- 3.3.1 Properties and applications
- 3.3.2 Anti-corrosion aluminium oxide nanoparticle coatings
- 3.4 Nanodiamonds
  - 3.4.1 Properties and applications
- 3.4.2 Anti-corrosion nanodiamond coatings

#### 3.5 Nanoclays

3.5.1 Properties and applications



- 3.5.2 Anti-corrosion nanoclay coatings
- 3.6 Silicon oxide nanoparticles
- 3.6.1 Properties and applications
- 3.6.2 Anti-corrosion silicon oxide nanoparticle coatings
- 3.7 Zirconia nanoparticles
- 3.7.1 Properties and applications
- 3.7.2 Anti-corrosion zirconia nanoparticle coatings
- 3.8 Iron oxide nanoparticles
  - 3.8.1 Properties and applications
- 3.8.2 Anti-corrosion iron oxide nanoparticle coatings

## **4 ANTI-CORROSION NANOCOATINGS MARKET ANALYSIS**

- 4.1 Market overview
  - 4.1.1 Market assessment
  - 4.1.2 Applications map
  - 4.1.3 Global market size
  - 4.1.4 Product developers
- 4.2 Self-healing nanocoatings for anti-corrosion
  - 4.2.1 Market overview
  - 4.2.2 Market assessment
  - 4.2.3 Applications map
  - 4.2.4 Global market size
  - 4.2.5 Product developers

# 5 MARKET SEGMENT ANALYSIS FOR ANTI-CORROSION NANOCOATINGS, BY END USER MARKET

#### 5.1 AVIATION AND AEROSPACE

- 5.1.1 Market drivers and trends
- 5.1.2 Applications
- 5.1.3 Anti-corrosion aerospace nanocoatings
- 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 AUTOMOTIVE
  - 5.2.1 Market drivers and trends
  - 5.2.2 Applications



- 5.2.3 Anti-corrosion automotive nanocoatings
- 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 MARINE
  - 5.3.1 Market drivers and trends
  - 5.3.2 Applications
  - 5.3.3 Anti-corroson marine nanocoatings
  - 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 MILITARY AND DEFENCE
  - 5.4.1 Market drivers and trends
  - 5.4.2 Applications
  - 5.4.3 Anti-corrosion nanocoatings
  - 5.4.4 Global market size
  - 5.4.4.1 Nanocoatings opportunity
  - 5.4.4.2 Global market revenues 2010-2030
- 5.4.5 Companies
- 5.5 OIL AND GAS
  - 5.5.1 Market drivers and trends
  - 5.5.2 Applications
  - 5.5.3 Anti-corrosion nanocoatings
  - 5.5.4 Global market size
  - 5.5.4.1 Nanocoatings opportunity
  - 5.5.4.2 Global market revenues 2010-2030
  - 5.5.5 Companies

#### **6 NANOCOATINGS COMPANIES (60 COMPANY PROFILES)**

#### 7 RESEARCH METHODOLOGY

- 7.1 Aims and objectives of the study
- 7.2 Market definition
  - 7.2.1 Properties of nanomaterials
  - 7.2.2 Categorization



+357 96 030922 info@marketpublishers.com

#### **8 REFERENCES**





# **Tables**

#### TABLES

- Table 1: Properties of nanocoatings
- Table 2: End user markets for nanocoatings
- Table 3: Global revenues for nanocoatings, 2010-2030, millions USD
- Table 4: Global revenues for nanocoatings, 2010-2030, millions USD, by market
- Table 5: Global revenues for nanocoatings, 2010-2030, millions USD, by type
- Table 6: Market and technical challenges for nanocoatings
- Table 7: Technology for synthesizing nanocoatings agents
- Table 8: Film coatings techniques

Table 9: Contact angles of hydrophilic, super hydrophilic, hydrophobic and

- superhydrophobic surfaces
- Table 10: Disadvantages of commonly utilized superhydrophobic coating methods
- Table 11: Applications of oleophobic & omniphobic coatings
- Table 12: Nanomaterials used in nanocoatings and applications
- Table 13: Graphene properties relevant to application in coatings

Table 14: Uncoated vs. graphene coated (right) steel wire in corrosive environment solution after 30 days.

- Table 15: Market and applications for SWCNTs in coatings
- Table 16. Applications of Aluminium oxide nanoparticles (Al2O3-NPs) in coatings
- Table 17. Market overview for anti-corrosion nanocoatings
- Table 18: Market assessment for anti-corrosion nanocoatings
- Table 19. Applications map for anti-corrosion nanocoatings

Table 20: Superior corrosion protection using graphene-added epoxy coatings, right, as compared to a commercial zinc-rich epoxy primer, left

- Table 21: Applications map for anti-corrosion nanocoatings
- Table 22: Opportunity for anti-corrosion nanocoatings by 2030
- Table 23: Revenues for anti-corrosion nanocoatings, 2010-2030
- Table 24: Anti-corrosion nanocoatings product and application developers
- Table 25: Types of self-healing coatings and materials
- Table 26: Comparative properties of self-healing materials
- Table 27: Types of self-healing nanomaterials
- Table 28. Market assessment for self-healing nanocoatings
- Table 29. Applications map for self healing nanocoatings
- Table 30: Self-healing nanocoatings product and application developers
- Table 31. Market drivers and trends for nanocoatings in aviation and aerospace
- Table 32: Types of nanocoatings utilized in aerospace and application



 Table 33: Revenues for nanocoatings in the aerospace industry, 2010-2030

Table 34: Aerospace nanocoatings product developers

Table 35: Market drivers and trends for nanocoatings in the automotive market

Table 36: Anti-corrosion automotive nanocoatings

Table 37: Revenues for nanocoatings in the automotive industry, 2010-2030, US\$, conservative and optimistic estimate

Table 38: Automotive nanocoatings product developers

Table 39: Market drivers and trends for nanocoatings in the marine industry

Table 40: Nanocoatings applied in the marine industry-type of coating, nanomaterials utilized and benefits

Table 41: Revenues for nanocoatings in the marine sector, 2010-2030, US\$

Table 42: Marine nanocoatings product developers

Table 43: Market drivers and trends for nanocoatings in the military and defence industry

Table 44: Revenues for nanocoatings in military and defence, 2010-2030, US\$

Table 45: Military and defence nanocoatings product and application developers

Table 46: Market drivers and trends for nanocoatings in the oil and gas exploration industry

Table 47: Desirable functional properties for the oil and gas industry afforded by nanomaterials in coatings

Table 48: Revenues for nanocoatings in oil and gas exploration, 2010-2030, US\$

Table 49: Oil and gas nanocoatings product developers

Table 50: Categorization of nanomaterials



# **Figures**

#### FIGURES

- Figure 1: Global revenues for nanocoatings, 2010-2030, millions USD
- Figure 2: Global revenues for nanocoatings 2010-2030, millions USD, by market
- Figure 3: Global revenues for nanocoatings, 2010-2030, millions USD, by type
- Figure 4: Regional demand for nanocoatings, 2010-2020, millions USD
- Figure 5: Hydrophobic fluoropolymer nanocoatings on electronic circuit boards
- Figure 6: Nanocoatings synthesis techniques
- Figure 7: Techniques for constructing superhydrophobic coatings on substrates
- Figure 8: Electrospray deposition
- Figure 9: CVD technique
- Figure 10: Schematic of ALD
- Figure 11: SEM images of different layers of TiO2 nanoparticles in steel surface
- Figure 12: The coating system is applied to the surface. The solvent evaporates
- Figure 13: 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 14: During the curing, the compounds or- ganise themselves in a nanoscale monolayer. The fluorine-containing repellent component (red dots in figure 3) on top makes the glass hydro- phobic and oleophobic
- Figure 15: (a) Water drops on a lotus leaf
- Figure 16: 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 17: Contact angle on superhydrophobic coated surface
- Figure 18: Self-cleaning nanocellulose dishware
- Figure 19: SLIPS repellent coatings
- Figure 20: Omniphobic coatings
- Figure 21: Graphair membrane coating
- Figure 22: Water permeation through a brick without (left) and with (right) "graphene paint" coating
- Figure 23: Nanovate CoP coating
- Figure 24: 2000 hour salt fog results for Teslan nanocoatings
- Figure 25: AnCatt proprietary polyaniline nanodispersion and coating structure
- Figure 26: Hybrid self-healing sol-gel coating
- Figure 27: Schematic of anti-corrosion via superhydrophobic surface
- Figure 28: Potential addressable market for anti-corrosion nanocoatings by 2030



Figure 29: Revenues for anti-corrosion nanocoatings, 2010-2030, US\$

Figure 30: Schematic of self-healing polymers. Capsule based (a), vascular (b), and intrinsic (c) schemes for self-healing materials. Red and blue colours indicate chemical species which react (purple) to heal damage

Figure 31: Stages of self-healing mechanism

Figure 32: Self-healing mechanism in vascular self-healing systems

Figure 33: Comparison of self-healing systems

Figure 34: Self-healing coating on glass

Figure 35: Nanocoatings in the aerospace industry, by nanocoatings type %, 2018

Figure 36: Potential addressable market for nanocoatings in aerospace by 2030

Figure 37: Revenues for nanocoatings in the aerospace industry, 2010-2030, US\$

Figure 38: Nanocoatings in the automotive industry, by coatings type % 2018

Figure 39: Potential addressable market for nanocoatings in the automotive sector by 2030

Figure 40: Revenues for nanocoatings in the automotive industry, 2010-2030, US\$

Figure 41: Potential addressable market for nanocoatings in the marine sector by 2030

Figure 42: Revenues for nanocoatings in the marine sector, 2010-2030, US\$

Figure 43: Nanocoatings in military and defence, by nanocoatings type %, 2018

- Figure 44: Potential addressable market nanocoatings in military and defence by 2030
- Figure 45: Revenues for nanocoatings in military and defence, 2010-2030, US\$
- Figure 46: Oil-Repellent self-healing nanocoatings

Figure 47: Nanocoatings in oil and gas exploration, by coatings type %

Figure 48: Potential addressable market for nanocoatings in oil and gas exploration by 2030

Figure 49: Revenues for nanocoatings in oil and gas exploration, 2010-2030, US\$

Figure 50: Self-healing mechanism of SmartCorr coating



## I would like to order

Product name: The Global Market for Anti-Corrosion Nanocoatings 2020 Product link: https://marketpublishers.com/r/GA17ED8CCBBEN.html Price: US\$ 625.00 (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 <u>https://marketpublishers.com/r/GA17ED8CCBBEN.html</u>