

# The Global Market for Nanodiamonds 2023-2033

<https://marketpublishers.com/r/GD5D8E61B7BEN.html>

Date: May 2023

Pages: 106

Price: US\$ 1,100.00 (Single User License)

ID: GD5D8E61B7BEN

## Abstracts

Nanodiamonds (NDs) are diamond phase carbon nanomaterials that were initially used for their strong abrasive properties and as lubricant additives for industrial applications. Now they are impacting a broad range of markets including batteries, supercapacitors, skincare, biomedicine, coatings and plastics.

Main types of commercial NDs produced are categorized as high-pressure high temperature (HPHT) nanodiamonds, CVD diamond and detonation nanodiamonds (DND). Extremely small amounts of nanodiamond additives can modify a variety of thermal and mechanical properties in various parent materials. Properties include:

Diamond core: highest hardness (167 Gpa) and wear resistance

Highest thermal conductivity (2300 W/mK)

High electrical resistivity ( $10^{11}$  Ωcm)

Low thermal expansion ( $1.0 \times 10^{-6}$  K<sup>-1</sup>)

Wide band gap (5.47 eV {300 K})

High refractive index (2.417)

Low specific gravity (3.52)

Chemical/radiation resistance

Biocompatibility

Large surface area (250- 450 m<sup>2</sup>/g)

High & controllable chemical activity of the surface.

Environmentally friendly (green additives).

Main current applications of Nanodiamonds in terms of volume demand are:

Fine polishing abrasives.

Coatings additives (galvanic and electroless).

Lubricant additives (oils and grease).

Reinforcing polymer fillers.

Other applications that will gain commercial prominence include skincare, biomedicine (e.g. drug delivery and biosensors) and batteries.

Report contents include:

Types of nanodiamonds and properties.

Production methods by producer.

Applications, benefits, market megatrends, market drivers for use of nanodiamonds, technology challenges, competing materials, market demand.

Competitive landscape.

Markets for nanodiamonds including  
lubricants

electroplating and anti-wear/friction coatings

polishing materials

biomedicine

composites

thermoplastics

skincare

energy storage

Nanodiamonds pricing.

Global consumption of nanodiamonds to 2033, by market (tons).

In depth company profiles of 30 nanodiamonds producers and product developers, including types produced, products, target markets, production capabilities, contact details. Companies profiled include Adamas, Carbodean, Daicel, Hyperion, NDB and Ray Techniques.

## Contents

### **1 RESEARCH METHODOLOGY**

### **2 PROPERTIES OF NANODIAMONDS**

#### 2.1 Types

##### 2.1.1 Commercial nanodiamonds

##### 2.1.2 Fluorescent nanodiamonds (FNDs)

#### 2.2 Production methods-advantages and disadvantages

### **3 APPLICATIONS**

### **4 MARKETS FOR NANODIAMONDS**

#### 4.1 LUBRICANTS

##### 4.1.1 Nanolubricants

###### 4.1.1.1 Products

##### 4.1.2 Market for nanodiamonds in lubricants

##### 4.1.3 Applications, key benefits, trends, market drivers and competing materials

##### 4.1.4 Global market consumption of nanodiamonds in lubricants (tons)

#### 4.2 ELECTRONIC POLISHING MATERIALS

##### 4.2.1 Market for nanodiamonds in electronic polishing materials

##### 4.2.2 Applications, key benefits, trends, market drivers and competing materials

##### 4.2.3 Global market consumption of nanodiamonds in polishing additives, 2017-2033 (tons).

#### 4.3 ELECTROPLATING AND ANTI-WEAR/FRICTION COATINGS

##### 4.3.1 Market for nanodiamonds in electroplating and anti-wear/friction coatings

##### 4.3.2 Applications, key benefits, trends, market drivers and competing materials

##### 4.3.3 Global market consumption of nanodiamonds in electroplating and anti-wear/friction coatings, 2017-2033 (tons)

#### 4.4 COMPOSITES

##### 4.4.1 Market for nanodiamonds in composites

##### 4.4.2 Fiber-based polymer composite parts

###### 4.4.2.1 Market overview

##### 4.4.3 Applications, key benefits, trends, market drivers and competing materials

##### 4.4.3.1 Global market consumption of nanodiamonds in composites, 2017-2033 (tons).

##### 4.4.4 Metal-matrix composites

#### 4.4.4.1 Market overview

4.4.4.2 Global market consumption of nanodiamonds in metal-matrix composites, 2017-2033 (tons).

### 4.5 SKINCARE

#### 4.5.1 Market for nanodiamonds in skincare

#### 4.5.2 Applications, key benefits, trends, market drivers and competing materials

#### 4.5.3 Global market consumption of nanodiamonds in skincare, 2017-2033 (tons).

### 4.6 ENERGY STORAGE

#### 4.6.1 BATTERIES

##### 4.6.1.1 Market for nanodiamonds in batteries

##### 4.6.1.2 Applications, key benefits, trends, market drivers and competing materials

##### 4.6.1.3 Global market consumption of nanodiamonds in batteries, 2020-2033 (tons).

#### 4.6.2 SUPERCAPACITORS

##### 4.6.2.1 Market for nanodiamonds in supercapacitors.

##### 4.6.2.2 Applications, key benefits, trends, market drivers and competing materials

4.6.2.3 Global market consumption of nanodiamonds in supercapacitors, 2017-2033 (tons).

### 4.7 DRUG DELIVERY

#### 4.7.1 Market for nanodiamonds in drug delivery

#### 4.7.2 Applications, key benefits, trends, market drivers and competing materials

## 5 PRICING OF NANODIAMONDS

## 6 NANODIAMOND PRODUCERS AND PRODUCT DEVELOPER PROFILES 72 (30 COMPANY PROFILES)

## 7 EX-PRODUCERS

## 8 REFERENCES

## List Of Tables

### LIST OF TABLES

Table 1. Properties of nanodiamonds.

Table 2. Summary of types of NDS and production methods-advantages and disadvantages.

Table 3. Markets, benefits and applications of nanodiamonds.

Table 4. Nanomaterial lubricant products.

Table 5. Market overview for nanodiamonds in lubricants-market maturity, market demand, competitive landscape.

Table 6. Market and applications for nanodiamonds in lubricants-applications, benefits, market megatrends, market drivers for use of nanodiamonds, technology challenges, competing materials, market demand.

Table 7. Market consumption of nanodiamonds in lubricants 2017-2033 (tons)

Table 8. Market overview for NDs in polishing materials-market maturity, market demand, competitive landscape.

Table 9. Market and applications for nanodiamonds in polishing materials-applications, benefits, market megatrends, market drivers for use of nanodiamonds, technology challenges, competing materials, market demand.

Table 10. Global market consumption of nanodiamonds in polishing additives, 2017-2033(tons).

Table 11. Market overview for NDs in electroplating and anti-friction/wear coatings-market maturity, market demand, competitive landscape

Table 12. Market and applications for NDs in electroplating and anti-wear/friction coatings-applications, benefits, market megatrends, market drivers for use of nanodiamonds, technology challenges, competing materials, market demand

Table 13. Global market consumption of nanodiamonds in electroplating and anti-wear/friction coatings, 2017-2033 (tons).

Table 14. Market overview for nanodiamonds in composites-market maturity, market demand, competitive landscape

Table 15. Market overview for nanodiamonds in fiber-based polymer composite parts.

Table 16. Market and applications for nanodiamonds in fiber-based composite parts-applications, benefits, market megatrends, market drivers for use of nanodiamonds, technology challenges, competing materials, market demand

Table 17. Global market consumption of nanodiamonds in thermosets, 2017-2033 (tons).

Table 18. Global market consumption of nanodiamonds in thermoplastics, 2017-2033 (tons).

Table 19. Market and applications for NDs in metal matrix composites-market maturity, market demand, competitive landscape.

Table 20. Global market consumption of nanodiamonds in metal-matrix composites, 2017-2033 (tons).

Table 21. Market overview for NDs in skincare (cosmetics).

Table 22. Market and applications for nanodiamonds in skincare (cosmetics)-applications, benefits, market megatrends, market drivers for use of nanodiamonds, technology challenges, competing materials, market demand

Table 23. Global market consumption of nanodiamonds in skincare, 2017-2033 (tons).

Table 24. Market overview for nanodiamonds in batteries -market maturity, market demand, competitive landscape.

Table 25. Market and applications for NDs in batteries- applications, benefits, market megatrends, market drivers for use of nanodiamonds, technology challenges, competing materials, market demand.

Table 26. Global market consumption of nanodiamonds in batteries, 2020-2033 (tons).

Table 27. Market overview for nanodiamonds in supercapacitors-market maturity, market demand, competitive landscape.

Table 28. Market and applications for nanodiamonds in supercapacitors- applications, benefits, market megatrends, market drivers for use of nanodiamonds, technology challenges, competing materials, market demand.

Table 29. Global market consumption of nanodiamonds in supercapacitors, 2017-2033 (tons).

Table 30. Market overview for NDs in drug delivery.

Table 31. Different nanoparticle vehicles used in nanomedicine.

Table 32. FDA-approved nanotechnology-based products and clinical trials.

Table 33. NDs for drug delivery-applications, benefits, market megatrends, market drivers for use of nanodiamonds, technology challenges, competing materials, market demand.

Table 34. Pricing of nanodiamonds, by producer/distributor.

Table 35. Production methods, by main ND producers.

Table 36. Adamas Nanotechnologies, Inc. nanodiamond product list.

Table 37. Carbodeon Ltd. Oy nanodiamond product list.

Table 38. Daicel nanodiamond product list.

Table 39. FND Biotech Nanodiamond product list.

Table 40. JSC Sinta nanodiamond product list.

Table 41. Plasmachem product list and applications.

Table 42. Ray-Techniques Ltd. nanodiamonds product list.

Table 43. Comparison of ND produced by detonation and laser synthesis.

Table 44. Ex-producers of nanodiamonds.





## List Of Figures

### LIST OF FIGURES

Figure 1. Detonation Nanodiamond.

Figure 2. DND primary particles and properties.

Figure 3. Functional groups of Nanodiamonds.

Figure 4. Market consumption of nanodiamonds in lubricants, 2017-2033 (tons).

Figure 5. Global market consumption of nanodiamonds in polishing additives, 2017-2033(tons).

Figure 6. Global market consumption of nanodiamonds in electroplating and anti-wear/friction coatings, 2017-2033 (tons).

Figure 7. Global market consumption of nanodiamonds in thermosets, 2017-2033 (tons).

Figure 8. Global market consumption of nanodiamonds in thermoplastics, 2017-2033 (tons).

Figure 9. Global market consumption of nanodiamonds in metal-matrix composites, 2017-2033 (tons).

Figure 10. Prototypes of nanodiamonds, fullerene and lignin sunscreen.

Figure 11. Global market consumption of nanodiamonds in skincare, 2017-2033 (tons).

Figure 12. Global market consumption of nanodiamonds in batteries, 2020-2033 (tons).

Figure 13. Global market consumption of nanodiamonds in supercapacitors, 2017-2033 (tons).

Figure 14. Application of NDs in biomedicine based on synthesis method.

Figure 15. NBD battery.

Figure 16. Neomond dispersions.

Figure 17. Visual representation of graphene oxide sheets (black layers) embedded with nanodiamonds (bright white points).

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