

The Global Market for Nanodiamonds 2023-2033

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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 (1.0×10^{-6} K⁻¹)

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 m²/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.

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