

The Global Market for Lab-Grown Diamonds and Nanodiamonds 2022-2033

<https://marketpublishers.com/r/G457481A119CEN.html>

Date: September 2022

Pages: 120

Price: US\$ 1,250.00 (Single User License)

ID: G457481A119CEN

Abstracts

A diamond possesses the highest chemical stability, as well as unique conductivity and thermal shock resistance. Lab-grown diamonds have recently risen to prominence as replacement for natural diamonds. The fine jewellery market is the main customer for lab-grown diamonds. However, other applications are also being developed in thermal management, optics, quantum computing, high-power electronics and diamond detectors.

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} – 10^{14} 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 lab-grown diamonds and nanodiamonds and properties.

Production methods by producer.

Applications, benefits, market megatrends, market drivers for use of lab-grown diamonds and nanodiamonds, technology challenges, competing materials, market demand.

Competitive landscape.

Markets for lab-grown diamonds and nanodiamonds including lubricants

electroplating and anti-wear/friction coatings

polishing materials

biomedicine

composites

thermoplastics

skincare

energy storage

thermal management

optics

quantum computing

high-power electronics

diamond detectors.

Lab-grown diamonds and nanodiamonds pricing.

Global market consumption of lab-grown diamonds and nanodiamonds to 2033

In depth company profiles including types produced, products, target markets, production capabilities, contact details. Companies profiled include Adamas, Appsilon Enterprise, Carbodean, Daicel, Lusix, NDB, Quantum Brilliance, Ray Techniques etc.

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