Quantum Dots Market: Global Industry Trends, Share, Size, Growth, Opportunity and Forecast 2023-2028

Market Report | 2023-07-05 | 143 pages | IMARC Group

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Report description:

Market Overview:

The global quantum dots market size reached US$ 6.5 Billion in 2022. Looking forward, IMARC Group expects the market to reach US$ 25.4 Billion by 2028, exhibiting a growth rate (CAGR) of 23.4% during 2023-2028.

Quantum dots, also known as QDs or fluorescent semiconductor nanocrystals, are tiny structures that emit light in only one color, which is determined by their shape and size. They have broad absorption spectra; massive Stokes shift; high quantum yield, photostability and molar extinction coefficients; and their emission wavelengths span from the ultraviolet (UV) to the infrared (IR) range. QDs have gradually replaced the conventional fluorophores, with their increasing usage in microarrays, immunoassays, fluorescence imaging, targeted drug delivery and therapy. QD-based materials have a longer life, purer colors, and lower manufacturing cost and power consumption as compared to organic luminescent materials, thus enabling manufacturers to produce next-generation displays affordably and efficiently.

Quantum dot solar cells (QDSC) convert the sun's energy into electricity, thereby increasing the amount of electricity produced by the solar cells. This aids in the production of solar energy in a cost-effective manner while reducing the amount of wasteful heat generated in the process. Moreover, the size and composition of tiny, semiconducting quantum dots make them suitable for a wide variety of applications. For instance, in the medical sector, these nanoparticles are used for different biomedical applications, including medical imaging and biosensors. Besides this, quantum dots also enable researchers to study cell processes and improve the diagnosis and treatment of chronic diseases such as cancer. The ongoing research on the usage of quantum dots in displays, ranging from small to large television screens, which would consume less power than that is used in current displays, is also driving the market growth. Researchers are also dedicating resources for finding efficient and universal methods for the synthesis of Graphene Quantum Dots (GQDs) with high stability, tunable PL emission wavelength and controllable surface properties. Furthermore, QDs have gained immense popularity as their integration with various nanomaterials, such as noble

metal nanoparticles, carbon allotropes, upconversion nanoparticles (UCNPs), metal oxides and metal-organic frameworks (MOFs) has provided new opportunities and possibilities in the fields of nanoscience and nanotechnology.

Key Market Segmentation:
IMARC Group provides an analysis of the key trends in each sub-segment of the global quantum dots market report, along with forecasts at the global, regional and country level from 2023-2028. Our report has categorized the market based on processing techniques, application, material and end-use industry.

Breakup by Processing Techniques:

Colloidal Synthesis
Fabrication
Lithography
Electron Beam Lithography
Soft Lithography
Stencil Lithography
Nanolithography
Photopatternable Arrays
Bio-Molecular Self-Assembly
Viral Assembly
Electrochemical Assembly
Others

Breakup by Application:

Medical Devices
Displays
Solar Cells
Photodetectors Sensors
Lasers
LED Lights
Batteries & Energy Storage Systems
Transistors
Others

Breakup by Material:

Cadmium Based QD
Cadmium Selenide
Cadmium Sulfide
Cadmium Telluride
Cadmium Free QD
Indium Arsenide
Silicon
Graphene
Lead Sulfide

Breakup by End-Use Industry:

Healthcare
Optoelectronics
LED Lighting
Solar Modules
Others

Breakup by Region:

North America
United States
Canada
Asia Pacific
China
Japan
India
South Korea
Australia
Indonesia
Others
Europe
Germany
France
United Kingdom
Italy
Spain
Russia
Others
Latin America
Brazil
Mexico
Argentina
Colombia
Chile
Peru
Others
Middle East and Africa
Turkey
Saudi Arabia
Iran
United Arab Emirates
Others

Competitive Landscape:

The report has also analysed the competitive landscape of the market with some of the key players being Altairnano, ams-OSRAM International GmbH, LG Display Co. Ltd, Nanoco Group plc., Nanosys Inc., Ocean NanoTech LLC, QD Laser, Quantum Materials Corp., Samsung Display Co. Ltd. (Samsung Electronics Co. Ltd) and Thermo Fisher Scientific Inc.

Key Questions Answered in This Report

1. What was the size of the global quantum dots market in 2022?
2. What is the expected growth rate of the global quantum dots market during 2023-2028?
3. What are the key factors driving the global quantum dots market?
4. What has been the impact of COVID-19 on the global quantum dots market?
5. What is the breakup of the global quantum dots market based on the processing techniques?
6. What is the breakup of the global quantum dots market based on the application?
7. What is the breakup of the global quantum dots market based on the material?
8. What is the breakup of the global quantum dots market based on the end-use industry?
9. What are the key regions in the global quantum dots market?
10. Who are the key players/companies in the global quantum dots market?

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