Nanotechnology in Energy Applications

Market Research Report | 2023-07-12 | 205 pages | BCC Research

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Report description:

Description

Report Scope:

This report examines nanotechnology in energy industry applications. Definitive and detailed estimates and forecasts of the global market are provided, followed by a detailed analysis of the nanomaterials, energy application and regions. Ongoing market trends, growth drivers and challenges impeding the market are discussed. The report will analyze global nanotechnology in energy markets by material, applications and geography. It will also focus on the regulations and government-supported programs impacting this market. Regionally, the focus of study will be the markets of North America, Europe, Asia-Pacific, and the Rest of the World (RoW).

The report focuses on the global market for nanoscale materials (e.g., nanopowders, nanocomposites, nanoscale thin films, and others) and devices (e.g., nanosensors) used in renewable and nonrenewable energy production (e.g., petroleum refining, solar energy) and energy storage (e.g., batteries and fuel cells). In the other types of applications (e.g., energy transmission, energy conversion, energy end uses), nanotechnology consumption is almost negligible.

The report concentrates on nanotechnology applications that are currently in commercial use or are likely to be commercialized by 2028. Other applications that, while promising, are not likely to make it out of the laboratory by 2028, are not covered in depth. It is worth noting that, unlike the previous versions of this report, these figures do not include consumption of industrial enzymes, as enzymes are not included in most assessments of the overall nanomaterials market.

The report does not cover nanoscale materials and devices used to monitor and/or control the environmental impacts of energy production or uses such as nanomaterials in automotive catalytic converters. These technologies are outside the scope of this study and are covered in detail in several other BCC Research reports such as report NAN039C, Nanotechnology in Environmental

Applications.

Using 2022 as the base year, the report provides estimated market data for the forecast period from 2023 to 2028. The market size for different regions (regions by application) will also be covered. The impact of COVID-19 was also considered when deriving market estimations. Sales value estimates are based on prices in the supply chain. Market-driving forces and industry structure are examined. International aspects are analyzed for all global regions.

In 2020, the growth rate of global manufacturing industries was severely affected by the COVID-19 pandemic. The pandemic halted progress in every regional economy. Governments took measures to contain the economic slowdown.

Report Includes:

- 33 tables and 62 additional tables
- Detailed overview and an up-to-date analysis of the global market for nanotechnology in energy applications
- Analyses of the global market trends, with market revenue (sales figures) for 2022, estimates for 2023, and projections of compound annual growth rates (CAGRs) through 2028
- Estimation of the actual market size and revenue forecast for global nanotechnology in energy applications market, and corresponding market share analysis based on material, application, and region
- Characterization and quantification of the market potential for each short-listed nanoscale materials and devices used in energy production or conservation applications, and identification of the main prerequisites that are still under development for commercial success
- A look at various factors involved in driving product demand in conjunction with trends, potential sales, and forecasts for major energy source markets and specific geographical markets
- Identification of nanotechnology applications that are currently in commercial use or are likely to be commercialized by 2028
- Estimation of potential net impact of nanoscale materials and devices on the global energy balance
- Detailed understanding of the importance of ESG in the nanotechnology in energy industry, key issues in implementing ESG principles, standard ESG practices by companies, as well as the current status and future of ESG considerations in nanotechnology for energy applications
- Review of key patent grants on nanotechnology applications in energy sector, and new and emerging developments in the global market
- Updated information on recent industry acquisitions, partnerships, agreements, collaborations, and other strategic alliances in the global nanotechnology in energy applications market
- Identification of major stakeholders and analysis of the company competitive landscape based on their recent developments, financial performance, segmental revenues, and operational integration
- Descriptive company profiles of the leading global players of the industry, including A123 Systems LLC, The Chemours Co., Honeywell International Inc., Nanosolar Inc. and Solaronix

Executive Summary

Summary:

Nanotechnology contributes to the development of more efficient fuel cells by improving catalysts and electrode materials. Nanostructured catalysts, such as platinum nanoparticles, provide larger surface areas and enhance reaction kinetics, making fuel cells more efficient and cost-effective. As the world seeks cleaner and more sustainable energy alternatives, fuel cells are gaining attention due to their low carbon emissions and high energy efficiency. Governments, industries and consumers are increasingly adopting fuel cells as a clean energy solution to reduce greenhouse gas emissions and combat climate change.

Key drivers for the growth of the market for nanotechnology in energy applications over the forecast period are the strong shift in trend toward energy security applications of nanotechnology in fuel cells and developing transport infrastructure. Nanomaterials offer opportunities for mitigating environmental challenges in the energy sector. For example, nanomaterials can aid in capturing and storing carbon dioxide emissions, contributing to carbon sequestration and reducing greenhouse gas emissions. The development of nanomaterials for environmental remediation aligns with the sustainability goals of the energy sector.

The nanotechnology industry is characterized by intense rivalry among its major players. Rising competition is continuously helping in product differentiation, cost reduction and innovation, which fuels market development. The industry is driven by technological innovation, with companies constantly developing new and improved products with integration of nanotechnology. Acquisition, capacity expansion and technological collaborations are other trends observed in the industry ecosystem.

While nanotechnology offers immense potential for the energy sector, there are some challenges that need to be addressed for its successful implementation. The potential health and environmental impacts of nanomaterials is a significant concern. It is essential to understand and mitigate any risks associated with the production, use and disposal of nanomaterials in the energy sector. Robust safety standards, regulations and responsible manufacturing practices are necessary to address these concerns.

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