Cerium Oxide Nanoparticles Market Size and Analysis, Trends, Recent Developments, and Forecast Till 2028

Cerium Oxide Nanoparticles Market Size - USD 378.3 Million in 2020, CAGR of 19.60%. Synthesis of nanoceria for safe and efficient use in pharmacology processes

Reports And Data

NEW YORK CITY, NY, UNITED STATES, October 27, 2021 /EINPresswire.com/ -- Increased research and development activities for safe and efficient use of cerium oxide nanoparticles, increased demand of cerium oxide nanoparticles from different sectors owing to a wide range of applicability coupled with abundant availability of cerium element are key factors contributing to high CAGR of Cerium oxide nanoparticles during the forecast period.

The global Cerium oxide nanoparticles market was valued at USD 378.3 Million in 2020 and is expected to reach USD 1,595.7 Million by the year 2028, at a CAGR of 19.60%. Cerium is a rare earth material that belongs to a lanthanide group of elements. Cerium reacts with oxygen to form cerium oxide nanoparticles, which have a wide range of applications across all fields. Cerium element is found in abundance, which has increased its importance in various biochemical, biomedical, and catalytic applications like low-temperature water-shift reaction, solar cells, oxygen sensors, auto-exhaust catalysts, glass polishing materials, cosmetics, and oxidation-resistant coatings. In small quantities, these are added to the end-products to improve the product's performance. However, excess use of cerium oxide nanoparticles can lead to toxicity. Cerium oxide has gained considerable importance in the medical field owing to its excellent self-regenerating antioxidant properties. It serves as a promising antioxidant for the treatment of various oxidative stress-related diseases. One of the significant challenges that still need to be solved is the safe and efficient use of cerium oxide nanoparticles in the pharmacological agents since nanoparticles tend to agglomerate, which can lead to toxicity and detrimental side-effects.

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Additionally, cerium oxide nanoparticles are extensively used in chemical mechanical planarization (CMP), corrosion protection, fuel oxidation catalysis, and automotive exhaust treatment. Cerium oxide nanoparticles also exhibit bio-relevant activities like mimicking superoxide dismutase (SOD), peroxidase, oxidase, phosphatase, and scavenging hydroxyl radicals. Thus, a wide range of unique properties coupled with increased applications in various fields is driving the market growth.

Some of the key factors propelling the cerium oxide nanoparticles market growth include increased demand for cerium oxide in various industrial applications, high penetration of cerium oxide in commercial uses, increase in research and development activity, synthesis of nanoceria for safe and efficient implementation in pharmaceuticals and price drop of cerium oxide nanoparticles. However, the market growth is expected to be hindered by factors like increased toxicity on excess use of cerium oxide nanoparticles, negative impact on health and environment, and the tendency of cerium oxide nanoparticles to agglomerate.

For making high-sensitive biosensor, Cerium oxide nanoparticles have been used. They are used as whole sensor or a part of the transducer element. Because of this there is certainty for cerium oxide nanoparticles to grow in the near future. North America has been one of the regions where there has been research and development in production of cerium oxide nanoparticles, as it is expected to favor the market growth. A region like Asia Pacific is about to see significant growth in coming years for these particles due to rise in the demand of medical and automotive sectors.

Key participants include

Cerion (US)
Plasmachem (Germany)
American Elements (US)
Inframat Advanced Materials (US)
NYACOL Nano Technologies (US)
Nanophase Technologies (US)
Meliorum Technologies
SkySpring Nanomaterials
American Elements
Strem Chemicals

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For this report, Reports and Data have segmented the Cerium oxide nanoparticles market based on the form type, application type, end-use, and region:
Form Type (Revenue, USD Million; 2018–2028)

Dispersion
Powder

Application Type (Revenue, USD Million; 2018–2028)

Catalyst
Biomedical

Chemical Mechanical Planarization (CMP)

Polishing
Others

End-Use (Revenue, USD Million; 2018–2028)

Cosmetic
Chemical
Medical
Others

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Regional Outlook (Revenue in USD Million; 2018–2028)

North America
Europe
Asia Pacific
Middle East & Africa
Latin America

Further key findings from the report suggest

Cerium oxide nanoparticles market is growing at a CAGR of 5% in the Asia Pacific, followed by North America and Europe, with 19.4 % and 19.3% CAGR, respectively. Increased R&D activities, coupled with high penetration of cerium oxide nanoparticles in various industrial applications, are expected to drive the market growth.

As of 2018, Dispersion form type is the dominating Cerium oxide nanoparticle, which holds 64.1% of the global market. North American regional market is the chief revenue-generating source for this product segment, followed by Europe and Asia-Pacific regions

An increase in applications and demand from various end-use industries coupled with funding

support from research & development and decrease in cerium oxide nanoparticles are expected to drive the market growth.

The key market players are adopting strategies like launching new products to satisfy a large number of customers. For example, Cerion advanced materials announced a cost-effective, flexible synthesis process that yields high-purity ceria nanoparticle dispersions suited for chemical mechanical planarization (CMP) and other polishing applications.

Exposure to cerium oxide nanoparticle through inhalation is a significant concern as the lungs and lymph nodes associated with are targeted first and later get distributed to other parts like spleen, liver, and kidney.

According to research, it was observed that exposure to high doses of nanoceria resulted in DNA damage in liver cells and peripheral blood leukocytes, cytogenetic changes, and micronucleus formation in the bone marrow.

For the production of bio-relevant nanoparticle, synthesis parameters need to be carefully optimized to select for beneficial physiochemical properties.

Cerium oxide nanoparticles assist in inhibited production of reactive oxygen species, cell migration, and invasion of ovarian cancer cells without affecting the healthy cells and successfully curbing the growth of cancerous cells.

Green synthesis methods that use biocompatible stabilizers are increasingly gaining relevance in the production of cerium oxide nanoparticles and their biomedical applications.

One of the significant issues that still need to be solved for safe and efficient use of CNPs as pharmacological agents is their tendency to agglomerate, experienced when CNPs are suspended in aqueous solutions as well as in vivo and physiological media.

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