

Scandium Market Size and Forecast (2021 - 2031), Global and Regional Share, Trend, and Growth Opportunity Analysis Report Coverage: By Derivative (Oxide, Iodide, Alloy, Zirconia, and Others) and Application (Aerospace and Defense, Solid Oxide Fuel Cells, Electronics, Ceramics, Lighting, Nuclear Applications, 3D Printing, and Others)

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Abstracts

The scandium market size was valued at US\$ 230.26 million in 2023 and is projected to reach US\$ 1,660.13 million by 2031; it is estimated to register a CAGR of 28.0% from 2023 to 2031.

Scandium is known for its ability to confer high strength, lightweight, and corrosion resistance in end products, which makes it a valuable alloying agent. These unique properties primarily drive the demand for scandium as an alloying agent. The aerospace and automotive industries are major consumers, wherein aluminum alloys reinforced with scandium offer a combination of strength, lightness, and corrosion resistance. In aerospace, scandium–aluminum alloys contribute to fuel efficiency and emissions reduction in aircraft, while in automotive applications, they improve performance and fuel efficiency by reducing weight. Additionally, scandium finds use in solid oxide fuel cells (SOFCs) and high-intensity discharge lamps. However, scandium's limited availability poses challenges to its supply chain. Most scandium is obtained as a byproduct of other mining activities, with Australia and China being major producers. The market experiences volatility in prices due to fluctuations in supply and demand dynamics. Efforts to increase primary production and develop more efficient extraction methods are underway to meet growing demand, which is likely to favor the expansion of the scandium market size by 2030. The rising demand from the 3D printing industry

contributes significantly to the scandium market growth. Scandium-containing metal alloys exhibit improved mechanical properties, corrosion resistance, and heat resistance, which make them an attractive choice for producing high-performance components using 3D printers. In additive manufacturing, scandium–aluminum alloys are gaining attention for their superior strength-to-weight ratio and enhanced mechanical properties compared to traditional metals and metal alloys.

Based on derivative, the market is segmented into oxide, iodide, alloy, zirconia, and others. The zirconia segment accounts for a significant scandium market share. Scandium-stabilized zirconia (ScSZ) represents a class of advanced ceramic materials. This material is primarily composed of zirconium dioxide (ZrO₂), which is added with scandium oxide to stabilize its crystal structure. The incorporation of scandium ions into the zirconia lattice alters its properties, resulting in enhanced thermal stability, mechanical strength, and ionic conductivity. In terms of thermal stability, ScSZ exhibits remarkable resistance to phase transformation even at high temperatures, which is a critical attribute for applications in extreme thermal environments. Thus, the ability to withstand high temperatures renders zirconia an ideal candidate for use in thermal barrier coatings (TBCs) for gas turbine engine components; the material provides insulation and protection against heat, extending component lifetimes and enhancing efficiency. Further, the stabilized crystal structure of ScSZ contributes to its superior mechanical properties, including high fracture toughness and strength.

In 2023, Asia Pacific held a significant share of the scandium market. Rapid economic progress and industrialization in Asia Pacific bolster the demand for high-performance materials to support infrastructure development and urbanization. Asia Pacific is home to some of the world's largest and fastest-growing aerospace and automotive industries, which are major consumers of lightweight and high-strength scandium-containing alloys. These alloys are particularly valuable in aircraft components, automotive parts, and structural materials, among other applications, wherein reducing weight while maintaining performance is crucial for enhancing the final products' fuel efficiency, range, and safety standards.

Scandium International Mining Corporation, American Elements Inc, NioCorp Development Ltd, Strategic Metal Investments Ltd, Rio Tinto, US Research Nanomaterials Inc, Otto Chemie Pvt Ltd, Stanford Advanced Materials, Heeger Materials Inc, and Hunan Oriental Scandium Co Ltd. are among the prominent players profiled in the scandium market report. In addition, several other players have been studied and analyzed during the study to get a holistic view of the market and its ecosystem. The scandium market report also includes company positioning and

concentration to evaluate the performance of competitors/players in the market.

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The overall global scandium market size has been derived using both primary and secondary sources. To begin the research process, exhaustive secondary research has been conducted using internal and external sources to obtain qualitative and quantitative information related to the market. Also, multiple primary interviews have been conducted with industry participants to validate the data and gain more analytical insights into the topic. Participants in this process include industry experts such as VPs, business development managers, market intelligence managers, and national sales managers, along with external consultants such as valuation experts, research analysts, and key opinion leaders specializing in the scandium market.

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