

# Global Nuclear-grade Zirconium Oxychloride Market Growth 2026-2032

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## Abstracts

The global Nuclear-grade Zirconium Oxychloride market size is predicted to grow from US\$ 100 million in 2025 to US\$ 139 million in 2032; it is expected to grow at a CAGR of 4.7% from 2026 to 2032.

Global production of nuclear-grade zirconium oxychloride is projected to reach 7,000 tonnes in 2025, with an average price of \$14,532 per tonne.

Nuclear-grade zirconium oxychloride is a high-purity, low-hafnium zirconium salt intermediate produced from zircon sand or industrial-grade zirconium oxychloride through processes such as dissolution, extraction, ion exchange, crystallization, zirconium-hafnium separation, and impurity control. It is primarily used to manufacture nuclear-grade zirconium oxide, nuclear-grade zirconium sponge, nuclear-grade zirconium alloys, and related structural materials for nuclear reactors.

The raw material system for nuclear-grade zirconium oxychloride centers on zircon sand ( $\text{ZrSiO}_3$ ), supplemented by caustic soda ( $\text{NaOH}$ ), hydrochloric acid ( $\text{HCl}$ ), extractants, and organic solvents. Zircon sand serves as the sole source of zirconium; global resources are highly concentrated in Australia and South Africa, and China relies on imports for over 90% of its supply. Nuclear-grade zirconium oxychloride imposes stricter quality requirements on zircon sand, necessitating the selection of high-quality ore sources with low radioactivity and low impurity levels. Producing one tonne of nuclear-grade zirconium oxychloride consumes approximately 0.6–0.7 tonnes of zircon sand; however, due to the zirconium-hafnium separation process, the actual yield is far lower than that of industrial-grade products—for instance, separating 10,000 tonnes of standard zirconium oxychloride yields only about 3,000 tonnes of nuclear-grade zirconium oxide. Caustic soda and hydrochloric acid are used for alkali fusion

decomposition and acid leaching conversion, with consumption levels comparable to those for standard zirconium oxychloride. Extractants—such as TOPO (trioctylphosphine oxide), Cyanex 272 (a phosphoric acid-based extractant), and sulfonated kerosene—are critical auxiliary materials for nuclear-grade products; these expensive organic reagents require periodic replacement, significantly driving up costs. Furthermore, nuclear-grade standards mandate strict requirements regarding production environments, equipment materials, and personnel qualifications, necessitating massive investments in cleanrooms, specialized alloy equipment, and radiation protection facilities.

In terms of cost structure, raw materials form the foundation of nuclear-grade zirconium oxychloride production, accounting for approximately 30%–40% of total costs. While zircon sand constitutes the largest share of raw material costs, the unit costs of specialized reagents—such as extractants—are far higher than those used for standard industrial-grade products. The cost of zirconium-hafnium separation represents the largest incremental cost distinguishing nuclear-grade products from industrial-grade ones, accounting for approximately 25%–35% of the total cost. This includes expenses such as extractant consumption, organic phase regeneration, the operation of multi-stage extraction equipment, and zirconium loss during the separation process (approx. 1–3%); this is the primary reason why nuclear-grade product costs are significantly higher than those of industrial-grade products. Equipment and facility costs account for approximately 15%–20%; nuclear-grade production requires specialized corrosion-resistant alloy equipment (e.g., Hastelloy reactors), sealed extraction systems, radiation monitoring devices, and cleanroom facilities, resulting in investment costs far exceeding those of standard production lines. Quality inspection and certification costs account for approximately 5%–10%; nuclear-grade products must undergo rigorous chemical composition analysis (e.g., ICP-MS to detect hafnium content at the ppm level), metallographic inspection, mechanical property testing, and irradiation testing, all of which involve long testing cycles and high expenses. Environmental protection and safety costs account for approximately 5%–10%; nuclear-grade production involves the management of radioactive materials, organic solvent recovery, and waste liquid treatment, leading to extremely high compliance costs. Labor and management costs account for approximately 5%–10%; nuclear-grade production lines impose strict qualification requirements on technical personnel, necessitating professionals with backgrounds in nuclear engineering.

United States market for Nuclear-grade Zirconium Oxychloride is estimated to increase from US\$ million in 2025 to US\$ million by 2032, at a CAGR of % from 2026 through 2032.

China market for Nuclear-grade Zirconium Oxychloride is estimated to increase from US\$ million in 2025 to US\$ million by 2032, at a CAGR of % from 2026 through 2032.

Europe market for Nuclear-grade Zirconium Oxychloride is estimated to increase from US\$ million in 2025 to US\$ million by 2032, at a CAGR of % from 2026 through 2032.

Global key Nuclear-grade Zirconium Oxychloride players cover Zhonghe Jinghuan Zirconium Industry, Sanxiang Advanced Materials, Orient Zirconic Ind Sci & Tech, Framatome Jarrie, ATI Materials, etc. In terms of revenue, the global two largest companies occupied for a share nearly % in 2025.

LP Information, Inc. (LPI) ' newest research report, the "Nuclear-grade Zirconium Oxychloride Industry Forecast" looks at past sales and reviews total world Nuclear-grade Zirconium Oxychloride sales in 2025, providing a comprehensive analysis by region and market sector of projected Nuclear-grade Zirconium Oxychloride sales for 2026 through 2032. With Nuclear-grade Zirconium Oxychloride sales broken down by region, market sector and sub-sector, this report provides a detailed analysis in US\$ millions of the world Nuclear-grade Zirconium Oxychloride industry.

This Insight Report provides a comprehensive analysis of the global Nuclear-grade Zirconium Oxychloride landscape and highlights key trends related to product segmentation, company formation, revenue, and market share, latest development, and M&A activity. This report also analyzes the strategies of leading global companies with a focus on Nuclear-grade Zirconium Oxychloride portfolios and capabilities, market entry strategies, market positions, and geographic footprints, to better understand these firms' unique position in an accelerating global Nuclear-grade Zirconium Oxychloride market.

This Insight Report evaluates the key market trends, drivers, and affecting factors shaping the global outlook for Nuclear-grade Zirconium Oxychloride and breaks down the forecast by Type, by Application, geography, and market size to highlight emerging pockets of opportunity. With a transparent methodology based on hundreds of bottom-up qualitative and quantitative market inputs, this study forecast offers a highly nuanced view of the current state and future trajectory in the global Nuclear-grade Zirconium Oxychloride.

This report presents a comprehensive overview, market shares, and growth opportunities of Nuclear-grade Zirconium Oxychloride market by product type,

application, key manufacturers and key regions and countries.

## **Segmentation by Type:**

Wet Extraction Route

Ion Exchange Route

Chlorination-rectification/Molten Salt Separation Route

## **Segmentation by Hafnium Content:**

Hf < 0.01%

Hf < 0.005%

Hf < 0.001%

## **Segmentation by Nuclear Reactor Type:**

Pressurized Water Reactor (PWR)

Boiling Water Reactor (BWR)

Heavy Water Reactor (CANDU)

Others

## **Segmentation by Application:**

Nuclear-grade Zirconium Oxide

Nuclear-grade Zirconium Sponge

Nuclear-grade Zirconium Alloy

Others

## **This report also splits the market by region:**

Americas

United States

Canada

Mexico

Brazil

APAC

China

Japan

Korea

Southeast Asia

India

Australia

Europe

Germany

France

UK

Italy

Russia

Middle East & Africa

Egypt

South Africa

Israel

Turkey

GCC Countries

The below companies that are profiled have been selected based on inputs gathered from primary experts and analysing the company's coverage, product portfolio, its market penetration.

Zhonghe Jinghuan Zirconium Industry

Sanxiang Advanced Materials

Orient Zirconic Ind Sci & Tech

Framatome Jarrie

ATI Materials

Nuclear Fuel Complex

Chepetsky Mechanical Plant

## **Key Questions Addressed in this Report**

What is the 10-year outlook for the global Nuclear-grade Zirconium Oxychloride market?

What factors are driving Nuclear-grade Zirconium Oxychloride market growth, globally and by region?

Which technologies are poised for the fastest growth by market and region?

How do Nuclear-grade Zirconium Oxychloride market opportunities vary by end market size?

How does Nuclear-grade Zirconium Oxychloride break out by Type, by Application?

## Contents

### 1 SCOPE OF THE REPORT

- 1.1 Market Introduction
- 1.2 Years Considered
- 1.3 Research Objectives
- 1.4 Market Research Methodology
- 1.5 Research Process and Data Source
- 1.6 Economic Indicators
- 1.7 Currency Considered
- 1.8 Market Estimation Caveats

### 2 EXECUTIVE SUMMARY

#### 2.1 World Market Overview

- 2.1.1 Global Nuclear-grade Zirconium Oxychloride Annual Sales 2021-2032
- 2.1.2 World Current & Future Analysis for Nuclear-grade Zirconium Oxychloride by Geographic Region, 2021, 2025 & 2032
- 2.1.3 World Current & Future Analysis for Nuclear-grade Zirconium Oxychloride by Country/Region, 2021, 2025 & 2032
- 2.2 Nuclear-grade Zirconium Oxychloride Segment by Type
  - 2.2.1 Wet Extraction Route
  - 2.2.2 Ion Exchange Route
  - 2.2.3 Chlorination-rectification/Molten Salt Separation Route
  - 2.2.4 Nuclear-grade Zirconium Oxychloride Sales by Type
    - 2.2.4.1 Global Nuclear-grade Zirconium Oxychloride Sales Market Share by Type (2021-2026)
    - 2.2.4.2 Global Nuclear-grade Zirconium Oxychloride Revenue and Market Share by Type (2021-2026)
    - 2.2.4.3 Global Nuclear-grade Zirconium Oxychloride Sale Price by Type (2021-2026)
- 2.3 Nuclear-grade Zirconium Oxychloride Segment by Hafnium Content
  - 2.3.1 Hf < 0.01%
  - 2.3.2 Hf < 0.005%
  - 2.3.3 Hf < 0.001%
  - 2.3.4 Nuclear-grade Zirconium Oxychloride Sales by Hafnium Content
    - 2.3.4.1 Global Nuclear-grade Zirconium Oxychloride Sales Market Share by Hafnium Content (2021-2026)
    - 2.3.4.2 Global Nuclear-grade Zirconium Oxychloride Revenue and Market Share by

## Hafnium Content (2021-2026)

### 2.3.4.3 Global Nuclear-grade Zirconium Oxychloride Sale Price by Hafnium Content (2021-2026)

## 2.4 Nuclear-grade Zirconium Oxychloride Segment by Nuclear Reactor Type

### 2.4.1 Pressurized Water Reactor (PWR)

### 2.4.2 Boiling Water Reactor (BWR)

### 2.4.3 Heavy Water Reactor (CANDU)

### 2.4.4 Others

### 2.4.5 Nuclear-grade Zirconium Oxychloride Sales by Nuclear Reactor Type

#### 2.4.5.1 Global Nuclear-grade Zirconium Oxychloride Sales Market Share by Nuclear Reactor Type (2021-2026)

#### 2.4.5.2 Global Nuclear-grade Zirconium Oxychloride Revenue and Market Share by Nuclear Reactor Type (2021-2026)

#### 2.4.5.3 Global Nuclear-grade Zirconium Oxychloride Sale Price by Nuclear Reactor Type (2021-2026)

## 2.5 Nuclear-grade Zirconium Oxychloride Segment by Application

### 2.5.1 Nuclear-grade Zirconium Oxide

### 2.5.2 Nuclear-grade Zirconium Sponge

### 2.5.3 Nuclear-grade Zirconium Alloy

### 2.5.4 Others

### 2.5.5 Nuclear-grade Zirconium Oxychloride Sales by Application

#### 2.5.5.1 Global Nuclear-grade Zirconium Oxychloride Sale Market Share by Application (2021-2026)

#### 2.5.5.2 Global Nuclear-grade Zirconium Oxychloride Revenue and Market Share by Application (2021-2026)

#### 2.5.5.3 Global Nuclear-grade Zirconium Oxychloride Sale Price by Application (2021-2026)

## 3 GLOBAL BY COMPANY

### 3.1 Global Nuclear-grade Zirconium Oxychloride Breakdown Data by Company

#### 3.1.1 Global Nuclear-grade Zirconium Oxychloride Annual Sales by Company (2021-2026)

#### 3.1.2 Global Nuclear-grade Zirconium Oxychloride Sales Market Share by Company (2021-2026)

### 3.2 Global Nuclear-grade Zirconium Oxychloride Annual Revenue by Company (2021-2026)

#### 3.2.1 Global Nuclear-grade Zirconium Oxychloride Revenue by Company (2021-2026)

#### 3.2.2 Global Nuclear-grade Zirconium Oxychloride Revenue Market Share by

## Company (2021-2026)

### 3.3 Global Nuclear-grade Zirconium Oxychloride Sale Price by Company

### 3.4 Key Manufacturers Nuclear-grade Zirconium Oxychloride Producing Area Distribution, Sales Area, Product Type

#### 3.4.1 Key Manufacturers Nuclear-grade Zirconium Oxychloride Product Location Distribution

#### 3.4.2 Players Nuclear-grade Zirconium Oxychloride Products Offered

### 3.5 Market Concentration Rate Analysis

#### 3.5.1 Competition Landscape Analysis

#### 3.5.2 Concentration Ratio (CR3, CR5 and CR10) & (2024-2026)

### 3.6 New Products and Potential Entrants

### 3.7 Market M&A Activity & Strategy

## **4 WORLD HISTORIC REVIEW FOR NUCLEAR-GRADE ZIRCONIUM OXYCHLORIDE BY GEOGRAPHIC REGION**

### 4.1 World Historic Nuclear-grade Zirconium Oxychloride Market Size by Geographic Region (2021-2026)

#### 4.1.1 Global Nuclear-grade Zirconium Oxychloride Annual Sales by Geographic Region (2021-2026)

#### 4.1.2 Global Nuclear-grade Zirconium Oxychloride Annual Revenue by Geographic Region (2021-2026)

### 4.2 World Historic Nuclear-grade Zirconium Oxychloride Market Size by Country/Region (2021-2026)

#### 4.2.1 Global Nuclear-grade Zirconium Oxychloride Annual Sales by Country/Region (2021-2026)

#### 4.2.2 Global Nuclear-grade Zirconium Oxychloride Annual Revenue by Country/Region (2021-2026)

### 4.3 Americas Nuclear-grade Zirconium Oxychloride Sales Growth

### 4.4 APAC Nuclear-grade Zirconium Oxychloride Sales Growth

### 4.5 Europe Nuclear-grade Zirconium Oxychloride Sales Growth

### 4.6 Middle East & Africa Nuclear-grade Zirconium Oxychloride Sales Growth

## **5 AMERICAS**

### 5.1 Americas Nuclear-grade Zirconium Oxychloride Sales by Country

#### 5.1.1 Americas Nuclear-grade Zirconium Oxychloride Sales by Country (2021-2026)

#### 5.1.2 Americas Nuclear-grade Zirconium Oxychloride Revenue by Country (2021-2026)

- 5.2 Americas Nuclear-grade Zirconium Oxychloride Sales by Type (2021-2026)
- 5.3 Americas Nuclear-grade Zirconium Oxychloride Sales by Application (2021-2026)
- 5.4 United States
- 5.5 Canada
- 5.6 Mexico
- 5.7 Brazil

## **6 APAC**

- 6.1 APAC Nuclear-grade Zirconium Oxychloride Sales by Region
  - 6.1.1 APAC Nuclear-grade Zirconium Oxychloride Sales by Region (2021-2026)
  - 6.1.2 APAC Nuclear-grade Zirconium Oxychloride Revenue by Region (2021-2026)
- 6.2 APAC Nuclear-grade Zirconium Oxychloride Sales by Type (2021-2026)
- 6.3 APAC Nuclear-grade Zirconium Oxychloride Sales by Application (2021-2026)
- 6.4 China
- 6.5 Japan
- 6.6 South Korea
- 6.7 Southeast Asia
- 6.8 India
- 6.9 Australia
- 6.10 China Taiwan

## **7 EUROPE**

- 7.1 Europe Nuclear-grade Zirconium Oxychloride by Country
  - 7.1.1 Europe Nuclear-grade Zirconium Oxychloride Sales by Country (2021-2026)
  - 7.1.2 Europe Nuclear-grade Zirconium Oxychloride Revenue by Country (2021-2026)
- 7.2 Europe Nuclear-grade Zirconium Oxychloride Sales by Type (2021-2026)
- 7.3 Europe Nuclear-grade Zirconium Oxychloride Sales by Application (2021-2026)
- 7.4 Germany
- 7.5 France
- 7.6 UK
- 7.7 Italy
- 7.8 Russia

## **8 MIDDLE EAST & AFRICA**

- 8.1 Middle East & Africa Nuclear-grade Zirconium Oxychloride by Country
  - 8.1.1 Middle East & Africa Nuclear-grade Zirconium Oxychloride Sales by Country

(2021-2026)

8.1.2 Middle East & Africa Nuclear-grade Zirconium Oxychloride Revenue by Country

(2021-2026)

8.2 Middle East & Africa Nuclear-grade Zirconium Oxychloride Sales by Type

(2021-2026)

8.3 Middle East & Africa Nuclear-grade Zirconium Oxychloride Sales by Application

(2021-2026)

8.4 Egypt

8.5 South Africa

8.6 Israel

8.7 Turkey

8.8 GCC Countries

## **9 MARKET DRIVERS, CHALLENGES AND TRENDS**

9.1 Market Drivers & Growth Opportunities

9.2 Market Challenges & Risks

9.3 Industry Trends

## **10 MANUFACTURING COST STRUCTURE ANALYSIS**

10.1 Raw Material and Suppliers

10.2 Manufacturing Cost Structure Analysis of Nuclear-grade Zirconium Oxychloride

10.3 Manufacturing Process Analysis of Nuclear-grade Zirconium Oxychloride

10.4 Industry Chain Structure of Nuclear-grade Zirconium Oxychloride

## **11 MARKETING, DISTRIBUTORS AND CUSTOMER**

11.1 Sales Channel

11.1.1 Direct Channels

11.1.2 Indirect Channels

11.2 Nuclear-grade Zirconium Oxychloride Distributors

11.3 Nuclear-grade Zirconium Oxychloride Customer

## **12 WORLD FORECAST REVIEW FOR NUCLEAR-GRADE ZIRCONIUM OXYCHLORIDE BY GEOGRAPHIC REGION**

12.1 Global Nuclear-grade Zirconium Oxychloride Market Size Forecast by Region

12.1.1 Global Nuclear-grade Zirconium Oxychloride Forecast by Region (2027-2032)

12.1.2 Global Nuclear-grade Zirconium Oxychloride Annual Revenue Forecast by Region (2027-2032)

12.2 Americas Forecast by Country (2027-2032)

12.3 APAC Forecast by Region (2027-2032)

12.4 Europe Forecast by Country (2027-2032)

12.5 Middle East & Africa Forecast by Country (2027-2032)

12.6 Global Nuclear-grade Zirconium Oxychloride Forecast by Type (2027-2032)

12.7 Global Nuclear-grade Zirconium Oxychloride Forecast by Application (2027-2032)

## **13 KEY PLAYERS ANALYSIS**

13.1 Zhonghe Jinghuan Zirconium Industry

13.1.1 Zhonghe Jinghuan Zirconium Industry Company Information

13.1.2 Zhonghe Jinghuan Zirconium Industry Nuclear-grade Zirconium Oxychloride Product Portfolios and Specifications

13.1.3 Zhonghe Jinghuan Zirconium Industry Nuclear-grade Zirconium Oxychloride Sales, Revenue, Price and Gross Margin (2021-2026)

13.1.4 Zhonghe Jinghuan Zirconium Industry Main Business Overview

13.1.5 Zhonghe Jinghuan Zirconium Industry Latest Developments

13.2 Sanxiang Advanced Materials

13.2.1 Sanxiang Advanced Materials Company Information

13.2.2 Sanxiang Advanced Materials Nuclear-grade Zirconium Oxychloride Product Portfolios and Specifications

13.2.3 Sanxiang Advanced Materials Nuclear-grade Zirconium Oxychloride Sales, Revenue, Price and Gross Margin (2021-2026)

13.2.4 Sanxiang Advanced Materials Main Business Overview

13.2.5 Sanxiang Advanced Materials Latest Developments

13.3 Orient Zirconic Ind Sci & Tech

13.3.1 Orient Zirconic Ind Sci & Tech Company Information

13.3.2 Orient Zirconic Ind Sci & Tech Nuclear-grade Zirconium Oxychloride Product Portfolios and Specifications

13.3.3 Orient Zirconic Ind Sci & Tech Nuclear-grade Zirconium Oxychloride Sales, Revenue, Price and Gross Margin (2021-2026)

13.3.4 Orient Zirconic Ind Sci & Tech Main Business Overview

13.3.5 Orient Zirconic Ind Sci & Tech Latest Developments

13.4 Framatome Jarrie

13.4.1 Framatome Jarrie Company Information

13.4.2 Framatome Jarrie Nuclear-grade Zirconium Oxychloride Product Portfolios and Specifications

13.4.3 Framatome Jarrie Nuclear-grade Zirconium Oxychloride Sales, Revenue, Price and Gross Margin (2021-2026)

13.4.4 Framatome Jarrie Main Business Overview

13.4.5 Framatome Jarrie Latest Developments

13.5 ATI Materials

13.5.1 ATI Materials Company Information

13.5.2 ATI Materials Nuclear-grade Zirconium Oxychloride Product Portfolios and Specifications

13.5.3 ATI Materials Nuclear-grade Zirconium Oxychloride Sales, Revenue, Price and Gross Margin (2021-2026)

13.5.4 ATI Materials Main Business Overview

13.5.5 ATI Materials Latest Developments

13.6 Nuclear Fuel Complex

13.6.1 Nuclear Fuel Complex Company Information

13.6.2 Nuclear Fuel Complex Nuclear-grade Zirconium Oxychloride Product Portfolios and Specifications

13.6.3 Nuclear Fuel Complex Nuclear-grade Zirconium Oxychloride Sales, Revenue, Price and Gross Margin (2021-2026)

13.6.4 Nuclear Fuel Complex Main Business Overview

13.6.5 Nuclear Fuel Complex Latest Developments

13.7 Chepetsky Mechanical Plant

13.7.1 Chepetsky Mechanical Plant Company Information

13.7.2 Chepetsky Mechanical Plant Nuclear-grade Zirconium Oxychloride Product Portfolios and Specifications

13.7.3 Chepetsky Mechanical Plant Nuclear-grade Zirconium Oxychloride Sales, Revenue, Price and Gross Margin (2021-2026)

13.7.4 Chepetsky Mechanical Plant Main Business Overview

13.7.5 Chepetsky Mechanical Plant Latest Developments

## **14 RESEARCH FINDINGS AND CONCLUSION**

## List Of Tables

### LIST OF TABLES

Table 1. Nuclear-grade Zirconium Oxychloride Annual Sales CAGR by Geographic Region (2021, 2025 & 2032) & (\$ millions)

Table 2. Nuclear-grade Zirconium Oxychloride Annual Sales CAGR by Country/Region (2021, 2025 & 2032) & (\$ millions)

Table 3. Major Players of Wet Extraction Route

Table 4. Major Players of Ion Exchange Route

Table 5. Major Players of Chlorination-rectification/Molten Salt Separation Route

Table 6. Global Nuclear-grade Zirconium Oxychloride Sales by Type (2021-2026) & (Tons)

Table 7. Global Nuclear-grade Zirconium Oxychloride Sales Market Share by Type (2021-2026)

Table 8. Global Nuclear-grade Zirconium Oxychloride Revenue by Type (2021-2026) & (\$ million)

Table 9. Global Nuclear-grade Zirconium Oxychloride Revenue Market Share by Type (2021-2026)

Table 10. Global Nuclear-grade Zirconium Oxychloride Sale Price by Type (2021-2026) & (US\$/Ton)

Table 11. Major Players of Hf < 0.01%

Table 12. Major Players of Hf < 0.005%

Table 13. Major Players of Hf < 0.001%

Table 14. Global Nuclear-grade Zirconium Oxychloride Sales by Hafnium Content (2021-2026) & (Tons)

Table 15. Global Nuclear-grade Zirconium Oxychloride Sales Market Share by Hafnium Content (2021-2026)

Table 16. Global Nuclear-grade Zirconium Oxychloride Revenue by Hafnium Content (2021-2026) & (\$ million)

Table 17. Global Nuclear-grade Zirconium Oxychloride Revenue Market Share by Hafnium Content (2021-2026)

Table 18. Global Nuclear-grade Zirconium Oxychloride Sale Price by Hafnium Content (2021-2026) & (US\$/Ton)

Table 19. Major Players of Pressurized Water Reactor (PWR)

Table 20. Major Players of Boiling Water Reactor (BWR)

Table 21. Major Players of Heavy Water Reactor (CANDU)

Table 22. Major Players of Others

Table 23. Global Nuclear-grade Zirconium Oxychloride Sales by Nuclear Reactor Type

(2021-2026) & (Tons)

Table 24. Global Nuclear-grade Zirconium Oxychloride Sales Market Share by Nuclear Reactor Type (2021-2026)

Table 25. Global Nuclear-grade Zirconium Oxychloride Revenue by Nuclear Reactor Type (2021-2026) & (\$ million)

Table 26. Global Nuclear-grade Zirconium Oxychloride Revenue Market Share by Nuclear Reactor Type (2021-2026)

Table 27. Global Nuclear-grade Zirconium Oxychloride Sale Price by Nuclear Reactor Type (2021-2026) & (US\$/Ton)

Table 28. Global Nuclear-grade Zirconium Oxychloride Sale by Application (2021-2026) & (Tons)

Table 29. Global Nuclear-grade Zirconium Oxychloride Sale Market Share by Application (2021-2026)

Table 30. Global Nuclear-grade Zirconium Oxychloride Revenue by Application (2021-2026) & (\$ million)

Table 31. Global Nuclear-grade Zirconium Oxychloride Revenue Market Share by Application (2021-2026)

Table 32. Global Nuclear-grade Zirconium Oxychloride Sale Price by Application (2021-2026) & (US\$/Ton)

Table 33. Global Nuclear-grade Zirconium Oxychloride Sales by Company (2021-2026) & (Tons)

Table 34. Global Nuclear-grade Zirconium Oxychloride Sales Market Share by Company (2021-2026)

Table 35. Global Nuclear-grade Zirconium Oxychloride Revenue by Company (2021-2026) & (\$ millions)

Table 36. Global Nuclear-grade Zirconium Oxychloride Revenue Market Share by Company (2021-2026)

Table 37. Global Nuclear-grade Zirconium Oxychloride Sale Price by Company (2021-2026) & (US\$/Ton)

Table 38. Key Manufacturers Nuclear-grade Zirconium Oxychloride Producing Area Distribution and Sales Area

Table 39. Players Nuclear-grade Zirconium Oxychloride Products Offered

Table 40. Nuclear-grade Zirconium Oxychloride Concentration Ratio (CR3, CR5 and CR10) & (2024-2026)

Table 41. New Products and Potential Entrants

Table 42. Market M&A Activity & Strategy

Table 43. Global Nuclear-grade Zirconium Oxychloride Sales by Geographic Region (2021-2026) & (Tons)

Table 44. Global Nuclear-grade Zirconium Oxychloride Sales Market Share Geographic

## Region (2021-2026)

Table 45. Global Nuclear-grade Zirconium Oxychloride Revenue by Geographic Region (2021-2026) & (\$ millions)

Table 46. Global Nuclear-grade Zirconium Oxychloride Revenue Market Share by Geographic Region (2021-2026)

Table 47. Global Nuclear-grade Zirconium Oxychloride Sales by Country/Region (2021-2026) & (Tons)

Table 48. Global Nuclear-grade Zirconium Oxychloride Sales Market Share by Country/Region (2021-2026)

Table 49. Global Nuclear-grade Zirconium Oxychloride Revenue by Country/Region (2021-2026) & (\$ millions)

Table 50. Global Nuclear-grade Zirconium Oxychloride Revenue Market Share by Country/Region (2021-2026)

Table 51. Americas Nuclear-grade Zirconium Oxychloride Sales by Country (2021-2026) & (Tons)

Table 52. Americas Nuclear-grade Zirconium Oxychloride Sales Market Share by Country (2021-2026)

Table 53. Americas Nuclear-grade Zirconium Oxychloride Revenue by Country (2021-2026) & (\$ millions)

Table 54. Americas Nuclear-grade Zirconium Oxychloride Sales by Type (2021-2026) & (Tons)

Table 55. Americas Nuclear-grade Zirconium Oxychloride Sales by Application (2021-2026) & (Tons)

Table 56. APAC Nuclear-grade Zirconium Oxychloride Sales by Region (2021-2026) & (Tons)

Table 57. APAC Nuclear-grade Zirconium Oxychloride Sales Market Share by Region (2021-2026)

Table 58. APAC Nuclear-grade Zirconium Oxychloride Revenue by Region (2021-2026) & (\$ millions)

Table 59. APAC Nuclear-grade Zirconium Oxychloride Sales by Type (2021-2026) & (Tons)

Table 60. APAC Nuclear-grade Zirconium Oxychloride Sales by Application (2021-2026) & (Tons)

Table 61. Europe Nuclear-grade Zirconium Oxychloride Sales by Country (2021-2026) & (Tons)

Table 62. Europe Nuclear-grade Zirconium Oxychloride Revenue by Country (2021-2026) & (\$ millions)

Table 63. Europe Nuclear-grade Zirconium Oxychloride Sales by Type (2021-2026) & (Tons)

|                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------|
| Table 64. Europe Nuclear-grade Zirconium Oxychloride Sales by Application (2021-2026) & (Tons)                             |
| Table 65. Middle East & Africa Nuclear-grade Zirconium Oxychloride Sales by Country (2021-2026) & (Tons)                   |
| Table 66. Middle East & Africa Nuclear-grade Zirconium Oxychloride Revenue Market Share by Country (2021-2026)             |
| Table 67. Middle East & Africa Nuclear-grade Zirconium Oxychloride Sales by Type (2021-2026) & (Tons)                      |
| Table 68. Middle East & Africa Nuclear-grade Zirconium Oxychloride Sales by Application (2021-2026) & (Tons)               |
| Table 69. Key Market Drivers & Growth Opportunities of Nuclear-grade Zirconium Oxychloride                                 |
| Table 70. Key Market Challenges & Risks of Nuclear-grade Zirconium Oxychloride                                             |
| Table 71. Key Industry Trends of Nuclear-grade Zirconium Oxychloride                                                       |
| Table 72. Nuclear-grade Zirconium Oxychloride Raw Material                                                                 |
| Table 73. Key Suppliers of Raw Materials                                                                                   |
| Table 74. Nuclear-grade Zirconium Oxychloride Distributors List                                                            |
| Table 75. Nuclear-grade Zirconium Oxychloride Customer List                                                                |
| Table 76. Global Nuclear-grade Zirconium Oxychloride Sales Forecast by Region (2027-2032) & (Tons)                         |
| Table 77. Global Nuclear-grade Zirconium Oxychloride Revenue Forecast by Region (2027-2032) & (\$ millions)                |
| Table 78. Americas Nuclear-grade Zirconium Oxychloride Sales Forecast by Country (2027-2032) & (Tons)                      |
| Table 79. Americas Nuclear-grade Zirconium Oxychloride Annual Revenue Forecast by Country (2027-2032) & (\$ millions)      |
| Table 80. APAC Nuclear-grade Zirconium Oxychloride Sales Forecast by Region (2027-2032) & (Tons)                           |
| Table 81. APAC Nuclear-grade Zirconium Oxychloride Annual Revenue Forecast by Region (2027-2032) & (\$ millions)           |
| Table 82. Europe Nuclear-grade Zirconium Oxychloride Sales Forecast by Country (2027-2032) & (Tons)                        |
| Table 83. Europe Nuclear-grade Zirconium Oxychloride Revenue Forecast by Country (2027-2032) & (\$ millions)               |
| Table 84. Middle East & Africa Nuclear-grade Zirconium Oxychloride Sales Forecast by Country (2027-2032) & (Tons)          |
| Table 85. Middle East & Africa Nuclear-grade Zirconium Oxychloride Revenue Forecast by Country (2027-2032) & (\$ millions) |
| Table 86. Global Nuclear-grade Zirconium Oxychloride Sales Forecast by Type                                                |

(2027-2032) & (Tons)

Table 87. Global Nuclear-grade Zirconium Oxychloride Revenue Forecast by Type (2027-2032) & (\$ millions)

Table 88. Global Nuclear-grade Zirconium Oxychloride Sales Forecast by Application (2027-2032) & (Tons)

Table 89. Global Nuclear-grade Zirconium Oxychloride Revenue Forecast by Application (2027-2032) & (\$ millions)

Table 90. Zhonghe Jinghuan Zirconium Industry Basic Information, Nuclear-grade Zirconium Oxychloride Manufacturing Base, Sales Area and Its Competitors

Table 91. Zhonghe Jinghuan Zirconium Industry Nuclear-grade Zirconium Oxychloride Product Portfolios and Specifications

Table 92. Zhonghe Jinghuan Zirconium Industry Nuclear-grade Zirconium Oxychloride Sales (Tons), Revenue (\$ Million), Price (US\$/Ton) and Gross Margin (2021-2026)

Table 93. Zhonghe Jinghuan Zirconium Industry Main Business

Table 94. Zhonghe Jinghuan Zirconium Industry Latest Developments

Table 95. Sanxiang Advanced Materials Basic Information, Nuclear-grade Zirconium Oxychloride Manufacturing Base, Sales Area and Its Competitors

Table 96. Sanxiang Advanced Materials Nuclear-grade Zirconium Oxychloride Product Portfolios and Specifications

Table 97. Sanxiang Advanced Materials Nuclear-grade Zirconium Oxychloride Sales (Tons), Revenue (\$ Million), Price (US\$/Ton) and Gross Margin (2021-2026)

Table 98. Sanxiang Advanced Materials Main Business

Table 99. Sanxiang Advanced Materials Latest Developments

Table 100. Orient Zirconic Ind Sci & Tech Basic Information, Nuclear-grade Zirconium Oxychloride Manufacturing Base, Sales Area and Its Competitors

Table 101. Orient Zirconic Ind Sci & Tech Nuclear-grade Zirconium Oxychloride Product Portfolios and Specifications

Table 102. Orient Zirconic Ind Sci & Tech Nuclear-grade Zirconium Oxychloride Sales (Tons), Revenue (\$ Million), Price (US\$/Ton) and Gross Margin (2021-2026)

Table 103. Orient Zirconic Ind Sci & Tech Main Business

Table 104. Orient Zirconic Ind Sci & Tech Latest Developments

Table 105. Framatome Jarrie Basic Information, Nuclear-grade Zirconium Oxychloride Manufacturing Base, Sales Area and Its Competitors

Table 106. Framatome Jarrie Nuclear-grade Zirconium Oxychloride Product Portfolios and Specifications

Table 107. Framatome Jarrie Nuclear-grade Zirconium Oxychloride Sales (Tons), Revenue (\$ Million), Price (US\$/Ton) and Gross Margin (2021-2026)

Table 108. Framatome Jarrie Main Business

Table 109. Framatome Jarrie Latest Developments

Table 110. ATI Materials Basic Information, Nuclear-grade Zirconium Oxychloride Manufacturing Base, Sales Area and Its Competitors

Table 111. ATI Materials Nuclear-grade Zirconium Oxychloride Product Portfolios and Specifications

Table 112. ATI Materials Nuclear-grade Zirconium Oxychloride Sales (Tons), Revenue (\$ Million), Price (US\$/Ton) and Gross Margin (2021-2026)

Table 113. ATI Materials Main Business

Table 114. ATI Materials Latest Developments

Table 115. Nuclear Fuel Complex Basic Information, Nuclear-grade Zirconium Oxychloride Manufacturing Base, Sales Area and Its Competitors

Table 116. Nuclear Fuel Complex Nuclear-grade Zirconium Oxychloride Product Portfolios and Specifications

Table 117. Nuclear Fuel Complex Nuclear-grade Zirconium Oxychloride Sales (Tons), Revenue (\$ Million), Price (US\$/Ton) and Gross Margin (2021-2026)

Table 118. Nuclear Fuel Complex Main Business

Table 119. Nuclear Fuel Complex Latest Developments

Table 120. Chepetsky Mechanical Plant Basic Information, Nuclear-grade Zirconium Oxychloride Manufacturing Base, Sales Area and Its Competitors

Table 121. Chepetsky Mechanical Plant Nuclear-grade Zirconium Oxychloride Product Portfolios and Specifications

Table 122. Chepetsky Mechanical Plant Nuclear-grade Zirconium Oxychloride Sales (Tons), Revenue (\$ Million), Price (US\$/Ton) and Gross Margin (2021-2026)

Table 123. Chepetsky Mechanical Plant Main Business

Table 124. Chepetsky Mechanical Plant Latest Developments

## List Of Figures

### LIST OF FIGURES

- Figure 1. Picture of Nuclear-grade Zirconium Oxychloride
- Figure 2. Nuclear-grade Zirconium Oxychloride Report Years Considered
- Figure 3. Research Objectives
- Figure 4. Research Methodology
- Figure 5. Research Process and Data Source
- Figure 6. Global Nuclear-grade Zirconium Oxychloride Sales Growth Rate 2021-2032 (Tons)
- Figure 7. Global Nuclear-grade Zirconium Oxychloride Revenue Growth Rate 2021-2032 (\$ millions)
- Figure 8. Nuclear-grade Zirconium Oxychloride Sales by Geographic Region (2021, 2025 & 2032) & (\$ millions)
- Figure 9. Nuclear-grade Zirconium Oxychloride Sales Market Share by Country/Region (2025)
- Figure 10. Nuclear-grade Zirconium Oxychloride Sales Market Share by Country/Region (2021, 2025 & 2032)
- Figure 11. Product Picture of Wet Extraction Route
- Figure 12. Product Picture of Ion Exchange Route
- Figure 13. Product Picture of Chlorination-rectification/Molten Salt Separation Route
- Figure 14. Global Nuclear-grade Zirconium Oxychloride Sales Market Share by Type in 2026
- Figure 15. Global Nuclear-grade Zirconium Oxychloride Revenue Market Share by Type (2021-2026)
- Figure 16. Product Picture of Hf < 0.01%
- Figure 17. Product Picture of Hf < 0.005%
- Figure 18. Product Picture of Hf < 0.001%
- Figure 19. Global Nuclear-grade Zirconium Oxychloride Sales Market Share by Hafnium Content in 2026
- Figure 20. Global Nuclear-grade Zirconium Oxychloride Revenue Market Share by Hafnium Content (2021-2026)
- Figure 21. Product Picture of Pressurized Water Reactor (PWR)
- Figure 22. Product Picture of Boiling Water Reactor (BWR)
- Figure 23. Product Picture of Heavy Water Reactor (CANDU)
- Figure 24. Product Picture of Others
- Figure 25. Global Nuclear-grade Zirconium Oxychloride Sales Market Share by Nuclear Reactor Type in 2026

Figure 26. Global Nuclear-grade Zirconium Oxychloride Revenue Market Share by Nuclear Reactor Type (2021-2026)

Figure 27. Nuclear-grade Zirconium Oxychloride Consumed in Nuclear-grade Zirconium Oxide

Figure 28. Global Nuclear-grade Zirconium Oxychloride Market: Nuclear-grade Zirconium Oxide (2021-2026) & (Tons)

Figure 29. Nuclear-grade Zirconium Oxychloride Consumed in Nuclear-grade Zirconium Sponge

Figure 30. Global Nuclear-grade Zirconium Oxychloride Market: Nuclear-grade Zirconium Sponge (2021-2026) & (Tons)

Figure 31. Nuclear-grade Zirconium Oxychloride Consumed in Nuclear-grade Zirconium Alloy

Figure 32. Global Nuclear-grade Zirconium Oxychloride Market: Nuclear-grade Zirconium Alloy (2021-2026) & (Tons)

Figure 33. Nuclear-grade Zirconium Oxychloride Consumed in Others

Figure 34. Global Nuclear-grade Zirconium Oxychloride Market: Others (2021-2026) & (Tons)

Figure 35. Global Nuclear-grade Zirconium Oxychloride Sale Market Share by Application (2025)

Figure 36. Global Nuclear-grade Zirconium Oxychloride Revenue Market Share by Application in 2025

Figure 37. Nuclear-grade Zirconium Oxychloride Sales by Company in 2025 (Tons)

Figure 38. Global Nuclear-grade Zirconium Oxychloride Sales Market Share by Company in 2025

Figure 39. Nuclear-grade Zirconium Oxychloride Revenue by Company in 2025 (\$ millions)

Figure 40. Global Nuclear-grade Zirconium Oxychloride Revenue Market Share by Company in 2025

Figure 41. Global Nuclear-grade Zirconium Oxychloride Sales Market Share by Geographic Region (2021-2026)

Figure 42. Global Nuclear-grade Zirconium Oxychloride Revenue Market Share by Geographic Region in 2025

Figure 43. Americas Nuclear-grade Zirconium Oxychloride Sales 2021-2026 (Tons)

Figure 44. Americas Nuclear-grade Zirconium Oxychloride Revenue 2021-2026 (\$ millions)

Figure 45. APAC Nuclear-grade Zirconium Oxychloride Sales 2021-2026 (Tons)

Figure 46. APAC Nuclear-grade Zirconium Oxychloride Revenue 2021-2026 (\$ millions)

Figure 47. Europe Nuclear-grade Zirconium Oxychloride Sales 2021-2026 (Tons)

Figure 48. Europe Nuclear-grade Zirconium Oxychloride Revenue 2021-2026 (\$

millions)

Figure 49. Middle East & Africa Nuclear-grade Zirconium Oxychloride Sales 2021-2026 (Tons)

Figure 50. Middle East & Africa Nuclear-grade Zirconium Oxychloride Revenue 2021-2026 (\$ millions)

Figure 51. Americas Nuclear-grade Zirconium Oxychloride Sales Market Share by Country in 2025

Figure 52. Americas Nuclear-grade Zirconium Oxychloride Revenue Market Share by Country (2021-2026)

Figure 53. Americas Nuclear-grade Zirconium Oxychloride Sales Market Share by Type (2021-2026)

Figure 54. Americas Nuclear-grade Zirconium Oxychloride Sales Market Share by Application (2021-2026)

Figure 55. United States Nuclear-grade Zirconium Oxychloride Revenue Growth 2021-2026 (\$ millions)

Figure 56. Canada Nuclear-grade Zirconium Oxychloride Revenue Growth 2021-2026 (\$ millions)

Figure 57. Mexico Nuclear-grade Zirconium Oxychloride Revenue Growth 2021-2026 (\$ millions)

Figure 58. Brazil Nuclear-grade Zirconium Oxychloride Revenue Growth 2021-2026 (\$ millions)

Figure 59. APAC Nuclear-grade Zirconium Oxychloride Sales Market Share by Region in 2025

Figure 60. APAC Nuclear-grade Zirconium Oxychloride Revenue Market Share by Region (2021-2026)

Figure 61. APAC Nuclear-grade Zirconium Oxychloride Sales Market Share by Type (2021-2026)

Figure 62. APAC Nuclear-grade Zirconium Oxychloride Sales Market Share by Application (2021-2026)

Figure 63. China Nuclear-grade Zirconium Oxychloride Revenue Growth 2021-2026 (\$ millions)

Figure 64. Japan Nuclear-grade Zirconium Oxychloride Revenue Growth 2021-2026 (\$ millions)

Figure 65. South Korea Nuclear-grade Zirconium Oxychloride Revenue Growth 2021-2026 (\$ millions)

Figure 66. Southeast Asia Nuclear-grade Zirconium Oxychloride Revenue Growth 2021-2026 (\$ millions)

Figure 67. India Nuclear-grade Zirconium Oxychloride Revenue Growth 2021-2026 (\$ millions)

Figure 68. Australia Nuclear-grade Zirconium Oxychloride Revenue Growth 2021-2026 (\$ millions)

Figure 69. China Taiwan Nuclear-grade Zirconium Oxychloride Revenue Growth 2021-2026 (\$ millions)

Figure 70. Europe Nuclear-grade Zirconium Oxychloride Sales Market Share by Country in 2025

Figure 71. Europe Nuclear-grade Zirconium Oxychloride Revenue Market Share by Country (2021-2026)

Figure 72. Europe Nuclear-grade Zirconium Oxychloride Sales Market Share by Type (2021-2026)

Figure 73. Europe Nuclear-grade Zirconium Oxychloride Sales Market Share by Application (2021-2026)

Figure 74. Germany Nuclear-grade Zirconium Oxychloride Revenue Growth 2021-2026 (\$ millions)

Figure 75. France Nuclear-grade Zirconium Oxychloride Revenue Growth 2021-2026 (\$ millions)

Figure 76. UK Nuclear-grade Zirconium Oxychloride Revenue Growth 2021-2026 (\$ millions)

Figure 77. Italy Nuclear-grade Zirconium Oxychloride Revenue Growth 2021-2026 (\$ millions)

Figure 78. Russia Nuclear-grade Zirconium Oxychloride Revenue Growth 2021-2026 (\$ millions)

Figure 79. Middle East & Africa Nuclear-grade Zirconium Oxychloride Sales Market Share by Country (2021-2026)

Figure 80. Middle East & Africa Nuclear-grade Zirconium Oxychloride Sales Market Share by Type (2021-2026)

Figure 81. Middle East & Africa Nuclear-grade Zirconium Oxychloride Sales Market Share by Application (2021-2026)

Figure 82. Egypt Nuclear-grade Zirconium Oxychloride Revenue Growth 2021-2026 (\$ millions)

Figure 83. South Africa Nuclear-grade Zirconium Oxychloride Revenue Growth 2021-2026 (\$ millions)

Figure 84. Israel Nuclear-grade Zirconium Oxychloride Revenue Growth 2021-2026 (\$ millions)

Figure 85. Turkey Nuclear-grade Zirconium Oxychloride Revenue Growth 2021-2026 (\$ millions)

Figure 86. GCC Countries Nuclear-grade Zirconium Oxychloride Revenue Growth 2021-2026 (\$ millions)

Figure 87. Manufacturing Cost Structure Analysis of Nuclear-grade Zirconium

Oxychloride in 2026

Figure 88. Manufacturing Process Analysis of Nuclear-grade Zirconium Oxychloride

Figure 89. Industry Chain Structure of Nuclear-grade Zirconium Oxychloride

Figure 90. Channels of Distribution

Figure 91. Global Nuclear-grade Zirconium Oxychloride Sales Market Forecast by Region (2027-2032)

Figure 92. Global Nuclear-grade Zirconium Oxychloride Revenue Market Share Forecast by Region (2027-2032)

Figure 93. Global Nuclear-grade Zirconium Oxychloride Sales Market Share Forecast by Type (2027-2032)

Figure 94. Global Nuclear-grade Zirconium Oxychloride Revenue Market Share Forecast by Type (2027-2032)

Figure 95. Global Nuclear-grade Zirconium Oxychloride Sales Market Share Forecast by Application (2027-2032)

Figure 96. Global Nuclear-grade Zirconium Oxychloride Revenue Market Share Forecast by Application (2027-2032)

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