As a very rare metal and an important strategic resource for a country, cobalt gets typically utilized in battery materials, super heat-resistant alloys, tool steels, cemented carbides, and magnetic materials. Spurred by the sales boom of new energy vehicles and a rise in electricity of each vehicle, the demand from power batteries for cobalt has been growing steadily, while that from consumer batteries has plunged due to the COVID-19, resulting in global cobalt consumption with a year-on-year decrease of 0.6% to 137,500 tons in 2020.

Although power battery cathode materials tend to feature high nickel and zero cobalt in the future, the unit cobalt consumption will edge down. With the explosive production and sales of new energy vehicle globally and the electricity increase per car, the global cobalt use in new energy vehicles will continue a bullish trend with an expected CAGR at least 30% by 2025. Benefiting from new trends like remote work and online education, the cobalt use in 3C consumer electronics is expected to grow stably or slightly. Besides, the cobalt used by cemented carbides and high-temperature alloys is projected to keep a CAGR of 3% to 4% driven by the high-end manufacturing.
Batteries are the largest consumer of cobalt with a share of about 57%, followed by nickel-based alloys with 14%.

On a regional basis, China is the largest and fastest-growing cobalt consumer, sweeping approximately 32% of global consumption in 2020 when the second-ranked Europe seized about 23% and the No.3 United States 18%.
The global cobalt resource reserves are roughly 7.1 million tons, as is revealed by the data from USGS. Congo-Kinshasa boasts the most abundant resources, with 3.6 million tons of cobalt reserves (nearly a half of the world’s total); the follower Australia has 1.4 million tons of cobalt resources as a percentage of about 20%; China holds about 80,000 tons of cobalt resources, sharing only 1.12% of the world's total, and has to rely heavily on imports to meet its own demand annually.

Concerning output, the global cobalt metal output fell 6% year-on-year to about 145,000 tons in 2020, mainly because Mutanda, the world's largest cobalt mine, was closed at the end of 2019. By country, Congo-Kinshasa took a lion’s share 66% of the global total with the output about 96,000 tons, while other countries had small shares like Australia 5%, Russia 4%, the Philippines 4%, Cuba 3%, Canada 3%, etc.

Notably, Glencore became the world's largest cobalt ore manufacturer in 2020 by 31,800 tons as a percentage of 23.7% of the world's total, followed by China Molybdenum Co., Ltd. ("CMOC") (which acquired cobalt ore resources from Freeport-McMoRan in 2017) 11.2% and Vale 3%.

Glencore, headquartered in Baar, Switzerland, is the world’s largest commodity trader, dedicates itself to the production and marketing of metals & minerals, energy products and agricultural products. Its metals & minerals mainly include copper, zinc, cobalt, lead, nickel, ferrochrome, gold, silver, etc., among which zinc, cobalt and copper are the fields where Glencore remains superior. Glencore owns the Mutanda Mine and Katanga Mining as its core cobalt assets. The Mutanda Mine is an open-pit copper mine in the Katanga Province of the Democratic Republic of the Congo. Katanga Mining operates a major mine complex in the Congo’s Katanga Province, producing refined copper and cobalt. The Mutanda Mine ceased production in late 2019. Katanga Mining resumed production in early 2018. Also, Glencore possesses INO (Integrated Nickel Operations) in Canada and Murrin Murrin (100%) in Australia.
CMOC

Headquartered in Luoyang city, China, CMOC is devoted to the mining, smelting, deep processing, trade and scientific research of rare and noble metals such as molybdenum, tungsten and gold.

In 2016, CMOC acquired an 80% stake in Tenke Fungurume Mining (TFM), a copper-cobalt mine owned by Freeport-McMoRan in the United States for US$2.65 billion. The mine’s cobalt output was about 15,000 tons in 2020.

On December 31, 2020, CMOC acquired a 95% indirect interest in the Kisanfu copper-cobalt mine in Congo-Kinshasa from Freeport-McMoRan for US$550 million; the Congo-Kinshasa government holds the rest 5% in the mine.

In April 2021, CMOC signed a “Strategic Cooperation Agreement” with Brunp Times, an indirect holding company of CATL, allowing Brunp Times to acquire a 25% stake in KFM at a total consideration of US$137.5 million through its wholly-owned subsidiary Hongkong Brunp and CATL Co., Limited. As yet, the mine has not been put into production. According to the latest estimates, the average grade of cobalt in the mine is about 0.85%, and the amount of cobalt-containing metals hits about 3.1 million tons.

Global and China Cobalt Industry Report, 2018-2023 highlights the following:

- The cobalt industry (definition, classifications, development trends, industry policies, etc.);
- Global cobalt industry (reserves, output, demand, and competitive landscape, etc.);
- China’s cobalt industry (output, demand, import and export, competitive landscape, etc.);
- Output, sales volume, import and export, etc. of global and Chinese cobalt segments;
- The cobalt application market, covering lithium batteries, high temperature metals, hard metals, magnetic materials, etc.;
- 18 cobalt-related manufacturers in the world and China, including Glencore, Umicore, Vale, Freeport, CMOC, Huayou Cobalt, GEM, Jinchuan, etc. (profiles, financials, output, sales volume, hit products, production base distribution and the latest dynamics).
1. Cobalt
   1.1 Definitions
   1.2 Industry Chain

2. Status Quo of Global Cobalt Market
   2.1 Cobalt Ore Reserves
   2.2 Market Supply
      2.2.1 Production of Cobalt Ores
      2.2.2 Cobalt Recycling
      2.2.3 Refined Production
   2.3 Demand
   2.4 Price
   2.5 Competition Pattern
   2.6 Development Trend

3. Cobalt Market Development in China
   3.1 Overview
   3.2 Policy
   3.3 Cobalt Ore Resources
   3.4 Market Supply and Demand
      3.4.1 Supply
      3.4.2 Demand
   3.5 Price
   3.6 Product Structure
   3.7 Competition Pattern

4. China’s Import and Export of Cobalt by Product
   4.1 Cobalt Ores and Concentrates
      4.1.1 Import
      4.1.2 Export
   4.2 Cobaltosic Oxide
      4.2.1 Import
      4.2.2 Export
   4.3 Cobalt Chloride
      4.3.1 Import and Export
      4.3.2 Regional Structure
   4.4 Cobalt Carbonate
      4.4.1 Import and Export
      4.4.2 Regional Structure
   4.5 Cobalt Nitrate
      4.5.1 Import and Export
      4.5.2 Regional Structure
   4.6 Cobalt Oxalate

5. Demand of Main Cobalt Downstream Industries
   5.1 Battery Materials
      5.1.1 Market Development
      5.1.2 Demand for Cobalt
   5.2 Hard Alloy
      5.2.1 Market Development
      5.2.2 Demand for Cobalt
   5.3 Magnetic Materials
      5.3.1 Market Development
      5.3.2 Demand for Cobalt
   5.4 Superalloy
      5.4.1 Market Development
      5.4.2 Demand for Cobalt

6. Major Global Cobalt Manufacturers
   6.1 Umicore
      6.1.1 Profile
      6.1.2 Operation
      6.1.3 Cobalt Business (Cobalt Specialty Materials)
      6.1.4 Business in China
   6.1.5 Development Prospect
## Selected Charts

- Cobalt Production Process
- Cobalt Product Process
- Cobalt Industry Chain
- Products of Major Cobalt Downstream Industries
- Cobalt Reserves in Major Countries, 2020
- Global Cobalt Mine Production, 2013-2020
- Cobalt Mine Production of the World excluding DRC, 2013-2020
- Cobalt Output in Democratic Republic of the Congo, 2013-2021
- Recycling Period and Rate of Cobalt Products
- Global Estimated Recycling of Cobalt by Source, 2013-2020
- Global Refined Cobalt Output, 2011-2020
- Global Cobalt Consumption, 2013-2020
- Consumption of cobalt in non-battery applications, 2013-2020
- Cobalt Demand Structure Worldwide, 2020
- Cobalt Demand Structure by Region, 2020
- Global Cobalt Price, 2017-2021
- Global MB Cobalt Price, 2015-2021
- Changes in Global Cobalt Inventory by Region, 2020-2021
- Supply of Main Cobalt Ore Companies Worldwide, 2017-2025
- Global Cobalt Supply Trend, 2020-2025E
- Cobalt Demand & Supply Balance in Worldwide, 2020-2025E
- Chinese Companies’ Layout of Cobalt Industry Chain
- Policies on Cobalt Industry in China, 2013-2021
- Cobalt Mines Invested by Chinese Companies in Democratic Republic of the Congo
- China’s Refined Cobalt Output, 2015-2021
- China’s Cobalt Consumption, 2016-2021
- Cobalt Price Trend in China, 2017-2021
- Cobalt Price by Product in China, 2021
- China’s Electrolytic Cobalt Output and Operating Rate by Month, 2020-2021
- China’s CoSO4 Output and Operating Rate by Month, 2020-2021
- China’s Co3O4 Output and Operating Rate by Month, 2020-2021
- China’s CoO Output and Operating Rate by Month, 2020-2021

## Selected Charts

- China's CoO Output and Operating Rate by Month, 2020-2021
- Capacity and Operation of Major Cobalt Companies in China, 2021
- Revenue and Gross Margin of China’s Major Cobalt Producers, 2020
- Import Volume and Import Value of Cobalt Ores and Concentrates in China, 2014-2020
- Export Volume and Export Value of Cobalt Ores and Concentrates in China, 2014-2020
- China’s Import Volume and Import Value of Cobalt Oxide, 2015-2020
- China’s Export Volume and Export Value of Cobalt Oxide, 2014-2021
- China’s Import Volume and Import Value of Cobalt Chloride, 2016-2021
- China’s Export Volume and Export Value of Cobalt Chloride, 2014-2021
- Structure (%) of China’s Export Volume of Cobalt Oxide by Country, 2021
- China’s Import Volume and Import Value of Cobalt Carbonate, 2011-2021
- China’s Export Volume and Export Value of Cobalt Carbonate, 2014-2021
- Structure (%) of China’s Export Volume of Cobalt Carbonate by Country, 2021
- China’s Import Volume and Import Value of Cobalt Nitrile, 2012-2021
- China’s Export Volume and Export Value of Cobalt Nitrate, 2014-2021
- Structure (%) of China’s Export Volume of Cobalt Nitrate by Country, 2015-2016
- China’s Export Volume and Export Value of Cobalt Oxalate, 2012-2021
- Global Lithium Battery Shipments by Type, 2016-2020
- China’s Lithium Battery Shipments by Type, 2016-2020
- Global Top10 Power Lithium Battery Companies by Shipment/Market Share, 2020
- Global Lithium Battery Cathode Material Sales, 2016-2025
- Lithium Battery Cathode Material Sales of China, 2016-2025
- Competitive Pattern of Chinese Lithium Battery Cathode Material Market, 2020
- Global Shipment of Ternary Materials and Ternary Precursors, 2016-2025E
- Product Structure Comparison of Ternary Precursors in China, 2020-2021
- Global and China Ternary Precursor Capacity
- Production of Main Ternary Precursor Companies in China, 2021
- Amount of Cobalt Consumed by Different Ternary Cathode Materials
- Cobalt Demand Structure in Battery Industry
- Metal Demand from Different Cathode Materials (Per Ton)
- Demand for Cobalt from New Energy Vehicles
- Global Demand for Cobalt from Battery Industry, 2020-2025E
- Classification of Cemented Carbide (by Component)
<table>
<thead>
<tr>
<th>Selected Charts</th>
<th>Selected Charts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Cemented Carbide Output, 2017-2020</td>
<td>Cobalt Output of Glencore from own sources, 2017-2020</td>
</tr>
<tr>
<td>China’s Cemented Carbide Output, 2010-2020</td>
<td>Glencore’s Cobalt Mine Output, 2015-2021</td>
</tr>
<tr>
<td>China’s Cemented Carbide Output Distribution, 2020</td>
<td>Global Presence of Vale, 2021</td>
</tr>
<tr>
<td>China’s Cemented Carbide Import and Export, 2017-2021</td>
<td>Revenue and Net Income of VALE, 2016-2021</td>
</tr>
<tr>
<td>China’s Cemented Carbide -use Cobalt Demand, 2016-2026E</td>
<td>Revenue Structure of VALE by Business, 2019-2020</td>
</tr>
<tr>
<td>Classification of Magnetic Materials</td>
<td>Revenue Breakdown of Vale by Region, 2019-2020</td>
</tr>
<tr>
<td>Global Rare Earth Permanent Magnet Output and Growth Rate, 2015-2025E</td>
<td>Cobalt Output of Vale by Mine Area, 2018-2020</td>
</tr>
<tr>
<td>China’s Rare Earth Permanent Magnet Output and Growth Rate, 2015-2025E</td>
<td>Cobalt Product Sales Volume and Revenue of Vale, 2013-2020</td>
</tr>
<tr>
<td>Global Magnetic Materials-use Cobalt Demand, 2017-2023E</td>
<td>Cobalt Ore Reserves and Grades of Vale, 2019-2020</td>
</tr>
<tr>
<td>China’s Magnetic Materials-use Cobalt Demand, 2016-2023E</td>
<td>Cobalt Ore Mines of Vale, 2020</td>
</tr>
<tr>
<td>Main Applications of Superalloy</td>
<td>Vale in China</td>
</tr>
<tr>
<td>Global Superalloy Consumption Structure by Application</td>
<td>Vale’s Revenue and YoY Growth in China, 2014-2020</td>
</tr>
<tr>
<td>Application of Superalloy in Aerospace Engine Thermal End Bearing Parts</td>
<td>Mineral Distribution of Freeport-McMoRan, 2020</td>
</tr>
<tr>
<td>Main Structure of Aerospace Engine</td>
<td>Revenue and Net income of Freeport-McMoRan, 2014-2021</td>
</tr>
<tr>
<td>Superalloy Development Course in China</td>
<td>Revenue Structure of Freeport-McMoRan by Product, 2018-2020</td>
</tr>
<tr>
<td>China’s Superalloy Output, 2014-2020</td>
<td>Revenue Breakdown of Freeport-McMoRan by Country/Region, 2018-2020</td>
</tr>
<tr>
<td>Global Superalloy-use Cobalt Demand, 2012-2020</td>
<td>Revenue and YoY Growth of Freeport-McMoRan in China, 2008-2020</td>
</tr>
<tr>
<td>China’s Superalloy-use Cobalt Demand, 2012-2020</td>
<td>Global Presence of Sherritt International</td>
</tr>
<tr>
<td>Key Business of Umicore, 2021</td>
<td>Key Business of Sherritt International</td>
</tr>
<tr>
<td>Business Layout of Umicore, 2021</td>
<td>Sherritt’s Main Subsidiaries, 2019-2020</td>
</tr>
<tr>
<td>Revenue and Net income of Umicore, 2014-2021</td>
<td>Revenue Breakdown of Sherritt International by Business, 2020</td>
</tr>
<tr>
<td>Energy &amp; Surface Technologies Business Group Profile</td>
<td>Sherritt’s Cobalt Output and Sales, 2019-2020</td>
</tr>
<tr>
<td>Growth and Profitability Drivers of Energy &amp; Surface Technologies Business Group</td>
<td>Revenue and Net income of GEM, 2014-2021</td>
</tr>
<tr>
<td>Total Revenue Structure (%) of Umicore by Region, 2015-2020</td>
<td>Revenue Breakdown of GEM by Product, 2020-2021</td>
</tr>
<tr>
<td>R&amp;D Costs and % of Total Revenue of Umicore, 2013-2021</td>
<td>Revenue Breakdown of GEM by Region, 2014-2021</td>
</tr>
<tr>
<td>Umicore’s Subsidiaries in China, by the End of 2020</td>
<td>R&amp;D Costs and % of Total Revenue of GEM, 2014-2020</td>
</tr>
<tr>
<td>Outlook of Umicore, 2021</td>
<td>Capacity of GEM’s Main Products until Dec, 2020</td>
</tr>
<tr>
<td>Global Presence of Glencore</td>
<td>Cobalt Industry Recycling Production Mode of Shenzhen Green Eco-Manufacture</td>
</tr>
<tr>
<td>Revenue and Net income of Glencore, 2012-2018</td>
<td>Downstream Customers for Cobalt Lithium Battery Materials of GEM</td>
</tr>
<tr>
<td>Revenue Structure (%) of Glencore Xstrata by Business, 2015-2021</td>
<td>Main Products of Huayou Cobalt</td>
</tr>
</tbody>
</table>
Selected Charts

Revenue and Net income of Huayou Cobalt, 2014-2021
Operating Revenue of Huayou Cobalt by Product, 2017-2020
Operating Revenue of Huayou Cobalt by Region, 2014-2020
Gross Margin of Huayou Cobalt by Product, 2014-2020
Major Customers of Huayou Cobalt
Production and Sales Volume of Cobalt Products of Huayou Cobalt, 2016-2020
Revenue and Net income of Jinchuan International, 2016-2021
Revenue Breakdown of Jinchuan International, 2021
Specification of Ruashi Mine
Specification of Musonoi Project
Revenue and Net income of Tengyuan Cobalt, 2018-2021
Revenue Breakdown of Tengyuan Cobalt by Product, 2018-2020
Revenue Breakdown of Tengyuan Cobalt by Region, 2018-2020
Gross Margin of Tengyun Cobalt by Product, 2019-2021
Capacity and Output of Tengyuan Cobalt, 2018-2020
TOP Customers of Tengyuan Cobalt, 2020
Proposed Project of Tengyuan Cobalt, 2021
Development Course of Easpring Material, 1992-2021
Revenue and Net Income of Easpring Material, 2012-2021
Revenue of Easpring Material by Business, 2019-2021
Revenue of Easpring Material by Region, 2014-2021
Gross Margin of Easpring Material by Business, 2019-2021
Key Lithium Battery Materials of Easpring Material
Capacity of Cathode Materials of Easpring Material, 2015-2021
Capacity Distribution of Easpring Material, 2021
Capacity Expansion Plan of Easpring Material, 2019-2023
Revenue and Net income of Hanrui Cobalt, 2014-2021
Revenue Breakdown of Hanrui Cobalt by Product, 2018-2021
Gross Margin of Hanrui Cobalt by Product, 2017-2021
Industrial Chain of Hanrui Cobalt
Capacity of Major Products and Capacity Planning of Hanrui Cobalt, 2021
Output of Hanrui Cobalt by Product, 2016-2020
Global Presence of China Molybdenum

Selected Charts

Revenue and Net income of China Molybdenum, 2014-2021
Revenue and Gross Margin of China Molybdenum by Product, 2019-2021
Revenue and Gross Margin of China Molybdenum by Region, 2019-2021
Cobalt Metal Sales Volume of China Molybdenum’s TFM, 2017-2021
Revenue and Net Income of China Molybdenum’s TFM, 2019-2021
Kisanfu’s Shareholding Structure
CMOC’s Resource Reserves in TFM and KFM
Revenue and Net Income of Guangdong Silver, 2014-2021
Operating Revenue and Gross Margin of Guangdong Silver by Product, 2019-2021
Proposed Cobalt Project of Guangdong Silver, 2021H1
Main Subsidiaries of Jiana Energy
Revenue and Net Income of Jiana Energy, 2016-2021
Main Products of Jiana Energy
Production of Dowstone’s Cobalt Products, 2018-2021
Sales Volume of Dowstone’s Cobalt Products, 2018-2021
Purposes of Funds Raised by Dowstone through Non-public Offering of Shares
Shareholding Structure of Projects of Ramu Nico Management Limited, 2017
Nickel Cobalt Companies of Jiangxi Tungsten
Cobalt Related Products of Huayi Chemical
Beijing Headquarters
TEL: 13718845418
FAX: 010-82601570
Email: report@researchinchina.com

Chengdu Branch
TEL: 028-68738514
FAX: 028-86930659

Website: www.researchinchina.com
WeChat: zuosiqiche