October 2023 Journal of Latin Oct 2023
Volume 45 Issue 5 American Studies Vol 45 No 5

Special topic on dual carbon and critical mineral resources

The "power triangle" of key minerals based : on the investigation of the global nickel industry chain *

Cui Shoujun Li Zhupan

Abstract: Key minerals have become the object of competition among major powers due to their scarcity, irreplaceability and uneven distribution. As an important representative of key minerals, nickel ore has become the new focus of competition in the global new energy industry. The world's major economies have focused on the nickel industry. This article attempts to construct an analytical framework of the "power triangle" of key minerals. The "established technology country", "emerging technology country" and "resource country" are the three main subjects of the game. Focusing on the "technological power" and "resource country" The interaction between the control, competition and distribution of "power" has resulted in three pairs of structural contradictions, namely the contradiction between hegemonic protection and order reshaping between the conservative technology countries and the emerging technology countries, and the development needs and solid division of labor between the resource countries and the conservative technology countries. conflicts between resource countries and emerging technology countries, and the mismatch between economic needs and political status between resource countries and emerging technology countries. Based on the "power triangle" framework, this article focuses on the global nickel industry chain and explains the game situation and pattern evolution of the global nickel industry chain. Research findings: Established technology countries represented by the United States, emerging technology countries represented by China, and resource countries represented by Indonesia carry out strategic interactions based on the "power triangle" to promote the division of labor pattern, operating logic, rule system, and competition paradigm of the global nickel industry chain. Profound changes and complex adjustments have occurred.

Keywords: Key minerals "power triangle" global nickel industry chain global resource governance About the

author: Cui Shoujun, professor and doctoral supervisor at the School of International Relations, Renmin University of China, director of the Institute of International Development, Li Zhupan, master's student at the School

of International Relations, Renmin University of China ÿCLC number:

F416 1 Document identification code: A Article number: 1002 - 6649 (2023) 05 - 0096 - 23

** This article is a phased result of the 2019 National Social Science Fund general project "Research on changes in the political landscape of Latin America and the transformation and development of China and Latin America" (No. 19BG J061).

As "industrial food", mineral resources are an indispensable material basis for the development of human society. Due to their inherent scarcity, non-renewability and uneven distribution, mineral resources have become the focus of geopolitical games among major powers. Since mankind entered the industrial society, ÿ The mining and consumption of global energy minerals shows an "S" shaped evolution pattern, and the mining volume is gradually reaching its peak. ÿ As the climate crisis intensifies, it is urgent to promote the global clean energy transformation. Superimposed on the arrival of the fourth industrial revolution, breakthrough technology clusters The emergence of clusters and global industrial upgrading have ushered in a new period of opportunity. The new energy industry has increasingly become a new focus of geopolitical competition between major powers. Currently, due to the surge in demand for lithium, nickel, cobalt, etc., from the world's major powers, these products have not been used in large amounts in the past but have economic value. "Small minerals" with low prices have suddenly become "stuck" key minerals and are widely used in 166 categories in nine major fields, including the electric vehicle industry. According to the International Energy Agency (IEA), electric vehicles and New energy batteries will account for about half of the future increase in mineral demand. Among them, nickel will have the largest relative growth. Demand will increase from 400 tons in 2020 to 570,000 tons in 2040, an increase of more than 140 times. This will inevitably trigger A new round of international competition in the global nickel industry chainÿÿ

A question raised and existing research

With the advancement of global industrial upgrading and green development agenda, the game around key minerals has become increasingly fierce. After the global financial crisis in 2008, the United States continued to adjust its global competition strategy and competed with China around the construction of regional order and dominance. In China and the United States, In the context of intensified strategic competition, the United States and the West regard China as a "major competitor" and seek to "break links and decouple" from China in the field of key minerals. U.S. President Biden signed an executive order shortly after taking office, requiring that within 100 days, semiconductors, A comprehensive review of the supply chain in four key areas: drugs and pharmaceutical ingredients, critical minerals, and high-capacity batteriesÿ. The executive order aims to eliminate asymmetric dependence risks from “major competitors” and “other potential rivals.” At the same time, due to adverse events With the rise of globalization and resource nationalism, more and more resource countries are showing policy tendencies such as increasing royalties and taxes, stopping or renegotiating contracts, nationalizing, and banning exports, hoping to use resource leverage and protectionism to strengthen resources. Sovereignty, controlling the flow of resources, enhancing the value of resources, or adopting a follower strategy to support the hegemonic country in the form of alliance participation, nested circles, etc.

ÿ Wang Anjian, Dai Tao, Liu Guwang: «The “S"-shaped evolution trajectory of GDP growth rate—China’s mineral resource demand trend in the context of slowing growth», published in Acta Geosciences, No. 5, 2016, No. Pages 563 - 568. Wang Anjian, Wang Gaoshang, Zhou Fengying: "Limits and cycles of energy and mineral resource consumption growth", published in "Acta Geosciences", Issue 1, 2017, pp. 3 - 10.

ÿ IEAÿ “The Role of Critical Minerals in Clean E ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ ecial Report nt Biden at Signing of an Executive

ÿ Order Promo ting Competition in The American Economy” in Speech at State Din ing Roomÿ White Houseÿ July 9ÿ 2021

With the advancement of science and technology, industrial chain competition and changes in the international situation, the division of labor pattern, operating logic, rule system and competition paradigm of the global nickel industry chain are undergoing profound changes that are different from traditional fossil energy. Existing research on traditional resource geopolitics The paradigm has put forward new requirements. At present, most academic research on nickel and the nickel industry chain studies the properties and uses of nickel and nickel products under the framework of economics, engineering and medicine. Therefore, starting from the discipline of international relations, we sort out the global nickel The development status and game situation of the industrial chain are indispensable. Nickel is an important category of key minerals. The game between the world's major powers around the global nickel industry chain is essentially a game around key minerals. The so-called key minerals refer to the current and Mineral resources that are necessary to meet the sustainable development of modern society for a long time in the future but are high-risk in terms of stable supply. ÿ The concept of critical minerals was first proposed by the West. It was initially a "technical country-based" that focused on the "consumer end" "The concept refers to minerals that are both economically important and closely related to the development of industry and emerging industries, but also have high supply risks due to lack of domestic resources. ÿ Since entering the 21st century, major economies such as the United States, the European Union, and Japan have adopted industrial competition based on Taking into account the security of human resources and resources, research on key minerals is carried out from a national strategic perspective, focusing on lithium, nickel, cobalt, rare earth and other minerals required for the development of new energy, new materials, and new technologies. ÿ As more and more countries specialize in Especially as resource countries join the research ranks, the attributes of key minerals have gradually shifted from "technology country-based" to "resource country-based". Key minerals under the perspective of resource countries pay more attention to the "production end", which means that although the country's resource conditions are favorable, However, due to the backwardness of core development technology, it is in the upstream link of the global product value chain, or due to the excessive negative environmental effects of development, it has to be imported from abroad, resulting in mineral types that are overly dependent on foreign countries. It can be seen that as big countries As industry competition becomes increasingly fierce, the connotation and extension of key minerals are also gradually expanding.

At present, a new round of technological innovation and industrial upgrading has made key minerals the focus of competition among countries. Formulating key mineral strategies and issuing a list of key minerals have become a priority agenda to ensure resource security and achieve national strategic goals. Existing research is mainly based on real cases. ÿ can be divided into two major research paths: multi-sample and single case. The multi-sample research path comprehensively sorts out the critical mineral lists of the United States, the European Union and the United Kingdom.

ÿ Li Wenchang, Li Jianwei, Xie Guiqing, etc.: "Analysis of the status quo, research contents and resource strategies of China's key minerals", published in "Frontiers of Geoscience", Issue 1, 2022,

ÿ Pages 1-13, National Research Institute ÿCouncilÿ ÿÿÿÿÿÿÿ Critical ÿÿÿÿÿÿÿÿÿÿÿÿÿÿ eUS Economyÿ National Academies Pressÿ 2008ÿEuropean Commission itical Raw Materials for the EUÿ 2014 “Indicators for Energy Security”ÿ in Energy Policyÿ Vol

ÿ Bert Kruyt et al , 37 ÿ No 6ÿ 2009ÿ pp 2166 - 2181ÿ Huang Lin, Sun Yan, Guo Weiming, etc.: «Current new materials and required strategies Mineral Overview», Published in "China Mining", Issue 8, 2018, Pages 1-8, Huang Jianbai, Wang Zhiping, Zhong Meirui: "The Impact of Key Industries on China's Metal Consumption—A Comprehensive Analysis Based on a Cross-Industry Perspective", Published «Journal of Central South University» (Social Science Edition), Issue 6, 2018, Pages 103-112.

ÿ Wu Qiaosheng, Zhou Na, Cheng Jinhua: "Research Review and Prospects on Supply Security of Strategic Key Mineral Resources", published in "Resource Science", Issue 8, 2020, Pages 1439-1451.

The overall characteristics of the critical minerals strategies of the above-mentioned countries and regions are expounded. ÿ Some scholars have conducted comparative studies on the United States, the European Union, Japan and Australia, and proposed the evolution rules, driving factors and basis for tool selection of key minerals strategies of major countries. ÿ Some scholars have conducted comparative studies on the key minerals strategies of major countries . Conduct specific analysis and case studies on different key minerals (rare earth elements, chromium, nickel, etc.) to explore the supply and demand situation, development trends and response strategies for different key minerals in OECD member countries. ÿA single case study path is based on a certain big country As the research object, based on the critical minerals research reports and policy texts released over the years, this paper analyzes the development and evolution of its critical minerals strategy. Some scholars have conducted in-depth research on the critical minerals strategy of the United States, focusing on its strategic intentions, evaluation methods, and supply chains. policies and great power competition strategies, etc. ÿ Some scholars have conducted research on Japan's mineral security strategy. They believe that Japan aims to ensure the supply security of key minerals and takes multiple measures to enhance the competitiveness of local industries and promote related industries to occupy the top of the global value chain. ÿ Different Compared with the United States and Japan, Australia, as the world's major supplier of mineral resources, the key minerals strategy proposed is committed to improving the country's mining investment environment and promoting the transformation of its mining industry into a demand-driven one, so as to occupy a dominant position in the key mineral raw materials and refining markets. In addition, ÿ ÿ Existing research also focuses on the availability of critical mineralsÿ, the relationship between technological progress and the demand for critical mineralsÿ, and the supply chain and risks of critical mineralsÿ. However, most of the research objects tend to be factual issues in geography and resource disciplines. Research methods are also more biased towards statistical and econometric models, and rarely involve the interaction of the main actors in the key mineral fields.

ÿ Mao Jingwen, Yang Zongxi, Xie Guiqing, etc.: "Key Minerals—International Trends and Thoughts", published in "Ore Deposit Geology", Issue 2019 Issue 4, Pages 689 - 698

ÿ Ge Jianping, Liu Jiaqi: "International Comparison of Key Mineral Strategies—Historical Evolution and Tool Selection", published in "Resource Science", Issue 8, 2020, Pages 1464-1476.

ÿ Renaud Coulomb et al ÿ "Critical Minerals Today and in 2030: An Analysis s for OECD Countries"ÿ Center for Climate Change Economics and Poli cyÿ 2015

ÿ Zhao Shen, Wang Peng, Wang Lu, etc.: "The Evolutionary Characteristics and Enlightenment of the U.S. Critical Minerals Strategy", published in "Science and Technology Herald", Issue 2022 Issue 8, pages 91-103ÿ ÿ

Zheng Guodong, Chen Qishen, Zhang Yanfei, etc.: «Japan's mineral resource security from the perspective of the industrial chain», published in «Land and Resources Intelligence», Issue 8, 2021, pp. 18-24. Yu

ÿ Yun, Yang Jianfeng: «New trends in Australia's critical mineral policies »ÿ Published in "Land and Resources Information", Issue 7, 2020, Pages 12-16, Sujeong Leeÿ Heeyoung Choiÿ and Kyungkeun Yooÿ "Australia's Latest Strate" gy for the Development of Critical Minerals" in Journal of the Korean Society of Mineral and Energy Resources Engines ÿ Vol 59ÿ No 2ÿ 2 022ÿ pp 233-239 Cheng Jinhua et al.: "Research status and prospects of strategic key mineral availability evaluation methods", published in "Journal of China University of

ÿ Geosciences"

(Social Science Edition), Issue 4, 2022, Pages 38-49.

Dong Xuesong et al.: "Research Review on the Impact of Technological Progress on the Demand for Key Metal Minerals", published in "Resource Science", Issue 8, 2020 ÿIssue , pages 1592-1603

ÿ Shen Xi, Guo Haixiang, Cheng Jinhua: «Assessment of the resilience of key mineral supply chain network nodes under sudden risks—taking nickel ore products as an example», published in «Resource Science», Issue 1, 2022, pp. 85-96, Li Jing et al.: "Safety Risk Prevention and Control and Enlightenment of U.S. Critical Mineral Supply Chains", published in "Intelligence Magazine", Issue 6, 2022, pp. 58-65.

Model and behavior interaction

mechanism. Different from traditional fossil energy development, the development and utilization of key minerals is not only subject to natural resource endowments, but also depends on the core technologies required for exploration, mining and processing. With the rapid development of the technological strength of emerging countries, With the rise of China, major developing countries represented by China have broken the technological monopoly of Western developed countries and played an indispensable role in the global game of key minerals. From a structural point of view, there has been a traditional gap between developing countries and developed countries. The "producing country-consuming country" pattern has been broken, and the "triangular interactive relationship" pattern between Western developed countries, emerging countries and resource countries has become increasingly prominent. The former two master core technologies, and the latter has resource endowments. The relationship between the three The interactive game has reshaped the power structure of the global key minerals. This article will focus on the global nickel industry chain, construct a "power triangle" analysis framework for key minerals, and on this basis try to explore the game situation and evolution of the global nickel industry chain, so as to provide It provides a lesson for China to better safeguard its national strategic interests in the new period of turbulence and change.

The “Power Triangle” Analysis Framework of Two Key Minerals

The discipline of international relations has always paid attention to the allocation of power on a global scale. Power is one of the core concepts of Western political science and sociology. It refers to the ability of an individual or group to make other individuals or groups obey. ÿ Power is transformed from advantages, and strives to Individuals or groups that maximize their interests are in an eternal game, and the outcome of the game depends on the comparison of power and its application. The comparison of power between different subjects and the way they use power lead to different power distribution patterns, which constitutes power. Structure. William Domhoff and Wright Mills defined power structure from the perspective of social structure, and extended this concept to international society. ÿ There is a global power structure in international society, which refers to the power among different international actors. The distribution pattern among countries (mainly countries) can be divided into two types: equal type and centralized type. The equal type refers to a relatively equal distribution pattern of power among countries. Small and medium-sized countries can also have certain powers. The centralized type is A distribution pattern in which power is mainly concentrated in a few large countries. Two types of power structures

---

ÿ [Germany] Written by Max Weber, compiled by Zheng Leping: "Economic and Social Religion—Selected Works of Max Weber", Shanghai: Shanghai Academy of Social Sciences Press, 1997, Michael Mann, "The Source" es of ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ ÿ of ÿÿÿÿÿÿÿÿÿ 1ÿ 1986ÿ pp 1760 - 1914

ÿ Howard Kimeldorfÿ “ 'The Power Elite and the St ate: How Policy is Made in America'ÿ By G William Domhoff (Book Review)" in Social Forces ÿ Vol 70 ÿ No 1ÿ 1991ÿ p 249ÿ [US] Written by Wright Mills, Wang Kun Translation: «Power Elite», Nanjing: Nanjing University Press, 2004, [Italian] Written by Gatano Mosca, Translated by Jia Hepeng: «The Ruling Class», Nanjing: Yilin Publishing House, 2012,

Two almost opposing development mechanisms have been derived from this model, namely the inclusive development mechanism and the exclusive development mechanism. ÿ The inclusive development mechanism refers to a mechanism in which members of the international community share resources and achievements, while the exclusive development mechanism means that major countries share resources and achievements. Carry out monopoly. The so-called development means the dual transition of the power structure from centralized to equal and the development mechanism from exclusive to inclusive.ÿ

In the field of key minerals, the development and utilization of key minerals depends on the natural resource endowment on the one hand and the core technologies required for exploration, mining and processing on the other hand. It is difficult for countries with neither resource endowments nor core technologies to enter the key mineral industry. The arena of mineral gaming. Therefore, countries can be roughly divided into two categories: "technological countries" and "resource countries". "Technological countries" refer to mastering the complete technological chain of "exploration-mining-processing" and possessing investment in the entire industry chain. The huge amount of capital required is based on existing industrial advantages and national development strategies. Countries that have a large demand for key minerals, but are relatively deficient in resource endowments due to their own geological conditions, generally rely on their technological and capital advantages to expand outward. In order to make up for the resource gap, a "resource country" refers to one or several key minerals that are relatively rich in resource endowments, but usually do not have independent exploration, mining and processing capabilities, nor do they have the huge capital required for technology research and development. Mining activities generally directly serve countries for export rather than domestic demand. Exporting large quantities of raw ore or primary mineral products often becomes an important engine for their economic and social

development. Based on the different historical stages of obtaining technological advantages, "technological countries" can be divided into "technological countries that retain technology". " and "Emerging Technology Countries". "Constant Technology Countries" refer to the Western technological powers headed by the United States that have accumulated a profound technological foundation during the first two technological revolutions and won in fierce competition. They will Technological power is firmly in their own hands. They rely on technological advantages to establish a centralized power structure and monopolize the global resource market. They maintain their technological hegemony in the long term by establishing an exclusionary development mechanism, shaping the current "winner takes all" global resource order.ÿ "Emerging technology countries" refer to developing countries that were once disadvantaged in the international division of labor due to technological backwardness, but have rapidly achieved technological rise since the third scientific and technological revolution. They are mainly emerging powers represented by China. Especially the fourth Since the Second Industrial Revolution, emerging technology countries have emerged as a group and have continuously jumped up in the global industrial chain, supply chain and value chain

ÿ Gao Bo: «Equality of opportunity, economic freedom and power structure - Comparison and theoretical criticism of development models in Latin America and East Asia», published in «Latin American Studies», Issue 5, 2010, pp. 53-61. Gao Bo: «From the perspective of power structure Development Trap ——Based on the Analysis of Venezuela's "Punto Fijo System"» Published in "International Political Research", Issue 1, 2020, Pages 9-36.

Gao Bo, Li Haomin: «Power structure, land equality and national development», published in «World Economy and Politics», Issue 12 ÿ , 2022, pp. 116-149 ÿ ÿ

Ruth Knoblichÿ "The Role of Science and Technology" Logy in the Dynamics of Global Change and the S ignificance of Internal Knowledge Coop Eration in the Post - western World: An Intervie w with ÿÿÿÿÿÿÿÿÿÿ in The ÿÿÿÿÿ Science and Technology 273ÿ Li Ping, Liu Jian: «Political Economic Analysis of the Relationship between International Technology Monopoly and Technology Diffusion», published in «World Economy and Politics», Issue 5, 2006, pp. 68-73. He Yuping, Qin Haijing, et al.: «Globalization Technological Monopoly and Technology Diffusion in China » Beijing: Science Press, 2009, Page 3

The technological advantages of latecomers have a profound impact on the current international power structure. However, emerging powers are excluded from the centralized power structure and existing resource order rules dominated by technology-defying countries, resulting in limited space for upgrading their industrial chains and upgrading paths for their value chains. ÿ Therefore, emerging technology countries are committed to establishing an equal power structure and inclusive development mechanism, promoting the establishment of a more just, reasonable, stable, and universally beneficial global resource order, and advocating that all countries have the opportunity to achieve equitable development regardless of technological capabilities and resource endowments. opportunityÿ

The basic attributes of key minerals and the endowment characteristics of different countries determine that technological countries and resource countries have technological and resource advantages respectively, and thus form a set of power relationships, namely "technical power" and "resource power". Technology in essence It is an important part of knowledge power and has distinct political attributes. Technological changes can affect the balance of power between countries, and then play a role beyond national boundaries, having an important impact on international political and economic relations. ÿ Susan Strange and Joseph Naijun recognized the fundamental role of technology in national power. ÿ From the perspective of the history of human development, from fossil energy to today's key minerals, technology has always been the fundamental force that promotes industrial upgrading and shapes the global economic pattern. ÿ Who can obtain technology Whoever makes breakthroughs in innovation is likely to gain an advantage in the global industrial chain, and thereby gain dominance over international economic relations. ÿ The monopoly of technological oligopoly power in key mineral fields is particularly obvious. For example, in upstream exploration and mining and midstream smelting, fresh water A few oligarchs represented by Vale SA, Glencore, BHP and others control exploration, mining and processing technology. The monopoly of technology oligarchs on all aspects of the industrial chain constitutes the source of technological power for the home country.

If technological power is the patent of technological countries, then the inherent resource advantages of resource countries are the source of resource power. Historically, resource countries have always fallen into an abnormal "paradox of abundance" or "capital resources".

ÿ Cédric Durand and Wiliam Milbergÿ "Intellect ual Monopoly in Global Value Chains"ÿ in Revie w of International Political Economy Vol 27ÿ N o 2ÿ 2020ÿ ÿÿÿÿÿÿÿÿ ÿÿÿÿÿÿÿÿÿ "The Crisis of ÿÿÿ ÿÿÿÿÿÿ ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ in Cambridge Journal of Economicsÿ Vol 38ÿ No 6ÿ 2014ÿ pp 1409 - 1429ÿ Jeremy Black ÿ The Power of Knowle dge: How ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ dern World ÿ 2014. ÿ

[US] Written by Joseph Nye, translated by Liu Hua: "Is the United States Destined to Lead the World?—The Changing Nature of American Power", Beijing: China Renmin University Press, 2012, pp. 23-29, p. 150, [English]] Written by Susan Strange, translated by Yang Yuguang and others: "State and Market", Shanghai: People's Publishing House, 2006, pp. 19-38,

ÿ [American] Written by Charles P. Kindleberger, translated by Gao Zugui: « World Economic Hegemony: 1500-1990» Beijing: The Commercial Press, 2003, pp. 201-242, pp. 282-312, [English] Paul Kennedy, translated by Jiang Baoying and others: «The Rise and Fall of the Great Powers: 1500-2000 0 years Economic changes and military conflicts», Beijing: China Economic Press, 1989, pp. 180-184, pp. 246-247, Translated by Li Wei and Li Yu:

ÿ «Analysis of the "war" between the United States and Huawei - Transnational The Political Economy of Supply Chains», Published in "Contemporary Asia-Pacific", Issue 1, 2021, Pages 4-45, Feng Zhaokui: "Looking at the New Economy from the View of Technological Progress", Published in "World Economy and Politics", Issue 5, 2001 ÿ Pages 29 - 30 ÿ Li Bin, Chen Yi: "International Political Economics Analysis of High-Tech Industrial Competition" ÿ "World Economy and Politics" ÿ Issue 3, 2019 ÿ Pages 135 - 154

"Source Curse", the operating model of the global economy of "resource countries - producer countries - consumer countries" seems to be fixed. ÿ The four rounds of commodity cycles from the beginning of the 20th century to the present have caused resource countries to fall into a cycle of periodic prosperity and long-term silence. The unsustainability of the global economic operating model has become increasingly prominent. Drawing on academic research on "energy superpowers", resource countries can rely on the policy system of resource nationalismÿ to transform resource advantages into resource power in two ways: one is to leverage resources Industry plays a fundamental role in economic development; the other is to use "resource diplomacy" to seek international influence. ÿ In recent years, resource countries have increased their efforts to introduce policies and measures with a color of resource nationalism, which foreshadows the policies of resource countries. The goal is no longer limited to earning export profits from the short-term boom in commodities, but begins to explore the transformation of resource endowments into resource power, and use resource power to promote the upgrading of the industrial chain to achieve its own economic development.

In fact, technological power and resource power are a set of asymmetric power relationships. The technological country not only controls the complete technological chain of "exploration-mining-processing", but also has abundant capital to transfer the industrial chain to the resource country. Therefore, it can Partial "diffusion" of technological power can be achieved by investing in and setting up factories, thereby controlling the mineral mining and primary processing industries of the resource countries, and ultimately achieving control over resource power. At the same time, due to the geographical dependence of resource mining activities, the mineral resources of the resource countries have Extraction activities are usually limited within the scope of the country, and the transfer of resource development cannot be achieved by imitating the transfer of technology and industrial chains from technology countries. Coincidentally, the mining and processing activities of resource countries are usually highly dependent on the technology and financial support of technology countries. Therefore, the transformation of resource power into technological power is almost impossible to achieve. In order to bridge its own resource gap and the need for industrial development, technological power has a natural tendency to "control" resource power, and the "counter-control" of resource power over technological power is also caused by This results in the fact that in the field of key minerals, the power distribution between technological countries and resource countries often creates a centralized power pattern and an exclusive development mechanism, that is, technological power is concentrated in a few technological countries, and technological countries can often rely on technological power to achieve resource power. The dual transition of the power structure from centralized to equal and the development mechanism from exclusive to inclusive depends on the development and improvement of global resource governance (see Figure 1).

ÿ Feng Xuming, "Eye of Oil: Insights into the New Pattern of China and the World Economy", Beijing: Social Science

ÿ Literature Press, 2017, Jeffrey Wilson, "Resource N ÿÿÿÿÿÿÿÿÿÿResource ÿÿÿÿÿÿÿÿÿ? Explainin gAustralia's Application to Chinese Information in its Minerals Sector"ÿAirsÿ Vol 65ÿ No 3ÿ 2011ÿ pp 283 - 304 Meghan L O'sull ivanÿ "The Entangling of Energyÿ Grand Strat ÿÿÿ

ÿ ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ Policy tlandÿ "Russia as an Energy Superpower" in New Political Economy ÿ Vol 13ÿ No 2ÿ 2008ÿ pp 203-210

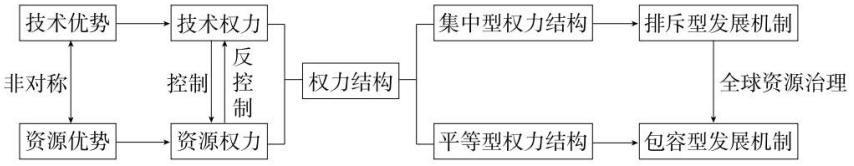

Figure 1 Analysis framework of power and power structure

Source: Made by the authorý

Established technology countries, emerging technology countries and resource countries interact around the control, competition and distribution of technology power and resource power, forming the basic form of the power structure in the key mineral field - the "power triangle" (see Figure 2). In the country In the process of pursuing power and the market pursuing prosperity, the three have formed completely different national will positions and resource governance concepts. The formulation of national resource strategies and the development and utilization of key minerals have become the intersection of the three logical demands, which also determines their relationship. There are structural contradictions in global resource governance, that is, there is a contradiction between hegemonic protection and order reshaping between established technology countries and emerging technology countries. There is a contradiction between development needs and solidified division of labor between resource countries and established technology countries. Resource countries and emerging technology countries. There is a contradiction between technological countries and the mismatch between economic needs and political status (see Table 1).

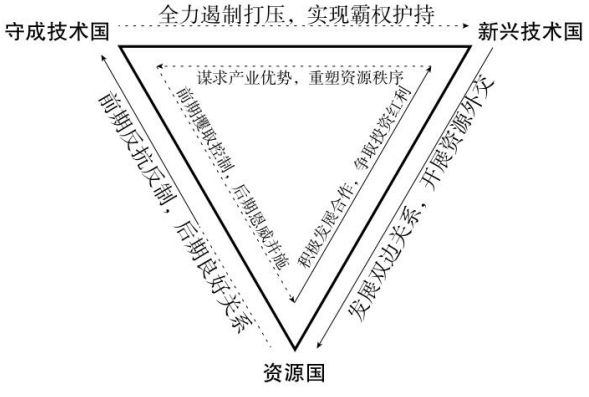

Figure 2 “Power Triangle” of Key Minerals

Note: The solid arrows represent positive relationships, the dotted arrows represent negative relationships. Source: Author's own production.

Table 1 Three pairs of contradictions under the "power triangle" relationship

main body	contradiction
A country with established technologies - a country with emerging technologies - a country with established technologies - a country with established technologies	The contradiction between the contradictory development needs of maintaining hegemony and reshaping order, and the contradiction between the solidification of division of labor.
Resource country - emerging technology country	The contradiction between economic needs and political status

Source: Author's own

First of all, the conservative technology countries and the emerging technology countries are engaged in a game over the protection of hegemony and the reshaping of the global resource order, which constitutes the first pair of contradictions in the power triangle. Due to different historical backgrounds and development paths, the conservative technology countries that emerged from the colonial era have a different relationship with each other. Centralized power structures and exclusionary development mechanisms have natural path dependence, because they are an important basis for generating and maintaining their national strength. Correspondingly, emerging technology countries that grew up in the era of globalization have a strong need for equal power structures and inclusive development mechanisms. The traditional development mechanism is full of aspirations and seeks to change the unfair and unreasonable resource order in global resource governance. However, this is regarded as having the intention of "challenging hegemony" by conservative technological countries. ÿ Currently, the advent of the digital age has made strategic industries Technology-intensive characteristics have been strengthened as never before. The technological advantages accumulated by the technology-defending countries over the past 200 years have encountered major challenges in just a few decades. The insecurity of "the technology monopoly has been broken" has been amplified. In the face of strong competition from emerging technology countries ÿ The strategic intentions of conservative technological countries increasingly show the distinctive characteristics of hegemonic support. ÿ Under the geopolitical logic of hegemonic support, conservative technological countries increasingly calculate relative gains more than they consider absolute gains, and do not hesitate to frequently use the "power stick" to contain The rise of emerging technology countries, and emerging

technology countries also use "visible hands" to hedge against the containment and suppression of established technology countries. Secondly, resource countries and established technology countries engage in strategic interaction on the development needs and the need to consolidate division of labor, forming a "visible hand" The second pair of contradictions in the "power triangle". In fact, the contradiction between resource countries and conservative technology countries is the specific manifestation of the asymmetric power of resource countries and technology countries mentioned above in a specific historical period. As Marx said, the impact on nature The appropriation of human resources is inherent in capitalism. Capitalism is driven by profit and plunders land and workers. In a sense, the history of the development of human society is the unjust control of natural resources by a few conservative technological countries on the land of resource countries. In the colonial era that lasted for hundreds of years, technologically conservative countries violently plundered global resources. The exclusionary development mechanism was gradually established in the process of conquering Asia, Africa and Latin America. That is, the vast resource countries in Asia, Africa and Latin America specialized in raw materials. With the rise of the national liberation movement after World War II, although the direct plundering of the conservative technology countries has been restrained in form, in essence, the vast number of resource countries are still using economic coercion and military force to exploit and produce the goods. Predation and exploitation continue through more covert means such as intervention, industri

ÿ Felix Prestonÿ Rob Bailey and Sian Bradleyÿ " Navigating the New Normal China and Global Re Source Governance"ÿ A Joint DRC and Chatham Hou See Report org/sites/default/files/publications/resea rch [2023-03- 30]

ÿ Sun Haiyong: «Offensive Technological Nationalism and the U.S.'s Technological War against China», in International Outlook, Issue 5, 2020, pp. 46-64. Yan Xuetong: «The International Competition Trend Reflected by the U.S.'s Containment of Huawei», in «International Political Science», Issue 2, 2019, pp. 3-6. Cai Yiming: «Resources, technology, institutions and the change of economic hegemony countries —explanations based on property rights theory and economic growth theory», published in «World Economy and Politics», Issue 12, 2007, Pages 15-23, Mohan Malikÿ "Technopolitics: H ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ ÿ in The Interface of Science ÿÿÿÿÿ Vol 12ÿ 2012ÿ ÿÿÿ 21 -29

ÿ Compilation and Compilation Bureau of the Works of Marx, Engels, Lenin and Stalin of the Central Committee of the Communist Party of China: "Selected Works of Marx and Engels Volume 43", Beijing: People's Publishing House, 1974, pp. 531-532.

They try to solidify the global division of labor and "pin" resource countries to the bottom of the global industrial chain and value chain forever. From the perspective of resource countries, extractive activities are unsustainable because they are destructive in nature. ÿÿ The development of resource countries needs to gradually transcend the short-term benefits of the short-term prosperity of commodities, and their resource policies are increasingly "anti-control". How to effectively use their own resource endowments to promote their own industrialization and achieve an improvement in the value chain has become an increasingly important issue. Priority issues for resource countries to achieve their own development.

Finally, resource countries and emerging technology countries engage in strategic interaction regarding the objective situation of mismatch between economic needs and political status, constituting the third pair of contradictions in the "power triangle". Currently, the degree of interdependence between resource countries and emerging technology countries is increasingly deepening. Resource countries are indispensable overseas suppliers and stable and reliable sources of imports for emerging technology countries, while emerging technology countries are the overseas markets and investment sources that resource countries rely on for their survival. Both sides have a strong desire to change the status quo of global resource governance. However, ÿ It is almost impossible to achieve the above goals by relying solely on bilateral relations - whether emerging technology countries strive for industrial competitive advantages or resource countries seek to improve their value chain status, they all rely on open international markets and orderly resource trade, while established technology countries The dominant position in the current “winner takes all” global resource order has become an obstacle to change. As John Ikenberry said, "[They] are facing not just each other, but the product of centuries of struggle and innovation, a broader international order." Generally speaking, resource countries and emerging technologies The contradiction between the economic needs and political status of the country does not largely lie in the bilateral relationship itself, but is affected by the pressure of the system. The future direction of this contradiction depends more on whether resource countries and emerging technology countries can cooperate in the While pursuing its own development, it should properly handle its relations with countries that maintain technological status.

In fact, the last two pairs of contradictions in the "power triangle" are constantly changing with the evolution and escalation of the first pair of contradictions. Currently, the industrial competition among technological countries is becoming increasingly fierce, and the global resource market is shifting from a "buyer's market" to a "seller's market." However, the resource countries are located at an important juncture between the conservative technology countries and the emerging technology countries. They are holding more and more bargaining chips and initiative - the conservative technology countries no longer pursue naked "extractivism" against them as they did in the colonial era. ” policy, but to superimpose more investment and assistance to cope with competition from emerging technology countries. Emerging technology countries seek an equal and mutually beneficial partnership with resource countries as development partners to offset the constraints and constraints from established technology countries. However, due to the limitations of national strength, the expansion of the game space does not mean that resource countries are enough to become competitors of technology countries. Therefore, "playing both ways" to enhance strategic autonomy has become the first choice of resource countries in the game: On the one hand, resource countries

ÿ Alberto Acosta, Wang Congcong: «Extractivism and Neo-Extractivism: Two Sides of the Same Curse», in «Nanjing Industry University Journal» (Social Science Edition), Issue 1, 2017, Pages 51-60.

ÿ John Ikenberry ld Order: Internationalism after America”ÿ in Foreign Affairs 2011 pp 56 - 68

Countries with established technologies maintain good relations with established technology countries in exchange for more public goods. On the other hand, resource countries actively develop industrial cooperation with emerging technology countries in order to obtain more investment and development dividends.

The current status of the global nickel industry chain and the "power triangle" game

After years of development, the global nickel processing industry has developed a relatively complete industrial chain of "raw ore supply - smelting and manufacturing - terminal application". The upstream, midstream and downstream links are closely related. Changes in any link will have a significant impact on the entire industry chain pattern.

In the upstream raw ore supply chain, global nickel ore reserves and production are dispersed and concentrated in the "two belts and two rings". In terms of reserves, as of 2022, the world's proven land-based mineral deposit reserves are about 100 million tons. According to geology The genetic classification mainly includes two types: nickel sulfide ore (accounting for about 64%) and laterite nickel ore (accounting for about 46%). They are scattered in the two major nickel ore distribution belts of tropical mid-low latitudes and northern mid-high latitudes. In the "two belts" " Two more concentrated annular distribution areas, namely the "Pacific Rim" and the "Atlantic Rim", are formed within it.

When it comes to countries, the concentrated distribution of nickel ores is even more obvious. The total recoverable reserves of Indonesia, Australia, Brazil, Russia, Cuba and the Philippines account for nearly 80% of the global total. In terms of output, nickel ore mining in the early years was dominated by Canada, Russia and other countries with traditional nickel sulfide ores in the north, middle and high latitudes are the main countries. However, in recent years, nickel sulfide ores have generally faced the problem of depletion of high-grade nickel ore resources. Coupled with the development of hydrosmelting technology, the output of laterite nickel ores in tropical middle and low latitudes has increased. Rapidly rising, it has become the mainstream of current nickel mining. According to data from the United States Geological Survey (USGS), Indonesia's laterite nickel ore production has increased more than 6 times since 2010, and will firmly rank first in the world with an absolute advantage of 1.6 million tons in 2022. The largest nickel ore producer, accounting for nearly half of the world's total nickel ore production. ÿ The Philippines is the world's second-largest nickel supplier after Indonesia. According to S&P Global Market Intelligence estimates, the Philippines' nickel ore production may reach 20% by 2025. Reaching 500,000 tons, the development potential is very huge. Currently, global nickel ore metal production fluctuates between Indonesia and the Philippines. Southeast Asia has also become the "heartland" of global nickel ores under the wave of clean energy.

In the midstream smelting and manufacturing link, the current "main track" of global nickel manufacturing is jointly occupied by leading domestic and foreign companies, gradually forming a multi-polar pattern. Traditionally, global nickel manufacturing is mainly dominated by Russia's Norilsk Nickel Company (Norilsk Nickel), BHP Billiton, Vale, Glencore, Sumitomo Corporation

---

ÿ US Geographical Surveyÿ "Mineral Commodity Sum maries 2023"ÿ January 2023 https: / / pubs usgs gov / periodicals / mcs2023 / mcs2023 pdf [2023-07-10]

ÿ Alvin Cambaÿ "The Unintended Consequences of National Regulations: Large - scale - small - sca le Relations in Phillippine and Indonesian Nic kel Mining"ÿ in Resources Policiesÿ Vol 74ÿ No 10221 3ÿ 2021ÿpp 1-10

Overseas multinational companies such as Sumitomo and Anglo American are dominant. In recent years, China, represented by Tsingshan Group, CATL, Jinchuan Group, Jiangsu Delong, etc. Companies are vying for Southeast Asia, gradually breaking the competition between leading overseas companies. Monopoly on the nickel product market. In 2009, Tsingshan Holdings successfully acquired 470,000 hectares of laterite nickel mines in Indonesia and directly smelted them locally. In 2018, Tsingshan Holdings' nickel output ranked first in the world.

In the downstream terminal application link, nickel is called the "industrial vitamin" and is mainly used in steel, nickel-based alloys, electroplating, batteries and other fields. Stainless steel is the largest consumer use in downstream. In 2021, nickel for stainless steel accounted for the total global nickel consumption. Nearly 70% of the total. Nickel is also an important raw material for nickel-metal hydride batteries, nickel-cadmium batteries, and ternary material lithium-ion batteries. It is widely used in electric vehicles and new energy batteries and other fields. It is the key to improving battery energy density and extending cruising range. At present, the new technology competition pattern has not yet formed, and the development of innovative potential is reshaping the industrial pattern. Under the wave of clean energy, the demand potential for nickel in the battery field will be extremely huge. In 2021, nickel consumption in the battery field accounted for only 7%. However, due to the electric The automobile, battery energy storage and other industries are developing rapidly. It is expected that the proportion of nickel demand for batteries will increase to 41% in 2040. ÿ Tesla CEO Elon Musk has publicly stated more than once that Tesla will expand lithium-ion battery production The biggest problem is "nickel shortage". In addition, nickel is also commonly used in electroplating, catalysis and permanent magnet materials. It is used in strategic emerging industries such as electronic remote control, atomic energy industry and ultrasonic technology.

The current trade flow of the nickel industry chain is mainly from Southeast Asia, Oceania, and Latin America to East Asia The three core nickel ore consumption areas: (accounting for about 82%), Europe (accounting for about 11%) and North America (accounting for about 6%), constitute the international trade pattern of "three circles and two systems" of global nickel ore resources. The “three circles” refer to the Asia-Pacific trade circle (I), the American trade circle (II), and the transatlantic trade circle (III). The “two systems” refer to the nickel ore supply and demand integrated system of the Asia-Pacific trade circle and the nickel supply and demand systems of the other two circles. In the ore supply and demand separation system, major nickel ore supplying countries such as Indonesia, the Philippines, Australia and Brazil have close relationships with the three trade circles. The trade circles partially overlap and complement each other. Previously, the "Russia-Europe Trade Circle" also It occupies an important position in the global nickel ore trade pattern. However, in February 2021, water seepage accidents occurred in two mines of Russia's Norilsk Nickel Industry and production was suspended. Other nickel ore suppliers such as Sumitomo quickly seized the market and quietly changed the original The global nickel ore supply and trade pattern. In addition, the outbreak of the Ukraine crisis in 2022 has dealt a heavy blow to the Russian-European nickel ore trade. Norilsk Nickel, which previously controlled about 1/10 of the global nickel ore market,

---

ÿ McKinsy & Company nd Supply Perspective”ÿ June 2022 https: / / worldmaterialsform com/ files/ presentation ns2022 [2023-03-27]

ÿ Mathias Döpfnerÿ "Elon Musk Reveals Tesla's Pl an to Be at the Forefront of a Self - driving - ca r Revolution and Why He Wants to be Buried on Ma rs” com [2023-07-02]

Production cuts may be announced. If the crisis continues and there is no mutual compromise solution, the decline of the "Russia-Europe trade circle" in the global nickel ore trade pattern will be a foregone conclusion.

As a key raw material for strategic emerging industries, the strategic status of nickel continues to increase. The United States, China and Indonesia, as the most important established technology countries, emerging technology countries and resource countries in the current power structure of the global nickel industry chain, are all re-examining, Assess the acquisition and utilization status of nickel, and improve relevant strategies to ensure the security of the nickel chain. The United States and China are engaged in a game over the hegemony of the global nickel industry chain and the reshaping of the global resource order, which profoundly affects their respective policy orientations towards resource countries, and this This policy orientation based on the different positions of established technology countries and emerging technology countries further affects the policy considerations of resource countries represented by Indonesia under the "power triangle". The three countries have strategic interactions on the global nickel industry chain, jointly shaping the current global nickel industry. The international game situation of the chain, the global nickel industry chain has gradually become an important battlefield for a new round of global game. ÿ

(1) Strategic interaction between established technology countries and emerging

technology countries. The game between the United States and China over the global nickel industry chain is essentially a game between established technology countries and emerging technology countries around the contradictions of hegemony protection and reshaping of the global resource order. ÿ The rapid rise of emerging technology countries represented by China has had a great impact on the centralized power structure dominated by the United States. Therefore, in order to maintain its core leadership position in the nickel industry chain, maintain the current "winner takes all" exclusion type of resource governance pattern, the United States has clarified the strategic status of nickel for the first time at the legal and institutional levels, including nickel in the latest list of critical minerals announced in 2022ÿ, and regards China as the main predator of global nickel mines and its own nickel industry The main threat to blockchain hegemony is to transform technological power into a “big stick” to contain and suppress China’s rise.

On the one hand, the United States carries out technological suppression of China's nickel industry chain and builds a "small courtyard and high wall" of the nickel industry chain. The United States seeks to build an industrial chain alliance that excludes China, and uses the alliance system and global partnerships to promote the alliance of production and manufacturing links. Regionalization locks in China’s industrial upgrading space, ultimately making it unable to challenge the United States’ dominant position in the nickel industry chain. The United States has repeatedly emphasized green relationship networks and plans to combine the “Build Back a Better World” (B3W) initiative with the EU’s “Global Gateway Strategy” and The United Kingdom’s “Clean Green Initiative” is aligned with the goal of ensuring that most clean energy technologies and key minerals can be purchased and produced within the alliance system. The important position of the nickel industry chain cannot be ignored. In addition, the United States announced that it will cooperate with major partners such as Canada The country establishes the "Mineral Security Partnership" to ensure the stability of the supply of critical minerals

ÿ Margaret Hofmann, et al , "Critical Raw Materials: A Perspective from th eMaterialsScienceCommunity"ÿinSustainable Materials and Technologies ÿ Vol 17ÿ 2018ÿ p 74 " Final List of Critical Minerals 2022"ÿ February 24

ÿ ÿ 2022 https: / / www iea org / policies / 15271 - final - list - of - critical - minerals - 2022 [2023 - 06 - 27]

and diversification. ÿ Although the establishment of the "Mineral Security Partnership" is not aimed at the nickel industry chain, but for a wide range of mineral alliance relationships, it actually constitutes a complete nickel industry chain - its relationship scope not only covers Canada, Mineral supply countries such as Australia also include nickel processing powerhouses Japan, South Korea, and major consumer countries such as Germany. This is obviously an industrial chain alliance of conservative technological countries led by the United States, participated by major Western countries, and seeking to exclude China.

On the other hand, the United States has suppressed the market of China's nickel industry chain and "selectively decoupled" China. The United States seeks to comprehensively attack the Chinese market on a regional and even global scale. Currently, the most important end-use downstream of the nickel industry chain is stainless steel. China is the world's largest producer and exporter of stainless steel, and is also the most important source of stainless steel imports for the United States and Europe. The United States' market suppression of China also began with the "anti-dumping" of stainless steel plates and strips. On March 3, 2016, Ying American AK Steel Corporation (AK Steel Corporation), Allegheny Technology Corporation (Allegheny Ludlu) m), North American Stainless Steel (North American Stainless Steel) and Outokumpu Stainless Steel (Outokumpu Sta Inless (USA) and other companies have applied. The U.S. Department of Commerce has imposed restrictions on imports from China. launched an anti-dumping and countervailing investigation into stainless steel plates and strips, and made a positive final anti-dumping and countervailing ruling in 2017. ÿ Under the "bewitchment" of the United States, Canada also actively took the action of "decoupling" from China. By the end of 2022 ÿ The Canadian government has made the largest update to the Investment Canada Act in 10 years, and has repeatedly mentioned China during legislative discussions, saying that China is "a destructive force" and Canada needs to be "more vigilant". Vancouver-based FPX Nickel Mining Company announced at the end of 2022 that it had raised US$12 million for the development of a new nickel mine project in the country. The company's CEO made it clear that the investment will never come from China. ÿ

As an emerging technology country in the nickel industry chain, China promotes the establishment of a more just, reasonable, stable and universally beneficial global resource order, advocating that all countries, regardless of their technical capabilities and resource endowments, can achieve equitable development and ensure common security. This has brought great benefits to the United States. There has been tremendous objective pressure. Therefore, in the face of the United States' geopolitical suppression measures such as forming various resource alliances or supply chain alliances, China has not proposed exclusive measures of "an eye for an eye, a tooth for a tooth", but "multiple" measures. We will build a strategic system for the internationalization of nickel resources in a coordinated manner, from improving domestic nickel ore resource supply security capabilities to comprehensively enhancing new energy technology competition.

ÿ Andy Homeÿ "U S Forms 'Friendly' Coalition to Se Cure Critical Minerals"ÿ June 30ÿ 2022 https: / / www ÿÿÿÿÿcom/ ÿÿÿÿ [2023-06-ÿ0] «The United States conducts

ÿ anti-circumvention investigation of stainless steel plates and strips»ÿ China Trade Remedy Information Network, May 13, 2020 https: / / cacs mofcom gov / 202005 / 164035 html [2023-07-01]

ÿ Gabriel Friedmanÿ "Ottawa Sends 'Very Clear Si Gnal to Chinese Investors' with Tightening of Critical Minerals Policy "ÿ December 9ÿ 2022 http s: / / financialpost com/ commodities/ mining / otta wa - chinese - investors - critical - minerals - po licy [2023-06 - 26]

Starting from striving to compete, promote the high-quality development of domestic nickel mines and its mid-stream and downstream industrial chains, and strive to occupy a favorable position in the global nickel

industry chain. (2) The policy orientation of the two types of technology countries

towards resource countries is due to the existence of paths for the conservative technology countries to exploit resource countries. Therefore, the strategic interaction between the United States and nickel ore producing countries is fundamentally a global game between established technology countries and resource countries around the contradiction between solidified division of labor and development needs. However, in the face of the challenges of emerging resource countries represented by China, In the face of strong competition, the United States has to adjust its historical tradition of exploiting and plundering resource countries, and instead adopts the compound method of "co-opting + applying pressure". It comprehensively uses "carrot + stick" to improve relations with resource countries and strengthen its relationship with resource countries. While cooperating with other countries, it also forces resource-resource countries to dare not completely fall to China's side.

First of all, the United States has strengthened its assistance and investment in nickel ore resource countries, and strives to include resource countries in the resource alliance established under its leadership. On the one hand, it focuses on attracting nickel ore resource countries under traditional alliance relationships. In June 2019, the United States and 9 The Energy Mineral Resources Governance Initiative (ERGI) was jointly released by two major global producers of mineral resources. It aims to establish an international alliance for energy critical minerals, covering Canada, Australia, the Philippines and other major global nickel ore suppliers and nickel project investment centers. In June 2022, the "Mineral Security Partnership" announced by the United States once again included nickel ore supplier countries such as Canada and Australia. On the other hand, it actively "throws an olive branch" to nickel ore resource countries with ally potential. The United States International The Development Finance Corporation (DFC) has decided to make a new investment of US$30 million in the Irish Battery Metal Mining Company (TechMet) on the basis of existing support to develop Brazil's key mineral nickel and cobalt mining platforms, "Transitioning to clean energy. Enhance the resilience of the industrial chain and supply chain"ÿÿ

Secondly, the United States has strengthened the construction of standardized tools and put pressure on nickel ore-producing countries in the name of promoting "responsible" and "sustainable" mining of nickel ore. The United States has led the establishment of an organization dedicated to improving environmental, social and governance (ESG) standards. "Independent organizations" - the Initiative for Responsible Mining (IRMA) and the Global Battery Alliance (GBA), have joined forces with the European Union to provide a green economic development agreement totaling US$20 billion to Indonesia, the world's largest nickel ore producer, to promote nickel mining. ESG global standards for the industry. This pressure for sustainable standards transmitted to first-line mining companies will greatly affect the market's enthusiasm for investment in the Indonesian nickel industry. At the same time, due to the participation and autonomy of the governments of resource countries in the process of standard formulation and implementation, The regulatory capabilities are very limited. The international norms advocated by the United States carried by the above-mentioned measures are bound to create external pressure and practical challenges for the nickel industry policies and environmental reforms of the governments of resource countries. In addition, the domestic legislation of the United States also imposes restrictions on nickel ore producing countries and Chinese investment. Indirect pressure on relations with nickel companies, such as passing the "Inflation Reduction Act"

ÿ "Fact Sheet: Presents Bidenÿ Widodoÿ von d er Leyenÿ and G20 Announcement G20 Partnership for Global Infrastructural and Investment Projec ts "ÿ The White Houseÿ Nowember 15ÿ 2022 https: / / www ÿÿÿÿÿÿÿÿÿ/ÿÿÿÿÿ ÿÿÿÿÿ/ ÿÿÿÿÿÿÿÿÿÿ leases/ 2022 / 11 / 15 [2023-06-25]

Provides tax credits for consumers of electric vehicles, but this tax benefit "isolates" Indonesian nickel mines. The United States claims that the reason for excluding electric vehicles whose batteries contain components from Indonesia is that Indonesia has not yet signed a free trade agreement with the United States. The nickel industry is mainly dominated by Chinese-funded

enterprises. Finally, the United States competes for and controls overseas nickel resources through overseas mergers and acquisitions and "friendly shore outsourcing." Encouraging multinational companies to carry out overseas mergers and acquisitions is an important means for the US government to strengthen its control of overseas nickel mines. It is also in line with the new idea of the United States using "friendly shore outsourcing" to find reliable supply sources due to supply chain obstructions. According to the US "Newsweek" report, the US government is supporting Central American Nickel Company (CAN), headquartered in Montreal, Canada, to " "Substantial discount" to acquire Fenix Nickel Mine, a world-class nickel mine located in Guatemala, a Central American country. Among them, the role of the U.S. Embassy in Guatemala is to "promote economic activities that are strategically important to the U.S. green transition." The goal of U.S. diplomats The mission is to "promote discussions around Guatemala's business environment and supply critical minerals to the United States." The U.S. International Development Finance Corporation has also agreed to provide political risk guarantees and an additional $300 million in financing for a local nickel mine project. ÿ In the short term , Chinese-funded enterprises will not have any major project mergers and acquisitions in Guatemala, and the acquisition of a Guatemala nickel mine project by a North American company may be regarded as a much-needed "win" for the United States.

Resource countries are indispensable overseas suppliers and stable and reliable sources of imports for emerging technology countries. The degree of interdependence between the two is increasingly deepening. Facing a new period of development opportunities, emerging technology countries are innovating global resource governance tools and expanding opening up. and improving investment are fundamentally due to the common economic needs and development needs of both parties. Therefore, China is committed to reaching mutually beneficial and win-win institutional arrangements with nickel resource countries, strengthening resource diplomacy with resource countries, and providing a package investment plans and technology sharing mechanisms, accelerate the promotion of Chinese-funded enterprises to "go global", and improve their own security of

key minerals. Specifically, the Chinese government actively encourages Chinese-funded enterprises to build internationally competitive multinational operating groups and comprehensively promote cross-border operations. Strategy, through "going overseas" investment and factory establishment and overseas mergers and acquisitions of large and medium-sized resource projects, we will achieve a greater improvement in resource accumulation, significantly increase the scale of overseas assets, and form a "enterprise-domestic-overseas" transnational business structure. With Tsingshan Holdings, Ningde Times, Chinese-funded enterprises represented by Jinchuan Group, Jiangsu Delong, etc. have gradually increased their overseas investment, and have successively invested in nickel mine projects in Papua New Guinea, Myanmar and Indonesia. Among them, Indonesia is the top priority for Chinese-funded enterprises' overseas investment. ÿ The construction and investment related to the nickel industry chain is a key project of the “Belt and Road” jointly built by China and Indonesia. In the past 10 years, Chinese-funded enterprises have invested nearly 15 billion US dollars in nickel-related investments in Indonesia. In 2022 alone, Chinese-funded enterprises Invested US$3.2 billion in Indonesia. In Indonesia’s Sulawesi and Halmahera islands, China built

ÿ David Brennanÿ “Exclusive: U S Role in Notori ous Nickel Mine Deal Revealed”ÿ Newsweekÿ April l 6ÿ 2023 https: / / www newsweek com [2023-06-27]

It has built refineries, smelters and a new metallurgical school, and even built a nickel museum. Currently, 21 of Indonesia's 23 nickel smelters are Chinese-owned. In fact, as early as 2009, China's largest Tsingshan Holdings, a private stainless steel enterprise, has begun planning to build Indonesia's largest ferronickel industrial zone in Sulawesi. In 2013, China and Indonesia completed the signing of the first project of Tsingshan Industrial Park. In 2018, Tsingshan Holdings' nickel Output has become the first in the world. In 2022, CATL, the world's leading electric vehicle battery company, also began to lay out its power battery industry chain projects in Indonesia. Driven by large-scale investment projects by Chinese-funded enterprises, Indonesia did not have industrial processing capabilities from the beginning. The nickel ore exporting country has been upgraded to a global nickel processing power, which has laid an important foundation for its deep participation in the global new energy industry chain relying on nickel ore resources. (3) The policy orientation of resource countries. For resource countries, it is different from that of technology-

defending countries. The contradiction (the

contradiction between development needs and solidified division of labor) and the contradiction with emerging technology countries (the contradiction between economic needs and political status) are actually intertwined. Its policy orientation is based on its own national interests under the intertwining of these two pairs of contradictions. A compromise expression. Resource countries are caught in the game between established technology countries and emerging technology countries. Their resource policies often show a very obvious "bet on both sides" feature. As the world's largest nickel ore resource country, Indonesia is a technology country. The key countries in the geopolitical competition of the global nickel industry chain are also a typical case of using resource policies to promote economic transformation. Its policy changes have profoundly affected the game situation of the global nickel industry chain. Generally speaking, whether it is legislation and system construction or midstream In terms of nickel metal smelting or the layout of key downstream industries, Indonesia has not shown an obvious "pro-China" or "pro-U.S." tendency. Instead, it has repeatedly emphasized "becoming good friends with both China and the United States." First of all, resource countries should avoid "pro-China" or

"pro-U.S." "Choose sides" and adopt a "bet on both sides" strategy towards China and the United States. The Indonesian government has implemented legislation and institutional construction in the upstream of the industrial chain, and has adopted a "two-pronged approach" to raw ore exports and foreign investment access. It hopes to use the country's resource endowment advantages to attract foreign capital. Workers involved in the country's mining-relate

Industrial infrastructure construction, thereby expanding employment, increasing tax revenue, and keeping more output value domestically, showing the typical characteristics of "resource nationalism". Taken together, whether it is export control or restrictions on foreign investment access, whether it is China and the United States Both sides and other countries are treated "equally", with almost no obvious camp bias (see Table 2).

ÿ Yudith Ho and Eko Listiyoriniÿ "Chinese Compa ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ ÿ Bloomberg rg com/ news/ articles/ 2022-12-15 [2023-06-16] «What Indonesia plans to promote What is the prospect of "Nickel OPEC"? »ÿ FT Chinese website,

ÿ December 30, 2022, http://big5 ftchinese co m/ ÿÿÿÿ/0010ÿÿÿÿÿ? archive [2023-06-28]

Table 2 Changes in Indonesia's nickel mining policies since 2009

time	event	content
2009	Promulgation of the Mineral and Coal Mining Law No. 4 of 2009	In 2014, the export of 65 types of unprocessed raw ore will be completely banned. Raw ore must be smelted or refined locally before export. At that time, only nickel products with a nickel content of greater than or equal to 6% will be allowed to be exported.
2010	Release of mineral product benchmark price plan	At the beginning of the month, with reference to international market prices, the lower limit for export prices of mineral products, including nickel ore products, was released.
2011	Released nickel product export regulations	It is planned to ban the export of low-grade nickel products, including ferronickel with a nickel content of less than 16%, nickel matte with a nickel content of less than 70%, and nickel-containing pig iron with a nickel content of less than 6%. The ban will take effect in 2014
2012	Signed "Government Regulation No. 24 of 2012"	Specifies the equity reduction plan of foreign mining companies. 20% of the equity will be sold to local investors within 6 years, 30% within 7 years, 44% within 9 years, 37% 〃 〃 〃 51% within 10 years
2012 2	Issued «Regulations on Increasing the Added Value of Minerals through Processing and Refining»	It is stipulated that the export of some raw ores, including nickel, will be prohibited from the date the regulations take effect.
2012 3	Redefining mineral export policy	Mining companies that have submitted plans to build smelters will be given a grace period for the mining ban policy implemented after May 6, 2012.
2012 5	Increase the export tax rate for mineral products	Starting from May 6, 2012, an average export tax of 20% will be levied on the export of raw metal ores, including nickel ore.
2013	Revision of the "Catalogue of Prohibited and Restricted Investment Industries"	Mining and other industries restrict the entry of foreign investment
In 2013, the total annual nickel ore export quota was released.		151 recommendations for export licenses (SPE) and 203 recommendations for registration as exportable mineral exporters (ET) were issued, with a total quota of approximately 4.5 million tons issued.
2013 8	Abolition of export quota system	Abolish the nickel ore export quota system
2014 1	The raw ore export ban officially comes into effect	Starting from January 12, 2014, all exports of raw ore will be stopped. Enterprises mining in Indonesia must smelt or refine them locally before exporting.
2017	Allows conditional export of raw ore	Starting from January 12, 2017, the export of raw nickel ore is allowed, provided that mining companies must complete the construction of smelters within 5 years, and 30% of the raw nickel ore will be used in Indonesia.
2019	Decree No. 11 of 2019 was issued to ban the export of raw minerals and take effect in advance.	The export ban on nickel ore with a nickel content of less than 17% will take effect in advance to December 31, 2019. If a mining company has previously obtained export quota qualifications after December 31, 2019, the export quota will only be effective in 2019. Valid until December 31st
2020	Enactment of amendments to the Minerals and Coal Mining Act	Mining companies can apply to expand their operating area. The right to issue mineral rights is vested in the central government. The central government can entrust the provincial governor to issue the license.
2021	Promulgation of the GR96 Regulations on Minerals and Mining Businesses	Remove restrictions on the proportion of equity held by foreign investors in the mining industry, and relax the deadline for performance of foreign divestment (divestment) obligations.
2022	Several mining licenses revoked	2078 mining licenses revoked (IUP)

Source: Compiled and drawn by the authorÿ

Secondly, strengthen the nickel metal smelting capacity in the middle reaches of the industrial chain and increase the added value of export products. After the raw ore export ban officially came into effect in 2014, Indonesia issued new regulations, requiring companies mining in Indonesia to smelt or refine locally before exporting. To China It applies equally to both the United States and the United States. The regulations mandating local smelting have attracted a large number of Chinese-funded companies to invest and build factories, which has greatly improved Indonesia's local nickel metal smelting capabilities. In 2020, Indonesia's nickel smelting industry surpassed China's for the first time, making it the world's largest. Nickel pig iron producing countries. As of 2022, there are 27 pyrometallurgical companies in Indonesia and 5 hydrometallurgical companies under construction. By 2025, it is expected that there will be 71 pyrometallurgical plants and 10 hydrometallurgical plants. After the nickel Due to repeated adjustments to the mining policy, Indonesia's nickel metal smelting capacity has been unprecedentedly improved, and the nickel smelting industry has developed rapidly. However, the Indonesian government has not stopped at the middle reaches of the industrial chain. Instead, it encourages and emphasizes the development of downstream industries, focusing on new energy vehicles and power batteries.ÿ Further seeking the favorable location of the global nickel industry chain. ÿ In 2018, the Indonesian government officially launched the "Industry 40" (Making INDNENESIA 40) Strategic Plan. Indonesia President Zoko has repeatedly stated that Indonesia is not satisfied with the world's new energy. The role of a raw material supplier or parts supplier in the automotive supply chain must become a key participant in the global supply chain of the new energy vehicle industry. Indonesia wants to create a new energy vehicle ecosystem and integrate all related industries Chains are all built in Indonesia. For this reason, the Indonesian government is not limited to seeking investment from the United States or China. Instead, it sends invitations to many companies in both countries at the same time. Facts have proved that Indonesia has successfully attracted a lot of foreign investment to deploy downstream industries. : Indonesia and Tesla signed a nickel purchase contract worth US$5 billion (approximately RMB 33.78 billion) to purchase battery raw materials from nickel processing companies in Indonesia. Indonesia also signed a tripartite agreement with a subsidiary of CATL. A power battery industry chain project will be invested and constructed in Indonesia. In addition, one of the official vehicles used during the Group of Twenty (G20) summit held in Bali, Indonesia, is also a new energy vehicle from China's SAIC-GM-Wuling Indonesia.

Finally, it seeks to form a "Nickel OPEC" to enhance its voice in nickel pricing and geopolitical influence. In addition to domestic industry development, Indonesia is also coordinating and coordinating international nickel commodity policies, trying to unite global nickel resource countries to enhance its voice in nickel pricing. Thereby enhancing its own geopolitical influence. During the 17th Summit of the Group of 20 leaders in 2022, Indonesia formally proposed the idea of forming "Nickel OPEC", that is, to unite nickel ore resource exporting countries, through members Mineral policy coordination will affect the international market price of nickel ore. Although this proposal was "thrown cold water" by Canada, another important nickel resource country, when it was first proposed, this idea of the "Nickel Ore OPEC" industrial alliance based on resource nationalism reflects the This is due to Indonesia's ambition to maximize its economic and diplomatic advantages by leveraging resources.

Fourth, the reshaping of the global nickel industry chain pattern

At present, established technology countries, emerging technology countries and resource countries are conducting strategic interactions around the "power triangle" of key minerals, and jointly promote profound changes and complex adjustments to the global key mineral industry chain pattern. The division of labor pattern, operating logic, and rules of the global nickel industry chain The system and competition paradigm are undergoing profound changes.

First, the division of labor in the nickel industry chain has shifted from "globalization configuration" to "internal chain configuration." As the game of the global industry chain intensifies, countries have re-examined the inertial thinking about economic globalization formed in the past few decades, and then used A new concept reshapes the economic policy and development strategy for the next stage. Major technology countries such as the United States and Europe are paying more attention to the strategic independence of key minerals, or using alliance systems and global partnerships to promote alliances and regionalization of production and manufacturing links, or promoting Local exploration and development is supplemented by the return of manufacturing to promote the localization of the industrial chain. At the same time, multinational companies, as the source of technological power in the home country, are increasingly showing the special attributes of nationalization and politicization in the game of key minerals, prompting Asia-Pacific, Europe, North America, etc. The "intra-regional" cycle continues to strengthen. Resource countries represented by Indonesia have enhanced their industrial capabilities, improved supporting facilities, and developed their economic levels. More midstream links have achieved domestic production without the need to purchase from the international market or ship to other countries for processing. More domestic products have The manufactured goods can be sold domestically rather than exported. Based on this, the original division of labor in the chain between technology countries and resource countries has gradually shrunk to regions, alliance systems and even within countries. The key mineral industry chain has gradually become "vertically shortened, With the development in the direction of "horizontal clustering", the original global allocation division of labor pattern is gradually fragmented, and a new "internal chain allocation" division of labor pattern is accelerating to form.

Second, the operating logic of the nickel industry chain has shifted from "efficiency first" to "security first". The COVID-19 epidemic has exposed the fragility of the global configuration of the previous industrial chain. The Ukraine crisis has further revealed that geopolitical changes may bring major security risks. When security risks enter a country's strategic considerations as an important variable, the weight of security factors in the industrial chain layout of various countries is bound to increase, thereby reshaping the operating logic of the global industrial chain in the next stage. Governments of technological countries such as the United States and Europe re-evaluate the external exposure of industrial chains. The degree of dependence, improving supply chain flexibility and enhancing industrial chain control is an important part of ensuring resource security. By strengthening resource integration and "protective measures", promote the localization, near-shoring, friendly shore and diversification of the industrial chain. For resource countries such as Indonesia and the Philippines, on the one hand, the traditional development path oriented to the export of primary products is becoming increasingly difficult. Domestic society is also interested in "regaining" control over natural resources and striving for a favorable position in the profit distribution of the international industrial chain. The voices are getting louder and louder. On the other hand, the contraction of industrial chains in technological countries has also forced resource countries to shift their development focus to the domestic market. The window period for reform of existing industrial chains has been extended.

Industrial chain layout to safeguard its own economic sovereignty.

Third, the nickel industry chain rules system has shifted from "trade multilateralism" to "resource unilateralism." In recent years, the mining policies of more and more resource countries have begun to turn to protectionism, and the global key minerals rule system has become "resource unilateralism." ” The tendency has become increasingly serious. Take Indonesia as an example. The Indonesian government has repeatedly cited Article 333 of the 1945 Constitution, which is quite resource-nationalist. “Lands, waters and natural resources therein shall be within the scope of the power of the state and shall be used for the benefit of the people.” "Seeking maximum interests" as evidence of the rationality and legality of its nickel ore export control and foreign investment access restriction policies. However, in the dispute with the European Union, the World Trade Organization (WTO) made an adverse ruling against Indonesia, saying that Indonesia's mining policy It is not in compliance with global trade rules. Despite this, the Indonesian government has shown no signs of policy adjustment, and even plans to gradually expand such policy routes from nickel ore to other minerals such as bauxite, copper and tin. In addition, currently the only lithium mining company in Africa Zimbabwe, which mines, has issued new regulations to completely ban the export of raw minerals from the end of 2022. Congo (DRC), the world's largest cobalt producer and Africa's largest copper miner, has banned the export of concentrates since 2013 to encourage miners to process and refine locally. ore, and reinstated the export ban on copper and cobalt concentrate in 2021 after a period of policy reversal. The above situation shows that "unilateralism" seems to be occupying an increasingly important position in the global nickel industry chain rules system. The WTO The negotiation function of the organization is difficult to operate effectively in the absence of overall consensus. The conflict between the national strategy of "resource unilateralism" and the international rules of "trade multilateralism" may be difficult to avoid in the future.

Fourth, the competition paradigm of the nickel industry chain has shifted from "individual competition" to "cluster competition." The evolution of globalization has not achieved inclusive and balanced development. Instead, it has led to the increasing marginalization of some developing countries. In the global automobile power industry, from oil and gas to In the context of power battery conversion, resource countries have firmly grasped this wave of industrialization, promoted the integration of similar regional resources, and highlighted competitive advantages in a cluster manner. ÿ In addition to Indonesia’s proposal for the “Nickel Mine OPEC”, Argentina, Bolivia and Chile have It is also promoting the establishment of an organization similar to "Lithium OPEC" to control the price and supply of lithium. In addition, Brazil, Indonesia and Congo (DRC) are also seeking to establish a "Rainforest OPEC" to carry out environmental protection work. A series of "X OPEC" reflects an important trend in current international political and economic relations, that is, under the general trend of energy transformation, the development path of "individual competition" of "going it alone" has become increasingly unworkable. Resource countries hope to use "clusters" to develop "Competition", that is, by establishing new political alliances, jointly seeking international bargaining rights for important resources, and demanding the establishment of a more fair and reasonable supply chain value chain distribution system.

ÿ « "Lithium OPEC" is approaching or may change the global lithium supply situation», Published in "Shanghai Securities News", Page 5, December 1, 2022.

Five conclusion

As the application of strategic emerging industries becomes more and more widespread, the strategic significance of nickel as a key raw material for high-tech industries continues to be highlighted. The distribution of technological power and resource power among "established technology countries", "emerging technology countries" and "resource countries" Shaping the power structure of the global nickel value chain, three major categories of subjects engage in strategic interactions regarding the three structural contradictions of hegemony protection and order reshaping, development needs and solidified division of labor, and the mismatch between economic needs and political status, which constitute the current global nickel market. The international game situation of the industrial chain will jointly promote the deepening of the division of labor pattern, operating logic, rule system and competition paradigm of the global nickel industry chain.

Immediate change

On the one hand, the conservative technology countries represented by the United States use geopolitical suppression measures to contain the rise of emerging technology countries represented by China; on the other hand, they use a combination of "carrot + stick" against resource countries represented by Indonesia. The strategy is to strengthen its economic ties with resource countries while putting pressure on resource and technology interactions between resource countries and emerging technology countries. China implements nickel industry chain policies focusing on its domestic nickel ore resource supply security capabilities and new energy technology competitiveness. In response to the strong suppression by the United States, at the same time, it deepens economic cooperation with nickel resource countries, encourages Chinese-funded enterprises to "go global" and strives for a favorable position in the "battle" for resource countries. Resource countries represented by Indonesia pursue " It adopts the policy stance of “value neutrality” and avoids “choosing sides” between established technology countries and emerging technology countries. It uses the strategy of “betting on both sides” to strive for more public goods and investment dividends, and strives to enhance the country’s position in the global nickel industry chain. position. As more and more key technologies make major breakthroughs, and as relevant strategies and policy measures of major global economies advance in depth, lithium, cobalt, rare earths, graphene and other rare metals and non-metallic elements may become the future's The new arena for great power competition will also trigger new power flows and structural changes in key mineral fields. As the strategic competition between established technology countries and emerging technology countries continues to escalate, resource countries, as the relatively weak party in the "power triangle", How to take advantage of the "window" of opportunities for global energy transformation and industrial upgrading to enhance its position in the global industrial chain and value chain is an issue of the times that it urgently needs to solve.

(Editor-in-charge Wang Shuai)