



| Flash | China Announces Rare Metals-Related Export Ban

F-2023-12-22a

Classification: TLP:CLEAR

Criticality: Medium

Intelligence Requirements: Geopolitical, Trade

December 22, 2023

Scope Note

ZeroFox Intelligence is derived from a variety of sources, including—but not limited to—curated open-source accesses, vetted social media, proprietary data sources, and direct access to threat actors and groups through covert communication channels. Information relied upon to complete any report cannot always be independently verified. As such, ZeroFox applies rigorous analytic standards and tradecraft in accordance with best practices and includes caveat language and source citations to clearly identify the veracity of our Intelligence reporting and substantiate our assessments and recommendations. All sources used in this particular Intelligence product were **identified prior to 12:30 PM (EST) on December 22, 2023**; per cyber hygiene best practices, caution is advised when clicking on any third-party links.

Flash | China Announces Rare Metals-Related Export Ban

› Key Findings

- China announced an immediate ban on technologies that process rare-earth metals.
- The ban is likely retaliation for U.S. export controls and an effort to undercut U.S. ventures to develop its own clean energy and rare-earth metal supply.
- Further trade restrictions from both sides are likely in 2024, with the Biden administration reportedly planning moves to prohibit certain Chinese imports that could hurt U.S. industries.
- Cyber espionage to obtain access to technologies being withheld from China is possible.

Analyst Commentary

On December 22, 2023, China announced new export controls on key technologies with immediate effect.¹

- The export bans or restrictions touch on a range of products, including laser radars, drones, and biotechnology.

¹

[hXXps://www.scmp.com/news/china/diplomacy/article/3245924/china-brings-new-export-controls-hi-tech-products-amid-ongoing-rivalry-us](https://www.scmp.com/news/china/diplomacy/article/3245924/china-brings-new-export-controls-hi-tech-products-amid-ongoing-rivalry-us)

- Most importantly, the restrictions include a ban on technology used to extract, separate, and process rare-earth metals.²

China dominates the supply chain for rare-earth metals, which have become increasingly important due to their utility in advanced technology and products needed in the energy transition, like electric vehicle (EV) batteries.³ The ban is expected to impact technology used to make EV motors, weaponry, and medical devices.⁴

Recognizing the vulnerability of having a key geopolitical adversary dominate the supply chain for important technologies and materials, the United States announced billions in funding to create clean U.S. energy manufacturing, while also financing projects that develop non-Chinese sources of rare-earth metals like lithium, cobalt, and copper. Projects funded by the U.S. Inflation Reduction Act (IRA) are due to start coming online in 2024.

- China's latest trade restrictions should be seen as an effort to protect its dominance of the rare-earth metals supply chain and to thwart U.S. aspirations to reduce this dominance.

Alongside the IRA, the U.S. government sought to extend its dominance in a key technological area in which China remains weak: advanced semiconductor chips.

- In 2022, the United States announced the CHIPS and Science Act (CHIPS Act), which compels allied states like Taiwan, Japan, South Korea, and the Netherlands to limit sales of the most sophisticated forms of the technology and equipment to China.
- Semiconductor chips are used in smartphones, computers, and vehicles, as well as in advanced weapons and communications systems.

Trade Retaliation

Since the passage of the IRA and CHIPS Act, there have been a series of retaliatory measures by China, as well as updates that tighten certain CHIPS Act requirements.

² [hXXps://www.mining\[.\]com/web/china-bans-export-of-rare-earth-processing-tech-over-national-security/](https://www.mining.com/web/china-bans-export-of-rare-earth-processing-tech-over-national-security/)

³

[hXXps://www.bloomberg\[.\]com/news/articles/2023-12-21/china-bans-exports-of-some-rare-earth-processing-technologies](https://www.bloomberg[.]com/news/articles/2023-12-21/china-bans-exports-of-some-rare-earth-processing-technologies)

⁴ [hXXps://www.mining\[.\]com/web/china-bans-export-of-rare-earth-processing-tech-over-national-security/](https://www.mining.com/web/china-bans-export-of-rare-earth-processing-tech-over-national-security/)

- In July 2023, China announced bans on the export of gallium and germanium—key metals needed in the production of semiconductors.⁵
- On the one-year anniversary of the CHIPS Act in October 2023, the United States announced new measures that aim to close loopholes in the original law while also loosening other restrictions and adding some new measures.⁶
- On October 20, 2023, China announced a partial export ban on some graphite products. Under the new restriction, enterprises must go through a scrutiny process and obtain export permits for graphite, a key material for EV batteries, starting December 1, 2023.⁷
 - China is the world's top graphite producer, and the United States, South Korea, and Japan among the top importers.⁸ China's graphite export ban is widely considered retaliation for the United States' expanded controls announced in mid-October.⁹

China's latest moves announced on December 22 could prompt U.S. retaliation specifically related to EVs.

- The Biden administration is reportedly considering banning Chinese EV batteries altogether instead of continuing to follow the terms of the IRA, which provide heavy subsidies for batteries produced without Chinese inputs.
- In addition, the United States is considering banning other Chinese imports related to clean energy like solar panels, hoping to protect its nascent green energy sector.¹⁰

⁵

[hXXps://www.reuters\[.\]com/world/china/china-exported-no-germanium-gallium-aug-due-export-curbs-2023-09-20/](https://www.reuters.com/world/china/china-exported-no-germanium-gallium-aug-due-export-curbs-2023-09-20/)

⁶

[hXXps://www.whitehouse\[.\]gov/briefing-room/presidential-actions/2023/08/09/executive-order-on-addressing-united-states-investments-in-certain-national-security-technologies-and-products-in-countries-of-concern/](https://www.whitehouse.gov/briefing-room/presidential-actions/2023/08/09/executive-order-on-addressing-united-states-investments-in-certain-national-security-technologies-and-products-in-countries-of-concern/)

⁷

[hXXps://www.scmp\[.\]com/economy/global-economy/article/3238603/china-ups-export-curbs-key-ev-battery-component-safeguarding-graphite-amid-us-tensions](https://www.scmp.com/economy/global-economy/article/3238603/china-ups-export-curbs-key-ev-battery-component-safeguarding-graphite-amid-us-tensions)

⁸ [hXXps://asia.nikkei\[.\]com/Economy/Trade/China-to-curb-exports-of-key-EV-battery-material-from-Dec-1](https://asia.nikkei.com/Economy/Trade/China-to-curb-exports-of-key-EV-battery-material-from-Dec-1)

⁹

[hXXps://www.reuters\[.\]com/world/china/china-require-export-permits-some-graphite-products-dec-1-2023-10-20/](https://www.reuters.com/world/china/china-require-export-permits-some-graphite-products-dec-1-2023-10-20/)

¹⁰ [hXXps://www.ajot\[.\]com/news/us-considering-hiking-tariffs-on-china-evs-solar-products-wsj-reports](https://www.ajot.com/news/us-considering-hiking-tariffs-on-china-evs-solar-products-wsj-reports)

- Lastly, the administration is considering placing heavy tariffs on less-advanced forms of semiconductors produced in China, known as legacy chips.¹¹

U.S. government officials are concerned that China is seeking to retaliate against semiconductor manufacturers adhering to the ban on sales to China by flooding the market with cheap, less-sophisticated chips.¹²

- The most advanced forms of semiconductors make up only a small portion of the product offerings of most semiconductor producers.
- Instead, these companies rely on sales of less-advanced forms of the technology used in appliances, personal electronics, and vehicles to drive the revenues that they then use to fund research and development into more advanced semiconductor technology.
- China could in theory undercut the majority of semiconductor manufacturers' business, thus depriving them of the revenue needed to remain solvent.

Espionage Aimed at Semiconductor Producers

ZeroFox reporting since the first iteration of the CHIPS Act in 2022 has warned against cyber espionage campaigns as the amount of advanced technology withheld from China grows.

In mid-October, ZeroFox identified recent instances of possible Chinese state-sponsored threat actors conducting cyber espionage campaigns against semiconductor firms in Taiwan, Hong Kong, and Singapore. The aim of the campaigns is to provide sensitive data on semiconductor production back to the Chinese Communist Party (CCP) so that it can be replicated. This activity was attributed to a Chinese advanced persistent threat (APT) group due to the overlap in tactics, techniques, and procedures (TTPs). Specifically, the use of a HyperBro malware¹³ variant to install Cobalt Strike beacons with a Taiwan Semiconductor Manufacturing Co. PDF in a phishing lure correlates to the TTPs of Chinese threat actor APT27.¹⁴

¹¹

[hXXps://www.reuters\[.\]com/technology/us-launching-semiconductor-supply-chain-review-boost-national-security-2023-12-21/](https://www.reuters.com/technology/us-launching-semiconductor-supply-chain-review-boost-national-security-2023-12-21/)

¹² [hXXps://www.ajot\[.\]com/news/us-to-gather-intelligence-on-chinese-chipmakers-as-biden-mulls-tariffs](https://www.ajot[.]com/news/us-to-gather-intelligence-on-chinese-chipmakers-as-biden-mulls-tariffs)

¹³ [hXXps://attack.mitre\[.\]org/software/S0398/](https://attack.mitre[.]org/software/S0398/)

¹⁴ [hXXps://attack.mitre\[.\]org/groups/G0027/](https://attack.mitre[.]org/groups/G0027/)

On October 17, 2023, intelligence officials from the United States, the United Kingdom, Canada, Australia, and New Zealand (the Five Eyes) accused China of launching hacking and espionage attempts to steal trade secrets on everything from quantum technology and robotics to biotechnology and AI.¹⁵

| Looking Forward

ZeroFox Intelligence assesses that the global semiconductor industry will very likely continue to be targeted by Chinese APT groups. High-tech ecosystems with innovative semiconductor firms (such as in Taiwan, South Korea, Singapore, the United States, and Europe) are likely to be targeted since they have the most advanced semiconductor manufacturing capabilities and a large share of intellectual property. Verticals of the semiconductor industry—such as prominent universities and government research labs specializing in semiconductor research and development—are also likely to be targeted. In particular, these APT groups are likely to use open-source tools and exploit critical and widespread vulnerabilities in future cyber espionage campaigns targeting the global semiconductor industry.

¹⁵

<https://www.reuters.com/world/five-eyes-intelligence-chiefs-warn-chinas-theft-intellectual-property-2023-10-18/>

Appendix A: Traffic Light Protocol for Information Dissemination

	Red	Amber
WHEN SHOULD IT BE USED?	Sources may use TLP:RED when information cannot be effectively acted upon by additional parties and could lead to impacts on a party's privacy, reputation, or operations if misused.	Sources may use TLP:AMBER when information requires support to be effectively acted upon but carries risks to privacy, reputation, or operations if shared outside of the organizations involved.
HOW MAY IT BE SHARED?	Recipients may NOT share TLP:RED with any parties outside of the specific exchange, meeting, or conversation in which it is originally disclosed.	Recipients may ONLY share TLP:AMBER information with members of their own organization and its clients, but only on a need-to-know basis to protect their organization and its clients and prevent further harm. Note that TLP:AMBER+STRICT restricts sharing to the organization only.
	Green	Clear
WHEN SHOULD IT BE USED?	Sources may use TLP:GREEN when information is useful for the awareness of all participating organizations, as well as with peers within the broader community or sector.	Sources may use TLP:CLEAR when information carries minimal or no risk of misuse in accordance with applicable rules and procedures for public release.
HOW MAY IT BE SHARED?	Recipients may share TLP:GREEN information with peers and partner organizations within their sector or community but not via publicly accessible channels.	Recipients may share TLP:CLEAR information without restriction, subject to copyright controls.

Appendix B: ZeroFox Intelligence Probability Scale

All ZeroFox intelligence products leverage probabilistic assessment language in analytic judgments. Qualitative statements used in these judgments refer to associated probability ranges, which state the likelihood of occurrence of an event or development. Ranges are used to avoid a false impression of accuracy. This scale is a standard that aligns with how readers should interpret such terms.

Almost No Chance	Very Unlikely	Unlikely	Roughly Even Chance	Likely	Very Likely	Almost Certain
1-5%	5-20%	20-45%	45-55%	55-80%	80-95%	95-99%