SEMI Europe Comments on the Export Controls on Gallium and Germanium

Priorities to the European Commission, European Parliament and the Council of the European Union

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Background

In July 2023 the **Ministry of Commerce of the People's Republic of China** has announced its *"Implementation of Export Controls on Gallium and Germanium Related Items"* as part of China's latest action in the ongoing global battle for semiconductor technology.

SEMI, representing **3000+ member companies and 300+ European companies** from across the **microelectronics manufacturing and design supply chain**, welcome the opportunity to express their main concerns and key recommendations with regards to the recently imposed **export controls on gallium (Ga) and germanium (Ge).**

Gallium and Germanium in the Semiconductor Industry

Due to their wide range of favorable **physiochemical properties**, gallium and germanium have become increasingly important within the semiconductor supply chain, particularly for their propensity to modulate the **electrical, optical and structural properties** of semiconductors. Taking into account the overall growth of the semiconductor industry and the **lack of viable substitutes** at this point in time, it is likely that the **sector's demand** for these two metals will **continue to grow** in the upcoming years.

Nevertheless, in this context, it is important to note that **the semiconductor industry is neither a direct importer nor a major user of gallium and germanium in terms of absolute quantities.** As a matter of fact, semiconductor companies only utilize certain **derivatives of gallium and germanium as dopants** in their manufacturing processes, whose sourcing in the supply chain takes place multiple steps after the primary production and extraction processes, thus resulting in the use of **very small quantities** of both metals in relation to the global production levels.

China's Role in the Gallium and Germanium Supply Chains

Starting from the early 2000s, China was able to exploit its leading position in the aluminum industry and to implement strategic industrial policies that have largely **enhanced the country's production capacity** for gallium and germanium[1]. Even though these materials are not scarce and can also be sourced in Europe or the US, over the years China was able to establish a **dominant position at the global level** with a high production capacity and competitive prices[2]**.** This has led to the creation of a strategic dependency of the EU towards China that will likely **remain in the short and medium term**:

- China accounted for **more than 90% of global gallium production** in 2023, while **China's exports accounted for 71% of the EU's total imports of gallium[3]**
- China accounted for **83% of global germanium production** in 2023, with exports **accounting to 45% of the EU's total imports of germanium[4]**

[1] CSIS Hidden Reach, Mineral Monopoly (China's Control over Gallium Is a National Security Threat), July 2023. URL: https://features.csis.org/hiddenreach/china-critical-mineral-gallium/.
[2] The Diplomat, Don't Worry About China's Gallium and Germanium Export Bans, October 2023. URL: https://thediplomat.com/2023/10/dont-worry-about-chinas-gallium-and-germanium-export-bans/.
[3] European Commission Study on the Critical Raw Materials for the EU (ET-07-23-116-EN), 2023. URL: https://op.europa.eu/en/publication-detail/-/publication/57318397.
[4] European Commission Study on the Critical Raw Materials for the EU (ET-07-23-116-EN), 2023. URL: https://op.europa.eu/en/publication-detail/-/publication/57318397.

Impact on Supply Chains and Market Prices

In the short term, no detrimental impact on the supply chain of the EU semiconductor industry is expected through the Chinese export licenses on gallium and germanium. Due to the declining but **continued exports of gallium and germanium** in recent months and the **very small quantities** of gallium and germanium needed to produce derivatives used for semiconductor production, the industry is confident that its suppliers will be able to mitigate the potential impact of the recent export controls.[5]

In the long term, however, in the event of **trade escalations and further export restrictions**, the European semiconductor industry could be **impacted** by a shortage of critical raw materials, particularly considering the **lack of domestic production capacity** for the foreseeable future. Building up a respective value chain from mining to processing with sufficient capacity in Europe would require **significant time and large investments,** to allow **supply chains and market prices to adjust effectively.**[6] The establishment of suitable production facilities in Europe could take **multiple years to scale up.**

SEMI Recommendations to the European Union

In this light, based on the information and insights presented in this document, **SEMI strongly encourages all the policymakers involved in this topic to carefully consider the following policy recommendations:**

- Adopt a **fact-based and pragmatic approach** to the recent export restrictions, acknowledging the existing **strategic dependencies**, but also taking into account the low quantities used by the semiconductor industry and its position in the supply chain
- Engage in constructive **multilateral negotiations to de-escalate trade tensions, prevent retaliatory tit-for-tat measures** and ensure the free flow of raw materials and components
- **Diversify and de-risk the supply chains** for critical raw materials by engaging with strategically aligned trade partners at the international level
- Assess opportunities for supporting the development of EU value chains for critical raw materials by keeping in mind the need for global competitiveness of such value chains

[5] IEEE Spectrum, No Signs Yet of Gallium or Germanium Shortage, October 2023. URL: https://spectrum.ieee.org/gallium-and-germanium.
[6] FTI Consulting, China's Export Controls on Critical Minerals – Gallium, Germanium and Graphite, December 2023. URL: https://www.fticonsulting.com/insights/articles/chinas-export-controls-critical-minerals-gallium-germanium-graphite.