

# Critical Materials, A Compelling Case, Part 1

## SMT Prospects & Perspectives

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The time has come for a deliberate and comprehensive national strategy that addresses critical materials/minerals. Doing so is increasingly critical to the long-term economy, national security, and the nation's global competitiveness.

### Establishing Conflict-free Regulations

In the March 2013 issue of *SMT Magazine*, my column offered a snapshot of conflict materials. At that time, four minerals were classified to be "conflict." These four essential elements—tantalum, tin, tungsten, and gold—have been a key to a variety of end-use applications for a wide array of industries ranging from electronics and industrial to consumers, avionics, and military sectors.

The primary mines of these four essential elements are situated in the eastern portion of the Democratic Republic of the Congo (DRC) and surrounding countries, and the minerals have been mined in the conditions of armed conflict and severe human rights abuses in the region. The region's armed militia groups intended to exploit the area's natural resources. This pervasive exploitation of natural mineral resources in this high-risk area caused a grave concern by the international community about the region's activities. Internationally, there was an increased attention on the acute violence and gross human rights violations in the mining of these minerals. Accordingly, this region was deemed as "Conflict Region."



At that time, the companies directly or indirectly sourcing from, or directly operating in this region, faced higher risk of contributing to the conflict. To that end, the electronics/microelectronics industry was on the front line. These concerns spurred much debate and led to substantial activities by the U.S. Congress in dealing with the issues. After a concerted work and plan, the Dodd-Frank Act eventually passed the U.S. Congress and was signed into law on July 21, 2010. In August 2012, the U.S. Securities and Exchange Commission (SEC) adopted a rule mandated by the Dodd-Frank Wall Street Reform and Consumer Protection Act, which requires companies to publicly disclose their use of conflict minerals that originated in the Democratic Republic of the Congo or an adjoining country. The first required report had to be filed by May 31, 2014.

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Basically, the U.S. Conflict Minerals Law contains two requirements: independent third-party supply chain traceability audits and reporting of audit information to the public and SEC. Dodd Frank 1502 is a disclosure requirement and places no ban or penalty on the use of conflict minerals. However, a company is required to assess whether any conflict mineral was “necessary to the functionality or production” of a product manufactured or contracted for manufacture by the company. To comply with SEC regulation, whether a company, which contracts out production, holds the influence over the item

being contracted is also to be assessed and determined.

Although it is not illegal to use conflict minerals, corporate social responsibility is on the line. The ultimate goal is to be “conflict-free.” On this front, some corporations are in the forefront. For instance, Apple released its “2011 Supplier Responsibility Report,” detailing how it traces its supply chain—first to the suppliers that created the subcomponents to their products and then to the smelters that processed the ores. Intel has conducted “on-site reviews on smelters” as part of the Conflict-Free Smelter Program.

Since then, the conflict minerals have been “managed successfully.”

### **Addressing Today’s Critical Needs**

With the handling of conflict minerals as an exemplar, there is perhaps an even more urgent need to rally another concerted effort to tackle the critical materials/minerals. Overall, critical materials/minerals will have an overarching impact on the entire supply chain to all industries, and once again, electronics/microelectronics is on the front line.

At present, the supply chain is in an unprecedented state, filled with disruptions and hurdles as the result of a slew of factors and root causes. On top of an intertwined, complex system, the pandemic for the past two years has exacerbated the disruptions and further elevated the complexity. Simply put, the fundamental supply chain issues can be attributed to the decades of globalization, off-shore manufacturing, and continuing, fast-paced technological changes, in conjunction with many diverse suppliers being embedded in each product. Consequently, managing today’s global supply chain is a daunting task; securing reliable sources of materials/minerals is becoming ever an uncertainty.

It is time to reignite the spirit and reboot the system to set out a national strategy incorporated with a robust plan and actionable agenda to navigate through the pathway of securing

the critical materials/minerals. It is a challenging pursuit but can be done.

The goal of a national strategy must embrace and cut across these multiple fronts to:

- Define “criticality” for materials/minerals that are critical to the nation’s economy and security
- Identify the elements that are the foundational component of critical materials/minerals
- Verify the natural resources of the elements
- Define the effective sources of critical materials/minerals
- Ensure the secure availability of critical materials/minerals
- Tackle on-going supply chain uncertainties
- Build the key capabilities and infrastructure of critical materials/minerals
- Strike a balance between economy and environment
- Anticipate future challenges related to critical elements
- Identify actions and approaches that the government and the private sector can take to meet these goals

It will take a global perspective, a holistic thought process, integrated information, and collaborative effort among the government, academia, and the industry to fulfill these goals and tackle the technologies, processes, and manufacturability relevant to the arena of critical materials/minerals. For instance, in business operation and management, the long-term investment in critical materials/minerals-related business may warrant deliberations and shed new light. In corporate governance, critical materials/minerals should be a board issue to be watched for in an enterprise risk management program. In government and academia, the funding requirements, structure, and research priorities should be re-visited, and actions taken accordingly.

## Conclusion

My next column will discuss the key strategic tenets that should be considered and the specific materials/minerals that should be deemed critical to a robust economy and an impeccable national security. I welcome your thoughts and input on the specific materials and minerals that you and your company consider to be critical to your business, products, and services. Please feel free to contact me. **SMT007**



**Dr. Jennie S. Hwang**—an international businesswoman and speaker and a business and technology advisor—is a pioneer and long-standing leader to SMT manufacturing since its inception as well as to the development and implementation of lead-free electronics technology. Among her many awards and honors, she was inducted to the International Hall of Fame—Women in Technology, elected to the National Academy of Engineering, named an R&D Star to Watch, and received a YWCA Achievement Award. Having held senior executive positions with Lockheed Martin Corp., Sherwin Williams Co., and SCM Corp., she was the CEO of International Electronic Materials Corp. and is currently CEO of H-Technologies Group, providing business, technology, and manufacturing solutions. She has served on the board of Fortune-500 NYSE companies and civic and university boards; the Commerce Department’s Export Council; the National Materials and Manufacturing Board; the NIST Assessment Board; as the chairman of the Assessment Board of DoD Army Research Laboratory and the chairman of the Assessment Board of Army Engineering Centers; and various national panels/committees and international leadership positions. She is the author of 600+ publications and several books and is a speaker and author on trade, business, education, and social issues. Her formal education includes four academic degrees, as well as the Harvard Business School Executive Program and Columbia University Corporate Governance Program. For more information, visit [JennieHwang.com](http://JennieHwang.com). To read past columns or contact Hwang, [click here](#).