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Pax Composita: A Strategy to Counter Chinese Carbon Fiber Dominance

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TOPLINE POINTS

- Carbon fiber is an essential component of the drones that are reshaping the modern battlefield.
- Control of the global carbon fiber market is highly concentrated and subject to manipulation by state-owned enterprises.
- The PRC is flooding the market via its state-owned companies and undercutting profit-responsible Western/Japanese in pricing in a bid to force them out of the market.
- The United States should support international sourcing coordination and industrial cooperation on carbon fiber with a *Pax Composita* program, following the *Pax Silica* model.

Introduction

Carbon fiber—a tightly woven carbon compound prized for its unique weight-to-strength ratio—is a critical input for the modern weapons supply chain. Carbon fiber reduces fatigue and corrosion during use, enabling "innovative drone designs and integration of advanced features like embedded sensors, antennas, and electronics." Carbon fiber has been a game-changing innovation in materials science, making it worthy of the attention of state actors looking to gain the advantage in evolving methods of warfare, including the People's Republic of China (PRC).

In its Made in China 2025 goals, the PRC set several benchmarks for materials science and materials production; among these, carbon fiber was included in several categories, including "basic materials" and "new materials," particularly those with military applications. The market for carbon fiber is subject to extreme concentration effects; estimates of the PRC's production indicate that it is now "at 43% of global production […] the world's largest producer of mid-range carbon fiber," driven largely by domestic demand growth and wind turbine construction.

Significantly, this drive to market dominance has been enabled by Western companies, including Boeing and Hexcel, which entered into or expanded joint ventures with Chinese partners as recently as 2024 and 2019, respectively. These companies are critical suppliers of carbon fiber for both the U.S. military and much of America's space program.

PRC Industrial Policy as a Dominance Strategy

The PRC, through subsidies, below-rate loans, state-backed land acquisitions, provincial government incentives, and other forms of support for the industry, has coordinated its attempted takeover of the carbon fiber sector through state institutions. The state support and subsidization provided directly to PRC carbon fiber producers, such as China National Building Material Group (CNBM), through its state ownership is significant—CNBM is approximately 45% owned by the CCP's state-owned assets commission, per its 2024 report. Support programs for state-owned firms often include favorable financing, below-market inputs, tax exemptions, and leadership through appointed management and ownership.

The PRC's control over global production allows it to influence markets through dumping. While Japan and the U.S. dominate in specific carbon fiber compounds, the PRC leads in volume, boosted by export policies; until April 1, 2026, some carbon fiber products had specialized export status.[1] The PRC still offers tax rebates of up to 13% for goods manufactured for export, which continue to apply to carbon fiber products, as they do to most PRC exports.

The support of state-owned-enterprises, export rebates, and China's industrial policies have enabled it to price carbon fiber below its competitors. In 2021, the U.S. imported 3,633,897 kg of Japanese carbon fiber at $142.27 million ($39.15/kg) and 2,677,927 kg of Chinese carbon fiber at $38.69 million ($14.45/kg); this price gap persisted through 2025, as tracked by the International Trade Commission. While the import data doesn't capture differences in specialty products, it highlights a significant price discrepancy.

This price difference could threaten American carbon fiber producers in the long term. China's Made in China 2025—a state-coordinated program stood up by the CCP in 2015 to domestic production and innovation in key industries—aims not just for self-sufficiency but also to undermine or eliminate foreign competitors. This mechanism, especially in the defense and adjacent sectors, is shown by the PRC's earlier actions in rare earths and magnets markets, where strategic purchases in the 1990s led to the PRC's total sector dominance.

American responses to PRC manipulation have been limited due to a focus on direct, commercial "off-the-shelf" acquisition, with an emphasis on finished products, not input materials. The U.S. mainly uses its Trade and Tariff Acts and associated tools, such as anti-dumping and countervailing duty investigations, to impose penalties on unfairly dumped or subsidized goods. But for carbon fiber, these methods might not suffice. Global producers of premium carbon fiber are very sensitive to price changes, especially when military-grade products with thin margins face foreign competition.

Japan's Toray, Teijin, and Mitsubishi Chemical, along with American producers such as Zoltek (owned by Toray) and Hexcel, produce high-quality carbon fiber, in contrast to the PRC's producers. The PRC tirelessly supports innovation, with CNBM boasting T1200-grade fiber in March of this year, matching Toray's 2023 achievement. While current PRC production is cost-effective, ongoing technical improvements will also narrow the quality gap.

Various strategies have the potential to remediate the problem of globalized, subsidized carbon fiber competition. Sourcing restrictions under Buy America could ease pressure on U.S. producers, but the

[1] DHS codes of products that previously received special treatment included 68151200, 68151310, and 68151390; carbon fiber fabrics & miscellaneous finished carbon fiber products.

close ties between Japanese and American firms in carbon fiber complicate this. The semi-globalized and dispersed nature of the carbon fiber market, compared to the highly concentrated nature of producers, makes specific, intentionally destructive dumping by the PRC a valid threat to many of these producers. Any such procurement plan should, at a minimum, extend to treaty allies—North Atlantic Treaty Organization (NATO) members, Japan, the Republic of Korea, the Philippines, Australia, and New Zealand.

Policy Recommendations

A potential alternative is a materials procurement and international coordination model, such as Pax Silica, that brings together countries in the semiconductor and computing sectors to box out the PRC. A Pax Composita could focus on supply chain clarity for critical defense materials like carbon fiber. Pax Silica supports rare-earth extraction and manufacturing to counter PRC domination; similarly, Pax Composita might secure supplies of carbon-fiber inputs, mainly in Asia, where the PRC has a significant market share. Participants would agree to prioritize goods from member nations, ensuring demand without favoring low-cost Chinese products.

This model would also allow non-treaty allies, such as Israel, Qatar, the United Arab Emirates (UAE), Taiwan—which already plays an outsized role in supplying non-PRC drone components, as it does with semiconductors—and Singapore, to participate without necessitating the extension of treaty defense rights. For drone parts specifically, Taiwan's Drone Diplomacy Task Force signed a letter of intent with the Association for Uncrewed Vehicle Systems International (AUVSI). While currently stalled, the proposal would also strengthen production capacity necessary to maintain an asymmetric deterrence capability consistent with objectives contained in the National Security Strategy Memorandum.

These efforts should be undertaken in combination with existing and ongoing efforts by the War Department (DOW) to cleanse drone supply chains of "Red" components, including the Blue UAS (Unmanned Aerial Systems) initiative to quickly identify, adapt, and adopt dual-use drone systems, as well as a similar Green UAS initiative for commercial, non-defense drones. Furthermore, these efforts should coordinate not only with the above-mentioned Pax Silica but also with other structures, such as the Quadrilateral Security Dialogue's Critical Minerals Initiative, which seeks to source and process minerals and metals that are precursors to drone components, including carbon fiber, from like-minded countries and not China.

Conclusion

American drone security has been and will continue to be a priority—beginning as early as 2020, this problem was understood and codified at 10 U.S.C. § 4871—but without a holistic view of the supply chains that produce the drones in question, the whole effort may be for naught.

No matter the solution, input security is paramount. Warfare's future is ever-evolving, but innovative drone technology, often made of carbon fiber, will likely be key, drawing on lessons from the Russo-Ukrainian war. Allowing the strategic destruction of major international producers, such as existing Japan- or U.S.-based carbon fiber firms via price undermining by the PRC would be a critical mistake, leaving the United States and American allies vulnerable in any future conflict.

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