

Welcome to the Spring Technical Meeting Edition of Advanced Ceramics Insights!

Fresh off our gathering in Washington, D.C., USACA is thrilled to announce significant growth in membership this year.

With the addition of six new members, our total now stands at 52. They are already propelling our efforts to amplify our collective voice with key decision- makers and drive new investments in our industry.

Who's who: We are proud to welcome to the fold:

- [Hybrid Plastics](#) in Mississippi is an innovator, manufacturer, and supplier of polyhedral oligomeric silsesquioxane (POSS) materials for oil and gas, industrial, and other sectors.
- [CVD Equipment Corporation](#) in New York specializes in silicon carbide high-power electronics, electric vehicle battery materials, and aerospace and defense.
- [Cambium](#), in California, is a “radically different advanced materials company” specializing in high-temperature composites and foams, precursors for carbon-carbon, and protection systems against direct energy.”
- [Centorr Vacuum Industries](#) in New Hampshire is a leading manufacturer of high-temperature vacuum and controlled atmosphere furnaces. Its furnaces are used for heat treating, brazing, sintering, and diffusion bonding in the aerospace, medical, energy, and automotive industries.
- [Canopy Aerospace](#) in Colorado specializes in high-temperature materials used in extreme space environments.
- [Weber University's Miller Advanced Research and Solutions Center](#) in Utah is a public-private partnership dedicated to advancing the deployment of high-temperature materials for hypersonics.

‘At the forefront’: “USACA represents an industry that is growing in importance to our national security and economic competitiveness. And our membership is growing with it,” said USACA Executive Director Ken Wetzel. “We are very pleased that so many leading companies and research universities are stepping up to help us ensure that advanced ceramics and other important materials are at the forefront of our national priorities.”



USACA UPDATE

SPRINGING FORWARD: A special thanks to everyone who attended our Spring Technical Meeting in Washington, D.C. During the meeting, members had the opportunity to hear from the USACA leadership and other experts about what to expect from the Trump administration and Congress regarding defense and energy. We also discussed the anticipated role of advanced ceramics and other materials that are designed for some of the harshest environments.

Meanwhile, our [working groups](#) focused on various areas, including CMC manufacturing, nuclear materials, transparent ceramics, workforce development, and microelectronics. Each group has continued to sharpen our priorities, resulting in two new white papers, one for boron carbide and the other for workforce development. These white papers will drive our advocacy efforts for funding this year.

‘GOLDEN’ ERA: Wetzel outlined some of the new administration’s evolving national security priorities. And there is reason for optimism for our industry.

Some new unfolding initiatives include plans for a “Golden Dome” missile defense shield and the decision to select Boeing to build the Next-Generation Air Dominance fighter jet, designated the F-47. Efforts to revitalize the U.S. shipbuilding industry are also underway, with a focus on new icebreakers capable of operating in the Arctic. Meanwhile, investments in hypersonic weapons are increasing, including the development of a hypersonic drone, alongside further expansion of the domestic capacity to manufacture munitions.

Mark your calendar: The Missile Defense Agency will hold a summit on next steps on April 29 in Huntsville, Alabama.

POWERING UP: On the energy side of the ledger, Dave Howell, a former top Department of Energy official who is now with SMI, offered insights into where the Trump team is headed in energy innovation, production, and deregulation.

Some takeaways: Expect fossil fuels, nuclear, geothermal, and hydropower to be priorities, as well as ways to reduce America's reliance on China and other foreign sources for critical minerals. Howell also predicted a new focus on breakthrough technologies, including quantum computing and AI.

Go deeper: [Missile Defense Agency releases five-year acquisition framework for Golden Dome.](#)

INDUSTRY UPDATE



INVESTMENT STRATEGY: Two of USACA's working groups unveiled white papers during the Spring Technical Meeting aimed at proposing new government investments that would assist in developing a domestic supply of boron carbide and addressing workforce challenges within the advanced ceramics industry.

Why it matters: Boron carbide, an extremely hard ceramic material, is used in aerospace, defense, nuclear, and advanced manufacturing sectors. Currently, China dominates the supply market.

"Despite its strategic importance and lack of viable substitutes, domestic production is severely limited despite 930 metric tons of consumption annually," said Landon Mertz, CEO of USACA member [Cerion Nanomaterials](#). "As a result, the U.S. imports about 870 metric tons per year, with 66% coming from China, a figure that has risen sharply over the past two decades. The European Union, the second-largest supplier to the United States, also relies on Chinese raw materials, further extending Chinese supply chain dominance over the U.S."

Mertz continued: "U.S. dependence poses significant economic and national security risks. Over the recent years, prices for boron carbide powder have risen dramatically, outpacing inflation, while quality has deteriorated, leading to higher production costs and defect rates of boron carbide parts. Additionally, there are industry concerns that China may be selectively exporting lower-grade material while reserving high-quality powder for its military, exacerbating supply chain vulnerabilities. In the event of a conflict, China could restrict exports, cutting off a material

essential for U.S. defense and industrial needs. Future demand from emerging technologies like small modular reactors and fusion energy could further strain supply.”

What's next: The white paper, titled *High Purity Boron Carbide Pilot Demonstration*, advocates for \$10 million in the Fiscal Year 2026 Army budget to demonstrate a new process for producing high-quality boron carbide powder that “surpasses market standards while maintaining or lowering costs and relying entirely on a domestic supply chain for materials and equipment,” the paper stipulates.

“Given current market conditions and price pressures from China, private industry alone cannot justify the investment,” it states. “Without government support, these industries risk continued reliance on foreign suppliers, particularly China, creating strategic and economic vulnerabilities.”

The proposal was compiled by Cerion, Lucideon, and Framatone.

HANDS-ON: Another major thrust for USACA this year is to secure funding for the Advanced Ceramics for Defense Consortium (ACDC), which has developed an initiative to help alleviate labor shortages in the advanced ceramics manufacturing industry – particularly to address national security needs.

The challenge: “The shrinking workforce of ceramic engineers threatens the future of U.S. defense technologies,” the proposal states. “Despite the vast usage of advanced ceramics in a multitude of military applications, the United States is producing fewer ceramic engineers today than at any point in the last 70 years, while our adversaries are doing just the opposite.”

‘Only three’: Advanced ceramics engineering is a unique subspecialty within the engineering field. “Yet with only three ceramic engineering programs in the country and fewer than fifty qualified ceramic engineers graduating annually, the advanced ceramics industry faces severe workforce constraints,” the paper attests.

The pitch: The consortium is proposing several workforce initiatives with a \$10 million request in the Pentagon's research budget for next fiscal year.

They include establishing three regional nodes – in the Mountain West, Midwest, and Northeast – equipped with specialized training facilities that can support hands-on coursework and defense industry traineeship. “This will ensure a steady pipeline of skilled workers with the essential knowledge and expertise for defense industry applications,” according to the proposal.

Public-private partnership: The consortium, meanwhile, “will provide financial support to acquire and/or upgrade state-of-the-art equipment focused on advanced ceramics fabrication, integration, and testing” and “offer first-year fellowships to students pursuing ceramic engineering degrees,” according to the white paper.

“Through these comprehensive initiatives,” it concludes, “ACDC will help alleviate labor shortages in the advanced ceramics manufacturing industry. Over time, these efforts will ensure the continued production of defense technologies that rely on advanced ceramics, as well as the uninterrupted support for research and development in this field.”

Double or nothing: One major goal of the effort is to double the number of ceramic engineering degrees by 2030.

GOVERNMENT UPDATE



INSIDE VIEW: Attendees got a bird's eye view of some advanced materials priorities of the Naval Surface Warfare Center Carderock Division and Danielle Gerstner, Branch Head of Materials for Hypersonic and Advanced Systems.

Future needs: Some major thrusts of the organization include leveraging AI and machine learning for materials discovery and education; automating processes to accelerate manufacturing; improving certification and qualification procedures; modernizing infrastructure; and developing the workforce.

BASE NEEDS: Saagar Karwa from the Pentagon's Innovation Capability and Modernization Office also briefed attendees on how to partner with the Industrial Base Analysis and Sustainment program (IBAS), which is dedicated to addressing vulnerabilities in the defense industrial base and supply chains.

Focus areas: Among its priorities for this year: Flight test of a first and second stage sounding rocket solid rocket motor (SRM); increasing capacity for boost glide common hypersonic glide body components; improving production capacity for both fiber laser and Arc Jet for thermal protection system (TPS) testing; reducing production costs with additive manufacturing; and improving cost-effectiveness, manufacturing flexibility, and production speed of TPS.

STORMING THE HILL: Special shout out to USACA members who took our message to Capitol Hill in closed-door meetings with members of Congress and their staff from both parties.

We held meetings with offices representing states and districts as diverse as South Carolina, New York, North Carolina, Colorado, Missouri, Pennsylvania, and Massachusetts.

USACA SPOTLIGHT

SURGE CAPACITY: USACA member GE Aerospace has been cited in the news as one of the highest-performing companies despite all the talk (and action) of trade wars.

“The company benefited from high demand for its jet engines and maintenance services due to production delays at Boeing and Airbus, which forced airlines to operate older aircraft requiring more frequent maintenance,” [according to a recent Wall Street analysis](#).

It added: “Q4 2024 results also exceeded expectations, with a 44% increase in profit from the commercial engines division and a 19% revenue growth year-over-year. On top of that, GE Aerospace announced plans to invest nearly \$1 billion in its U.S. factories and supply chain in 2025. This was double the previous year’s investment.”

Plus: [GE Aerospace Awarded Subcontract for Next Phase of Future Long Range Assault Aircraft](#)