

Nitride Global to Partner on NASA Phase 2 Contract to Grow Aluminum Nitride Crystals in Space

Industry leaders team up to develop next-generation crystal growth capability

WICHITA, KS, UNITED STATES, February 15, 2026 /EINPresswire.com/ -- [Nitride Global, Inc.](#), a global leader in

Aluminum Nitride semiconductor materials and advanced packaging

technologies, today announced that along with its partners, [United Semiconductor, LLC](#) and [Axiom Space](#) has been selected for a NASA-funded Small Business Innovation Research (SBIR) grant titled "Physical Vapor Deposition Reactor Design and Validation for In-Space Manufacturing of Aluminum Nitride Single Crystals." The project will advance the development of a next-generation Physical Vapor Deposition (PVD) reactor for producing high-purity aluminum nitride (AlN) crystals in microgravity, a key step toward enabling large-scale space-based semiconductor manufacturing.



Aluminum nitride is an ultrawide bandgap semiconductor with superior thermal conductivity, operating temperature range, radiation resistance and electrical breakdown strength compared to silicon carbide (SiC) and gallium nitride (GaN). However, terrestrial AlN crystal growth faces challenges such as high dislocation densities, point defects, and size limitations that hinder its widespread adoption in high-performance power electronics and optoelectronic applications.

Microgravity provides a unique environment to overcome these barriers by:

- Eliminating thermal convection, ensuring uniform mass flux and reducing defects
- Minimizing thermal gradients, decreasing stress-induced dislocations
- Accelerating seed development, enabling the production of ultra-high-purity AlN substrates that could advance wafer quality by multiple generations in months rather than decades

During Phase I, the project team—led by USLLC—successfully developed and tested a proof-of-concept PVD reactor capable of achieving crystal growth temperatures of 2800–3200°C while operating at only 250–400 watts and weighing less than 700 grams. The compact system demonstrated feasibility for integration within the International Space Station (ISS) environment, where power, size, and thermal constraints are significant.

In Phase II, the consortium will develop and validate a flight-ready reactor prototype for deployment aboard the ISS. Objectives include:

- Refining reactor design to meet ISS middeck locker integration requirements
- Conducting AlN crystal growth optimization through modeling and empirical testing
- Completing NASA's Safety Review and securing payload integration approval for future on-orbit experiments

The enhanced system will also serve as a high-temperature materials research platform, supporting studies of silicon carbide, oxide crystals, and other advanced materials relevant to in-space manufacturing and next-generation semiconductor technologies.

"This collaboration represents a major step toward realizing the vision of in-space semiconductor fabrication," said Mahyar Khosravi, CEO of Nitride Global. "By harnessing the advantages of microgravity and advanced thermal systems engineering, we aim to help establish the U.S. as a leader in ultra-high-performance material production for both terrestrial and orbital applications."

The project aligns with NASA's broader goals of fostering sustainable, commercial in-space manufacturing, advancing R&D of aluminum nitride based semiconductors for extreme space environments, and leveraging low-Earth orbit (LEO) platforms such as the ISS and future Axiom Space stations to accelerate technology readiness for Earth and beyond.

About Nitride Global

Founded in 2021, Nitride Global (nitrideglobal.com) is an advanced materials innovator specializing in ultrawide bandgap materials with its ultra-high-purity aluminum nitride boules, and advanced packaging solutions with its revolutionary and patented aluminum oxynitride technology. Its cutting-edge solutions are designed to enable the next generation of semiconductor devices & microelectronics in sectors such as power grid, aerospace & defense electronics, EV, datacenters, power electronics, and sustainable energy solutions. Through continuous innovation and strategic partnerships, Nitride Global is committed to pushing the boundaries of performance while building a more sustainable, energy-efficient future.

About USLLC

United Semiconductors LLC (USLLC) is a U.S.-based, woman-owned small business specializing in the design, growth, and processing of advanced III-V compound semiconductor materials. Founded in 2005 and headquartered in Los Alamitos, California, USLLC provides crystal growth and wafer fabrication solutions for defense, aerospace, and high-performance electronics applications. The company is pioneering in-space manufacturing technologies to enable next-generation semiconductor substrates with superior performance and scalability.

About Axiom Space

Axiom Space is building the world's first commercial space station – Axiom Station. Serving as a

cornerstone for sustained human presence in space, this next-generation orbital platform fosters groundbreaking innovation and research in microgravity, and cultivates the vibrant, global space economy of tomorrow. Today, driven by the vision of leading humanity's journey off planet, Axiom Space is the principal provider of commercial human spaceflight services to the International Space Station and developer of advanced spacesuits for the Moon and low-Earth orbit. Axiom Space is building era-defining space infrastructure that will empower our civilization to transcend Earth for the benefit of every human, everywhere.

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