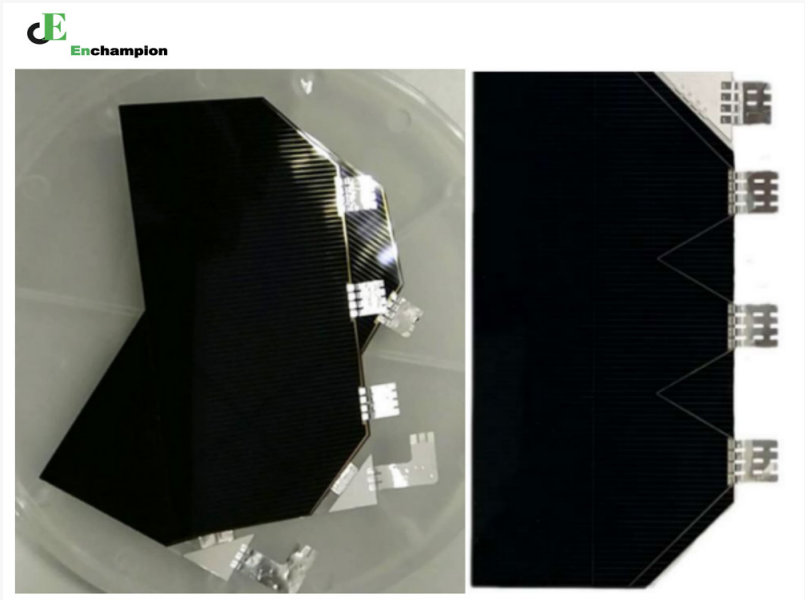
Enchampion matures the GaAs solar panel solution with best cost and performance for space applications

MUNICH, GERMANY, April 23, 2025 /EINPresswire.com/ -- With years of technical and cost optimization, Enchampion Aerospace Technology turns its low-cost triple junction GaAs solar panel solution into an ideal solution for satellite and other space applications, which can ideally meet the low-cost requirement while pursuing high photovoltaic conversion performance. All the performance figures are proved by the years of in-orbit flight tests.



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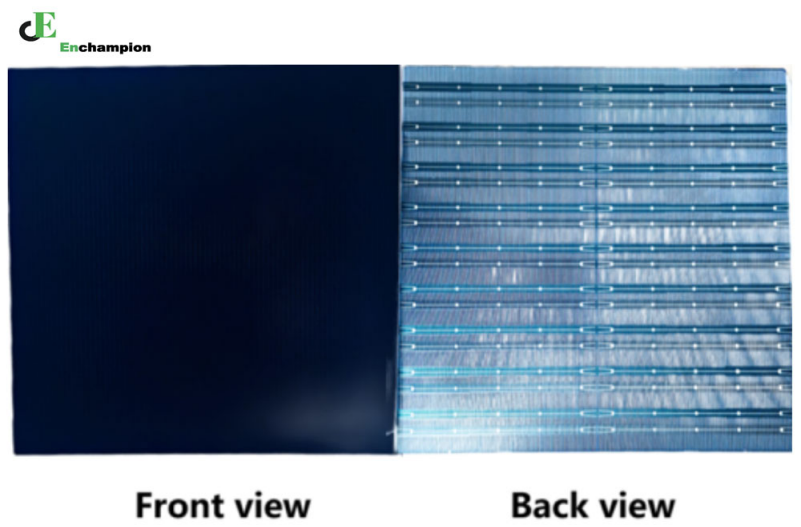
Industry Challenges
In the aerospace sector, high-efficiency and reliable solar cells are critical for ensuring satellite longevity. Triple-junction gallium arsenide (GaAs) cells have become the preferred solution for high-value space missions due to their exceptional conversion efficiency and superior radiation resistance. However, the widespread adoption of conventional GaAs technology has been constrained by prohibitively high manufacturing costs.

Aerospace solar cell technology has long faced two core issues. First is the cost barrier—GaAs material growth (MOCVD process) and substrate expenses significantly exceed silicon-based materials, with germanium substrate costs accounting for over 40% of total production. Second is technical complexity, including demanding lattice matching and current balancing requirements, as well as precise control needed for 6-8μm epitaxial growth.

Notable Breakthroughs: Balancing Performance and Cost
Facing these technical challenges, Enchampion, a company focused on aerospace energy product research and development, has optimized the epitaxial process through a series of innovations, significantly reducing costs while maintaining high performance.

These technical breakthroughs are manifested in three key areas:
High-Speed Multi-Wafer MOCVD Growth
The research team utilizes self-optimized multi-wafer MOCVD equipment, increasing epitaxial growth rate by 50% while significantly reducing single-wafer processing time and boosting production capacity. Through AI real-time monitoring of gas flow and temperature distribution, they ensure epitaxial layer uniformity (variation <±2%), achieving breakthrough yield rates exceeding 95%.



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Silicon Substrate Replacement and Reuse Technology
The team has developed silicon-based GaAs epitaxial technology, resolving lattice mismatch issues through buffer layers, significantly reducing substrate costs. They have also created a laser lift-off process to enable Ge substrate reuse, further reducing material costs.

High-Efficiency Design Optimization
The optimized InGaP/GaAs/InGaAs triple-junction structure achieves 30% AM0 efficiency with <5% annual degradation rate (15-year lifespan), meeting the long-life requirements of satellites.

Broader Aerospace Energy Solutions
Beyond triple-junction GaAs solar cells, the company also offers extremely low-cost silicon-based solar cells, flexible thin-film solar cells, and BC back-contact solar cells (optimized for HAPS). They have established cooperative relationships with mainstream satellite and HAPS customers, and continue to innovate and develop new technologies, having made significant progress in perovskite tandem solar cells, which have now completed space environment verification and are planned for commercial product launch by the end of 2025.

In addition to solar cells, the company possesses professional aerospace battery products, including cost-effective COTS lithium-ion and sodium-ion aerospace batteries for LEO applications, and specialized aerospace batteries for GEO applications. In the aviation sector, they offer high-energy-density and high-power battery products suitable for electric and hybrid eVTOLs, small fixed-wing aircraft, helicopters, and commercial airplanes.

Shaping New Standards for Aerospace Energy Products
With the rapid development of commercial space, technological breakthroughs that reduce the cost of key components such as solar cells will have a significant impact on the entire industry.

Such innovations make "high efficiency, reliability, and low cost" aerospace energy solutions possible, creating more opportunities for commercial space and clean energy.

About Enchampion Aerospace Technology
Enchampion is a high-tech enterprise focused on the R&D and production of high-efficiency, low-cost aerospace energy products, committed to providing comprehensive energy solutions for the global space and aviation sectors. For more information, visit www.enchampion.com or email marketing@enchampion.com.

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