The Tiny Startup that Holds the Key to AI's Trillion-Dollar Future

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We're witnessing a digital transformation across all sectors of technology.

Semiconductors, the chips that process digital information, are embedded in nearly everything: computers, cars, home appliances, medical equipment, and more.

In 2023, it's estimated that semiconductor companies sold around $600 billion worth of chips.

Of that $600 billion, roughly 5%, or $30 billion, was spent simply buying silicon wafers.

And that's only one year of revenue.

The growth of the semiconductor industry over the past decade has likely resulted in silicon wafer sales totaling hundreds of billions of dollars.

While the semiconductor industry is raking in billions of dollars, the scientific community is sounding the alarm.

Last year, Saptarshi Das, an associate professor of engineering, science, and mechanics at Penn State, warned that silicon is nearing its limit as an effective semiconductor material.
As Saptarishi and others have noted, silicon is responsible for getting technology to where it is today. However, new technologies require chips capable of operating faster, more efficiently, and with greater temperature control.

With tens of billions of dollars on the line, a viable and valuable replacement for silicon already exists. However, until now, no company has demonstrated an ability to manufacture the material at scale, cost-effectively, and without producing deadly chemical waste.

In just a few minutes, I'll introduce you to the company positioned to be the leading supplier of the next great scientific material required to create cutting-edge AI applications, space-based satellites, and other applications required for man's push toward the stars.

In other words, a company poised to change the world.

This privately held company is raising $5 million through a Regulation Crowdfunding round. I'll show you how you can invest long before the hedge funds and institutions on Wall Street get involved.

OK, let's dive in!

The One Device You Can't Live Without

I hate how reliant I am on a single device. I can't live without my phone, but for you, it might be your laptop or smartwatch.

But these devices allow most aspects of our personal and professional lives to operate efficiently.

Here's the thing, none of these devices would exist without silicon-based semiconductors.

Of course, semiconductors are used in more than just high-tech Apple gadgets. They also power your alarm clock, coffee maker, LED lighting, television, microwave, refrigerator, thermostat, automobile, and even your credit cards. I could go on for hours.

Anything that utilizes some form of electronics relies on semiconductors.

A LOT of them...

My iPhone 12 Pro has an A14 Bionic processor, and that single device has 11.8 billion transistors.

[A transistor is a semiconductor device that amplifies and switches signals and power, essentially acting as a gatekeeper for electricity in circuits.]

According to the folks at Waferworld, as of mid-2022, 13 sextillion transistors had been manufactured since they were first invented. That's 13 with 21 zeroes behind it.

It's clear our modern lives don't exist without semiconductors.

The advancement of AI will only put more pressure on the number, power, and complexity of microchips starting right now. It's happening. And the old world is about to give way to the new.

Opportunities Missed, Opportunities Seized

The forgotten inventor Morris Tanenbaum developed the primordial silicon switch in early 1954 while working at Bell Laboratories.

Like his prototype, semiconductors govern the movement of electricity in devices, much as valves manage water pressure, directing currents to flow or cease with subtle adjustments. Such regulation underlies all modern gadgets, from smartphones to cars, enabling the "common" digital technologies that rule our daily lives.

Bell Labs, whose scientists have been awarded nine Nobel Prizes and four Turing honors, neglected to commercially harness Tanenbaum's creation. Meanwhile, another company jumped at the chance, claiming the breakthrough that should have been credited to its creator.

Texas Instruments took the opportunity disregarded by Bell, coming to dominate the budding silicon transistor field through the mid to late 1950s thanks to its competitor's failure to recognize the material's scientific and industrial worth.

The Gold Standard for Electronics

Think of silicon (Si) as the gold standard for electronics, just as flour is for baking. Its abundance in the Earth's crust and intrinsic conduction characteristics have fueled technological breakthroughs for decades, enabling devices large and small.

Versatile yet stable, silicon allowed engineers to craft simple and sophisticated solutions. With a mere touch of impurities (other elements), its electrical properties change, granting engineers a vast palette for devising circuits. Whether conducting electricity or blocking its flow, silicon served as the defectable foundation.

Its flexibility stemmed not from one company's dominance but from nature itself.

Composing over a quarter of the planet's rocky layers, silicon remains easily accessible and reasonably priced. Maintaining functionality across wide temperature fluctuations, it likewise ensures stability where reliability is key.

Much like flour enables bakers creative freedom, silicon has given engineers seemingly boundless potential for miniaturization for more than half a century. Through constant refinement of this semiconductor, microchips and microdevices proliferated, reshaping modern life.

Silicon's role as the primary driver of advancement arose not from any single attribute but from its goldilocks qualities en masse. Readily available yet malleable, durable yet moldable, it formed the optimal substrate for generations of advancement in electronics.

The Backbone of Technology, Past and Present

Morris' creation of the silicon transistor only marked the beginning. For seventy-five years, silicon has served as electronics' structural backbone.

In the 1960s, integrated circuits emerged, and mass production began, cramming thousands and then millions of transistors onto singular chips.

Thanks to the adoption of integrated circuits in the 1960s, Intel introduced the world's first commercial microprocessor in the early 1970s. However, transistors, circuits, and processors meant nothing to many until the 1980s when IBM unveiled personal computing.

The 1990s heralded the World Wide Web, though the Web itself relies little on silicon; still, the digital networking powering it depends almost exclusively on silicon chips.

Entering the 21st century, the 2000s are best known for launching what we still can't live without - the smartphone. Combining traditional telephony with silicon-powered computing, Steve Jobs' 2007 iPhone forever changed communication.

Cloud utilization and data center reliance exploded in the 2010s, and as you probably guessed, the processors and storage that make cloud-based storage possible heavily leverage silicon.

This brings us to the 2020s, where AI and machine learning's initial widespread adoption relies on ultra-specialized silicon processors like GPUs and TPUs for development.

From the 1970s microprocessors and 1980s personal computers to the 2000s smartphones and the early 2020s AI uptake, no one can argue that technology's developmental pace has failed to keep up with demands for more power, speed, efficiency, or smaller miniaturization. However, this breakneck innovation pace has brought a major problem—engineers and researchers have realized that silicon, the semiconductor foundation for over half a century, can't keep up with the future demands of new technologies.

Cracks in Silicon's Foundation

There is tremendous pressure on microchips to cram greater amounts of electricity and complexity into ever-diminishing spaces.

We task silicon with handling more wattage, operating at faster speeds, and performing increasingly sophisticated functions, all while shrinking to ever-smaller sizes without overheating. This is akin to squeezing additional passengers into an elevator filled to capacity;

eventually, no one else can fit inside. If we continue to force additional weight, it risks causing the whole system to fail under strain. And no one wants to be in an elevator that fails.

Silicon's properties are reaching their physical limits. Here's what I mean.

1. Heat Constraints: Silicon chips can only function within a limited temperature range. If the temperature exceeds roughly 150 degrees Celsius, silicon instruments can fail or degrade in performance. This presents a challenge for contraptions that either produce a lot of heat themselves or are used in hot surroundings (or under extreme pressures like deep underwater).

2. Speed Boundaries: Silicon has a barrier to how quickly it can handle electronic signals. This is partly owing to its inherent material properties, like the movement of electrons through the silicon. More rapid processing speeds are often sought after in modern technology applications, testing the confines of what silicon can accomplish.

3. Size Limitations: As technologies advance, there is a push to make electronic devices smaller and smaller. Silicon transistors are nearing the physical boundaries of how tiny they can be made, a border set by the atomic size and quantum impacts that occur at very small scales. This restricts how much more densely the parts can be packed into silicon-based chips.

4. Energy Efficiency: Silicon instruments lose a significant amount of energy in the form of heat. This affects the strain on an already stressed electrical grid due to increased power demands and limits the devices' proficiency.

Silicon has been an incredible material that has powered technological advancement for decades, but we're reaching its limit. Like all good things, it's coming to an end.

We must find new materials to overcome our physical and efficiency limits. What worked on microprocessors in the 1970s and smartphones in the 2000s won't work on satellites, where extreme temperature and gamma radiation can quickly degrade the performance of a silicon-based microchip. Technical innovation in AI, machine learning, and quantum computing demands that scientists and researchers identify the next cutting-edge scientific material.

In a few minutes, I'll introduce you to a company that plans to provide companies like Intel, Texas Instruments, and Infineon with the scientific material that will replace silicon in advanced technologies and support things like advanced AI, quantum computing, and space-based endeavors for decades to come.

Silicon Passes the Torch to...

For decades, the technology industry has relied on silicon as the foundation of electronics for its ability to conduct electricity, relative stability at moderate temperatures, and cost-effectiveness. But innovation can't continue at its breakneck pace without a highly efficient base material that can operate at higher frequencies, handle extreme temperatures, and be miniaturized beyond what's been accomplished with silicon.

Here are a few compounds researchers have considered as silicon replacements.

Graphene

Graphene, a remarkably thin yet resilient sheet of arranged carbon atoms, resembles a futuristic variant of chicken wire constructed solely of carbon. This remarkable material possesses superb electrical conductivity, far surpassing silicon. Additionally, graphene maintains impressive flexibility and strength. However, enabling its natural function as a semiconductor, with the promise to alternatingly permit or impede electricity, has proven problematic.

Carbon Nanotubes

Carbon nanotubes, envisioned as miniature tubular structures meticulously crafted solely of carbon atoms, strikingly resemble curled sheets of graphene while sharing many of its highly prized traits, such as unrivaled electrical transmissibility and durability. Carbon nanotubes boast exceptional aptitude in transmitting current and potentially facilitating even smaller electronic devices than silicon, theoretically heralding swifter and more compact electronics. Nevertheless, integrating them into standard electronic fabrication, similar to graphene, remains challenging.

Gallium Nitride (GaN)

Gallium nitride, another semiconductor currently employed, particularly in situations requiring high power and temperature tolerance beyond silicon's limits, has achieved widespread usage in power electronics and LED technology. Demonstrating greater power handling capacity and higher operational heat tolerance than silicon, gallium nitride appears well-suited for specific applications in which silicon performance falls short.

Silicon Carbide (SiC)

Silicon carbide has proven itself as a rugged material well suited for harsh conditions that cause more fragile semiconductors, like silicon, to falter. Where standard silicon reaches its limits, especially when faced with immense power demands and scorching temperatures, SiC continues to operate normally. Its resilience makes it worthy of consideration for electric vehicles, industrial machinery, and other applications relying on sturdy, long-lasting electronics.

Withstanding voltages and heat that would cripple silicon, SiC delivers impressive efficiency and dependability even in the most punishing surroundings.

While graphene and carbon nanotubes have potential in highly specific applications, their limitations as natural semiconductors make them unlikely ever to replace silicon as the foundation of electronics.

However, gallium nitride and silicon carbide both outperform silicon and are well-positioned as potential replacements for the next foundational material for semiconductors.

GaN Outshines SiC

I don't want to turn this into more of a science lecture than it already is, but determining whether GaN or SiC will most likely be the next breakthrough scientific material comes down to the electrical, thermal, and mechanical properties of the two elements.

Electrical Properties: GaN allows for higher electron mobility, which allows electrons to move faster than in SiC. This permits GaN-based gadgets to switch on and off quicker, making them better suited for high-speed electronics. Additionally, GaN can accomplish lower on-resistance, implying it can conduct electricity more effectively with less power wasted.

Thermal Properties: While GaN and SiC manage heat well, GaN tends to run proficiently across a broader range of temperatures. This makes GaN devices specifically dependable and stable in surroundings where temperatures can differ notably.

Mechanical Properties: GaN is inherently a hard material comparable to SiC, yet it offers specific adaptability in its application, particularly in layering on other substrates. This can lead to more multifaceted applications in diverse types of electronic devices.

The bottom line is that based on GaN's electrical, thermal, and mechanical properties; it's the hands-down favorite material for applications necessitating fast functioning, competent power usage, and steady performance across fluctuating temperatures, such as in power electronics, RF applications, space-based applications, and LEDs.

Goodbye Silicon, Welcome to The Gallium Nitride Era (Century?)

It's tough to nail down the precise size of the global silicon market regarding electronics usage, but I've seen estimates of more than $6 billion from 2019. I expect that figure to increase to nearly $11.5 billion by 2027.

And that's only for the raw material, not the wafers, transistors, microprocessors, or any gadgets made with silicon.

Regardless of which company establishes itself as the premier manufacturer of GaN powder (which can be used to make traditional 4” or 6” wafers), billions of dollars are on the line.

But here’s the thing: if GaN is superior to silicon, why haven’t engineers used it for years?

There are four reasons: cost, complexity, existing supply chain, and necessity.

Costs: While silicon saturates the earth's crust, allowing extraction nearly anywhere, gallium nitride presents a different story. Due to specialized processes, its mining, processing, and manufacturing require more money. Transitioning requires expensive novel equipment and retraining personnel experienced in antiquated techniques.

Complex Challenges: Adopting gallium nitride means adjusting accustomed fabrication methods tailored for silicon. Reworking and retooling operations to handle compound assembly involves adopting unfamiliar machinery and re-educating experts in different methodologies.

Supply chain: Silicon benefits from extensive supply chains supporting its mass adoption. Enormous sums of money have been invested in established production methods. Overcoming silicon's momentum requires clear advantages and motivated stakeholders willing to accept risk.

Delayed Impetus: Only recently has the urgent need for an alternative to silicon gained acknowledgment despite scientists' understanding that gallium nitride provided superior characteristics for years. Without widespread applications necessitating gallium nitride's performance advantages, changing established practices seemed an unnecessary risk.

When it comes to the future of technical innovation, here’s what we know.

Technology's end users will always want their applications and devices to process faster, perform effortlessly, and get smaller. Scientists and engineers have no other option but to meet these demands.

Technological innovation requires that the power electronics industry pivot away from silicon and adopt a new base scientific material capable of accomplishing everything silicon can not.

That new material is gallium nitride.

You already know that cost and manufacturing have been massive impediments to the industry's adoption of GaN. But that’s because the scientific community only knows about the established methods of producing gallium nitride.

That will all change when the semiconductor industry realizes that a small start-up company headquartered in Southern California has developed a clean, efficient, and cost-effective way to produce pure gallium nitride particles.

Introducing Mivium Inc.

Incorporated in Delaware on July 1, 2022, and headquartered in Southern California, Mivium Inc. is dedicated to delivering a materials-based solution to solve the world’s toughest semiconductor challenges. To this end, the company strives to accelerate the world’s transition to gallium nitride as the backbone of advanced electronics.

Management believes the company’s patented technology can produce ultra-high-purity gallium nitride (GaN) and serve as the backbone for the next generation of wide-bandgap (WBG) semiconductors.

[Wide bandgap (WBG) semiconductors are materials that can handle a lot of electricity and heat without getting damaged. WBG semiconductors can make things like phones, computers, EVs, satellites, and anything in extreme environments perform better and last longer.]

In 2023, Mivium engaged an independent firm to conduct a detailed intellectual property (IP) analysis. While the firm only studied Mivium’s IP against a small range of potential use cases, the report stated that the company’s patented technology could be valued at $42.5 million.

Moreover, based on Mivium’s patented, physics-based process, the independent firm’s analysts found no serious or significant competition from well-established businesses.

Mivium has a first-mover advantage.

To capitalize on this advantage, Mivium’s management seeks to raise $5 million in equity capital to fund a bench test to further validate its ability to manufacture and sell GaN particles and substrates.

[Mivium’s bench test is a small-scale test of its physics-based manufacturing method for producing GaN particles patented by company co-founder and Chief Technology Officer Jim Qiu.]

Physics versus Chemistry

As promised, I won't turn this into a science class more than necessary. But to appreciate what Mivium has developed, I must take you back to your high school chemistry class for a minute.

The two industry-standard approaches to manufacturing GaN are Hydride Vapor Phase Epitaxy (HVPE) and Metalorganic Chemical Vapor Deposition (MOCVD).

While we're not going to get into the scientific weeds of the two approaches, it's essential to understand that HVPE and MOCVD utilize deadly chemicals and toxic compounds, require costly and sophisticated ventilation systems, and, if not adequately treated, disposing of the chemical byproducts can be a nightmare (and bring unwanted regulatory attention).

In addition to the dangers of the chemical process, neither HPVE nor MOCVD can produce large enough quantities of GaN in a reasonable amount of time or at a cost-effective rate.

While GaN has the characteristics we need to increase the speed and efficiency of renewable technologies, EVs, data centers, satellites, high-performance computing (for AI), and countless other technologies, chemical-based processes can't do the job.

Mivium's Patented Formula

Mivium's mission to accelerate the world's transition to gallium nitride is only possible because of its patented, physics-based process. This process produces high-purity GaN materials without using water, solutions, or solvents, and nothing toxic needs to be disposed of once the manufacturing process is complete.

The first step in Mivium's process involves breaking raw gallium into nano-atomic particles using a non-toxic, mechanical approach without chemicals. These nano-atomic particles will combine with [reaction] gas to form GaN polycrystalline powders or particles.

The second step requires placing nano-atomic gallium particles in a growth chamber. There, they combine with reaction gas to form GaN monocrystalline ingots. These ingots grow on seed crystals without the need for a catalyst.

[Semiconductor ingots are large cylindrical blocks of material that are the starting point for creating electronic components such as computer chips and transistors.]

The third step in Mivium's process results in the production of single crystal GaN substrates.

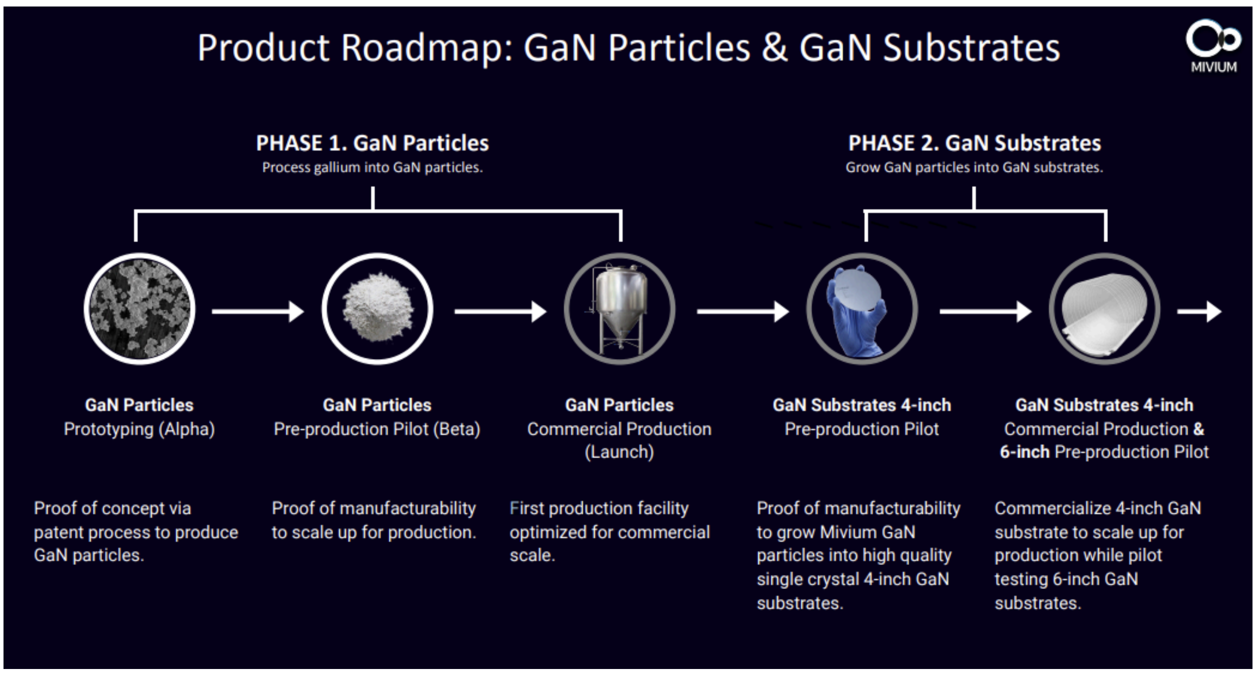
Having spent considerable time with the Mivium team over the past two years, I understand and appreciate why they're secretive and hyper-protective of their intellectual property.

The scientific community is only familiar with the established, chemical-based methods of manufacturing GaN. Once word gets out that Mivium can manufacture GaN particles at scale, cost-effectively, and without the toxins associated with the chemical-based process, the material science industry will bang down its doors.

Mivium's Product Pipeline and Business Model

Unless you're a chemistry wiz or material scientist, trying to understand Mivium's physics-based approach to manufacturing GaN will probably make your head spin.

I've spent nearly two years speaking with the management team and learning about the company's process. I'm still trying to understand the science.



Over the next two years, Mivium will primarily focus on creating GaN particles utilizing its chemical-free, physics-based manufacturing process. These ultra-high purity GaN particles are expected to be sold based on the quality and purity of the finished material.

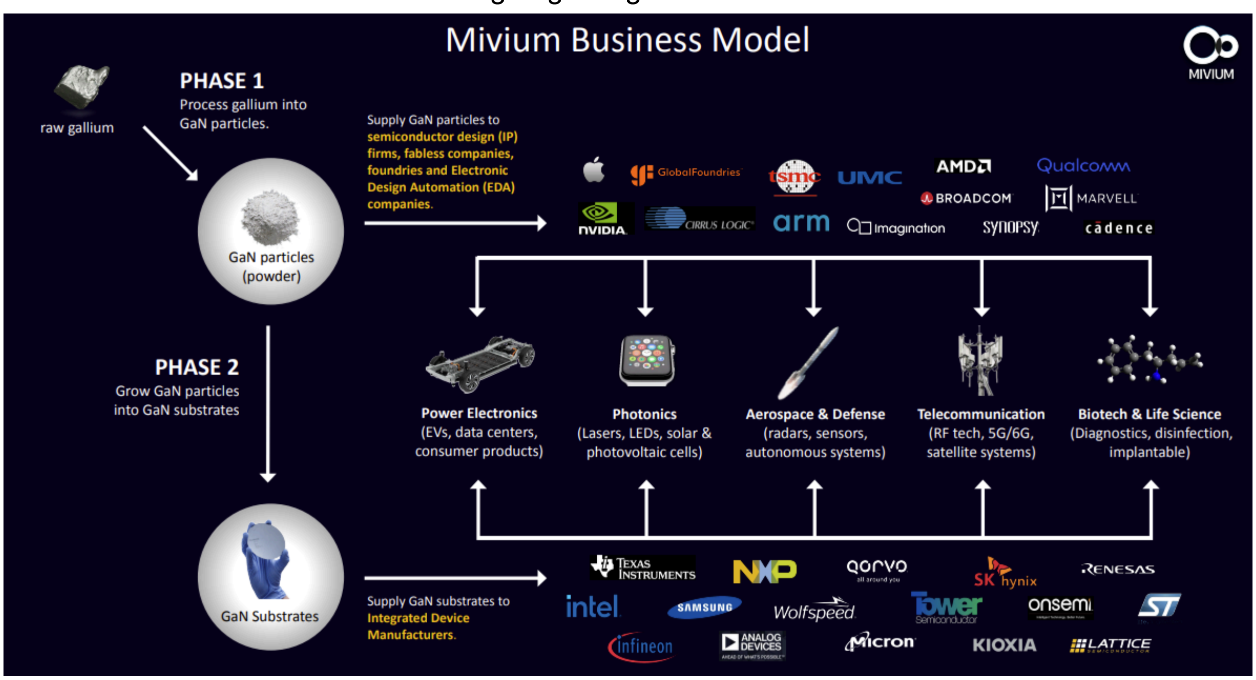
The company is targeting the production of 3N (99.9% gallium nitride), 4N (99.99% gallium nitride), and 5N particles (99.999% gallium nitride). The first product expected to be available to customers will be 3N GaN, and the company is targeting 2026 for that milestone.

Existing GaN Particles	Mivium GaN Particles
Cost: \$20—\$50/g	Cost: \$1—\$2/g
Yield: 20—500 kg/year	Yield: 4000—6000 kg/year
Purity: 90.0—99.9% (1N-3N)	Purity: 99.9—99.99% (3N-4N)
Environmental Impact: Toxic and Polluting	Environmental Impact: None
Existing GaN Wafer/Substrate	**Mivium GaN Wafer/Substrate**
Cost: \$5000—\$15,000 /slice	Cost: \$1000—\$5000 /slice
Yield: 1000 slices/year	Yield: 10,000-20,000 slices/year
Quality: $1x10^6$—$1x10^9$ dislocations/cm^2	Quality: <$1x10^5$ dislocations/cm^2
Wafer Size: 1"—4"	Wafer Size: 4"—6" +
Environmental Impact: Toxic and Polluting	Environmental Impact: None

Phase two of Mivium's product pipeline involves the production of GaN substrates, which will be derived from the company's ultra-high purity GaN particles.

Using its patented technology, and without chemicals or solvents, gallium will be transformed into numerous molten ultrafine droplets. These pure molten droplets will be introduced into an epitaxial growth chamber, gradually forming large GaN single crystal blocks. These blocks will then be cut and polished into GaN substrates or wafers.

The company expects to produce GaN substrates (wafers) ranging from 4 to 8 inches, with low-cost 4" and 6" wafer manufacturing beginning in 2028.



Customers of Mivium's ultra-high purity GaN particles are likely semiconductor design firms, fabless companies, foundries, and electronic design automation companies. Companies like Apple, AMD, ARM, and NVIDIA fall into this category.

Mivium's GaN substrate customers are likely integrated device manufacturers, including Intel, Texas Instruments, Infineon, and Samsung.

Manufacturing GaN particles and creating the GaN substrate isn't quick. While the company believes 2026 is a realistic target for particle availability, they're likely to try and sign off-take agreements with customers before that. So, there is a chance we will see revenue flow into the company in less than two years.

Non-Dilutive CHIPS Act Financing

It's been a couple of years since President Joe Biden signed the Creating Helpful Incentives to Produce Semiconductors for America Act (CHIPS Act) into law. Still, this act allows domestic companies working to reinvigorate a U.S.-based semiconductor industry to access non-dilutive financing.

And Mivium has its foot in the door!

The CHIPS Act aims to restart the U.S. semiconductor industry and better compete against Chinese dominance, especially regarding manufacturing.

While billions of dollars have gone out to folks like Intel, Micron, and Samsung (to produce facilities in the U.S.), the allocated funds also aim to support chip research facilities.

The Mivium team worked with the state of Nevada as a founding member of the Semiconductor Materials, Advanced Research, and Technology in Nevada (SMART NV) consortium. While this doesn't guarantee Mivium funding, it puts them in the running.

While there's no actual timetable for determining whether or how much the company might receive, one thing is sure: a successful bench test of Mivium's patented process for manufacturing GaN would only help their chances of receiving government support.

S.M.A.R.T. System

Now that I've introduced you to Mivium, let's analyze the company using our S.M.A.R.T system.

S.M.A.R.T stands for **S**olid fundamentals, **M**anagement expertise, **A**dvantage in the market, **R**eturn potential, and **T**ime spent researching.

Solid Fundamentals

Assessing the fundamentals of a seed-stage company is more art than science. Without customers, a minimally viable product, or revenues to base our analysis on, we need to focus on the market opportunity, value proposition, business model, and realistic milestones.

I'm leaving the management team out of this section, but only because we will discuss the team—which is very impressive—in a few minutes.

Market Opportunity

According to management, the existing GaN substrate market is around $5.4 billion and is expected to grow to over $13.7 billion by 2033. Taken in a vacuum, these are big numbers and offer ample opportunity for Mivium.

But here's the thing.

The current GaN market is a tiny fraction of what it could be because chemical-based manufacturing methods are slow, expensive, and toxic. The market would be much larger if GaN could be produced at scale and affordably without making massive amounts of harmful waste.

The most fundamental question a venture investor must ask regarding a seed-stage company is whether the size and growth potential of the market the startup targets are large enough to provide significant growth opportunities.

The market for GaN as a replacement for Silicon is enormous, likely in the tens of billions of dollars. If Mivium's patented process can produce the GaN particles as the company projects, it will have a significant head start on its competitors.

Value proposition

Mivium's mission to accelerate the world's transition to gallium nitride is built around the expectation that a bench test of its patented, physics-based approach to manufacturing GaN will be successful.

Current chemical-based GaN manufacturing methods won't support replacing silicon as the backbone of semiconductors and power electronics. But if Mivium's process is successful, a world where GaN replaces silicon becomes a possibility. That makes an investment in Mivium at this early stage and valuation very compelling.

Business Model

I look at hundreds of startup companies, and most of those with business plans are poorly conceived.

While Mivium's focus for this fundraising is to bench test its IP, the company is already building out its research lab, planning to manufacture its high-purity GaN particles, and laying the framework for a facility to manufacture 4" to 8" GaN substrates.

Simply put, Mivium isn't an ordinary seed-stage startup. This company is managed by a team of industry veterans, and they're focused on proving the technology and immediately moving toward a production-ready facility.

Milestones

Venture investors measure the success of their startup investments by identifying milestones. Mivium's most meaningful milestone is the bench test of its IP.

If that test proves that Mivium's manufacturing methods are successful, I believe the company will have a long runway and plenty of eager investors ahead of it. That said, the valuation of the post-successful bench test Mivium is likely significantly higher than the $22.60 million that the company is currently valued at.

Management

Mr. Tsai has nearly 25 years of experience in the technology sector. He is known for his leadership and team-building skills.

In 2021, he joined Mvium after serving as Vice President of Marketing and Business Development at Joybird, where, under his leadership, the company grew from $10 million to over $200 million, leading to its eventual acquisition by La-Z-Boy Corporation.

Eric started his career at Fieldsheer Inc. and rose through the ranks from Creative Director to President, during which time sales saw meaningful growth.

His previous experience includes jobs at Bridgetech Holdings, Pointivity, Revana Digital, and Lunada Biomedical in marketing business development roles aimed at strategic growth.

Ginetto "Gino" Addiego, PhD - Chief Operations Officer

Dr. Addiego began as Chief Operations Officer at Mivium in May 2024, bringing over thirty years of senior leadership experience within the semiconductor sector.

He had spent seventeen years at Applied Materials, culminating as Senior Vice President guiding worldwide operations, quality assurance, and engineering divisions. Addiego's management approach emphasizes excellence, imagination, and out-of-the-box problem-solving, especially when confronting uncertainty.

His background also includes high-level positions at Ultra Clean Technology, Novellus Systems, and KLA Instruments, where he focused on globalization, engineering functions, and corporate evolution.

While leading Ultra Clean Technology as President and Chief Operations Officer, he oversaw manufacturing facilities across eight locations in the Americas and Asia.

Before its acquisition by Lam Research, Dr. Addiego headed worldwide logistics and various internal departments as Novellus Systems continued expanding. Holding a Doctor of Philosophy in Electrical Engineering from the University of California, Berkeley, Addiego remains dedicated to operational progress.

Chandra Deshpandey, PhD - Chief Technology Officer

Dr. Deshpandey, Mivium's Chief Technology Officer, brings over 40 years of expertise in semiconductor processes and materials science.

He excels in strategic partnerships and optimizing market opportunities. Known for his work in deposition systems, ceramics, coatings, and semiconductor technologies, he developed Applied Materials's first physical vapor deposition tool, achieving a 90% market share and over a billion dollars in revenue. He also created polyimide and ceramic electrostatic chucks, generating $300 million in revenue.

He founded and exited Angstrom Systems Inc. and RF Arrays Systems Pvt Ltd as an entrepreneur.

Previously, he was a professor at UCLA and a research professor at the Royal Cavendish Laboratory. Dr. Deshpandey holds 30 patents, has authored over 150 publications, and has contributed to technical books. He holds a Ph.D. in Materials Science from the University of Sussex and two Master's degrees in Solid State Physics from IIT Delhi and Nagpur University.

Rick Qiu - Senior Vice President and Secretary to the Board of Directors

Mr. Qiu, a founding member of Mivium, is now the Senior Vice President responsible for the company's product vision and technology strategy.

Rick aims to create sustainable and scalable platforms to address semiconductor supply issues. Before Mivium, he led product launch teams at Nokia, McAfee, and Malwarebytes and co-founded the augmented reality startup MeARview.

From 2016 to 2023, he worked in Santa Clara, California, including roles as Senior Product Marketing Manager at Malwarebytes and Product Marketing Manager at McAfee. Earlier, he held positions at Huawei, Netenrich, and Nokia, focusing on product launches and go-to-market strategies.

Jim Hongjie Qiu - Chief Product Officer

Mr. Qiu, Mivium's Chief Product Officer, and founding member, has over 30 years of experience in the semiconductor industry.

He began R&D at Mivium in 2012, focusing on nitride semiconductors, and holds several patents. Jim is a pioneer in producing third-generation semiconductor materials using solvent-less methods. His career includes leading engineering teams at Intel and TriQuint, developing factory-automation systems at Applied Materials, and tech systems at Lam Research.

From 2014 to 2017, he was CTO at Kemute Novel Materials in China, where he led R&D, secured funding, and directed equipment design and manufacturing.

At Qualmat (2005-2014), he researched gallium properties and developed mass-production processes for GaN.

Earlier, he was Director of Factory Automation at ILS and a senior engineer at Applied Materials and Lam Research. Jim holds a Master's in Electrical and Computer Engineering from the University of Missouri and a Bachelor's in Electrical Engineering from Anhui University.

Advantage in the Market

I would only invest in an early-stage company if I understood its competitive advantage. Mivium's most significant strengths are its management team and industry-changing intellectual property.

The Magic Formula

Silicon got us to where we are, and Gallium Nitride will get us where we want to be. However, current GaN manufacturing methods are too slow, cost too much, and produce too much toxic waste.

There's already a market for GaN material. However, the economics of producing GaN means that only the most expensive chips, like those purpose-built for satellites, warrant the investment.

We can't expect a desktop PC, an iPhone, or a Tesla to utilize GaN chips if costs can't be brought down to a level comparable with silicon.

Mivium believes it has the formula to solve this problem.

Thanks to the company's patented, physics-based process, Mivium believes it can produce ultra-high purity GaN materials at scale, at costs comparable to silicon, and without the toxic chemicals and solvents currently plaguing the semiconductor industry.

Innovation demands that we replace silicon with a more advanced material--GaN is that material.

Decades of Experience

Seed-stage companies rarely have a minimally viable product or revenue, so traditional valuation models like discounted cash flow or product analysis are useless.

In my experience, seed-stage venture investing often boils down to an analysis of the management team.

Mivium's team gives it a massive advantage over potential competitors.

Between Jim's experience with nitride semiconductors, Chandra's decades of work as a materials scientist, and Gino's success in operations at some of the world's largest semiconductor companies, this team has the skillset and experience to develop, manufacture, and bring to market the ultra-high purity GaN that will replace silicon as the base material of semiconductors.

Return Potential

One of the most challenging aspects of my due diligence on Mivium is determining the return potential on an investment.

If the GaN market were mature, the total addressable market was clear, and Mivium simply had a better mousetrap, we could do some basic math and arrive at an estimate.

But that's not reality.

While there's no disagreement that GaN represents a huge leap in material science, the current methods for producing high-purity GaN are slow, prohibitively expensive, and produce an unacceptable amount of toxic chemicals.

We can find very rough guesstimates regarding the size of the GaN market today. Still, the GaN addressable market is in its infancy.

The real addressable market may be many-fold higher if Mivium's bench test is successful and the company can produce high-purity GaN as it claims.

So, while Mivium tells us the current value of the GaN substrate market is around $5.4 billion, the realistic potential could be many times greater if GaN particles and substrates can be produced in a manner that is competitive with silicon.

If the GaN substrate market is worth around $5.4 billion today and estimated to be valued at around $13.7 billion in 2033, as Mivium suggests, and we assume the company can capture a minimum of 5% of the addressable market, we're looking at revenues starting around $270 million and climbing to nearly $690 million over the next ten years.

This estimate, of course, fails to consider the potential for GaN to replace Silicon as the industry standard. As GaN replaces silicon in the production of transistors and integrated circuits, the market value of GaN increases dramatically.

Early-Stage Back-of-the-Napkin Analysis

Venture investing isn't easy. Real-world statistics confirm that as many as 8 out of 10 companies will fail.

To balance out the probability that many investments will go to zero, venture investors always ask this question: Does this investment have the potential to return at least 10x?

With no product or revenue, only Mivium's patented IP and a strong management team support its business, so there's no question that an investment in Mivium is high risk. However, if we wait until Mivium is a one—or two-product company producing consistent revenue, we will likely invest at a significantly higher valuation.

As with any investment, we either invest at a low valuation with incomplete information or wait for more information and invest at a higher valuation. It's that simple.

Let's apply a back-of-the-napkin, elevator-pitch analysis of this opportunity by asking five basic questions, as most venture capitalists would.

1. Does the management team possess the necessary skills to develop a minimally viable product? **Yes**. The Mivium team has decades of experience in the materials and semiconductor space.

2. Do we believe the proposed product will solve a real-world problem and be at least 10 times better than what's available? **Yes**. Current GaN manufacturing methods are slow, expensive, and dangerously toxic.

3. Is the total addressable market for Mivium products huge and attainable? **Yes**, the power electronics market is enormous.

4. Is there a need for the product that Mivium aims to develop? **Yes**, we've established that the electronics industry needs a suitable replacement for silicon.

5. Are the deal terms reasonable? With a total addressable market in the billions of dollars, $22.60 million represents an attractive risk/reward.

While it's impossible to say what the impact on the company's valuation will be if the bench test is successful, I believe it will be several times greater than today's $22.50 million valuation.

Time Spent Researching

With the help of my Asymmetric Ventures team, I quickly eliminate over 60% of our potential private company prospects in just a few hours of work.

Sometimes, I can determine that a prospect is not a good fit within 30 minutes of an initial call. However, on average, I spend about four hours ensuring we haven't missed any critical information that requires further investigation.

I was introduced to the Mivium team nearly two years ago.

During that time, the company's CEO, Eric Tsai, and Senior Vice President, Rick Qiu, have devoted hours to educating me and bringing me up to speed on semiconductors and material science. They have also outlined the realistic potential of GaN as silicon's replacement, and as a stepping stone to other WBG materials the company has in its top-secret pipeline.

I'm not a materials scientist. But if there's one thing I've come to understand over my two years of studying Mivium, it's that we've reached the limits of silicon as the backbone for power electronics. If innovation is to continue, new scientific materials are required.

Much of my due diligence involved studying silicon replacements like Graphene and Silicon Carbide. After all, a huge part of investing in the correct scientific materials company is ensuring they work on a suitable material!

The bottom line is that GaN possesses the properties required to replace silicon in advanced applications. As Mivium proves its ability to manufacture GaN particles and relevant substrates at scale, at a high purity level, and cost-effective, GaN-based chips may filter down into all areas of the power electronics market.

Material science and chip manufacturing are capital-intensive businesses. Even if Mivium can secure sources of non-dilutive financing, it's unrealistic to believe the company won't need to raise multiple rounds of funding in the coming years.

However, with guys like Gino Addiego and Chandra Deshpandey helping to manage and guide the process, Mivium has the leadership to reach its goals and emerge as the leader in GaN particle and substrate manufacturing.

What could go wrong

Mivium's mission is to accelerate the world's transition to Gallium Nitride. If they're successful, I believe an investment at this early stage could result in a massive return.

If Mivium grows into a successful company, it will do so over many years and with the help of multiple financing rounds.

Without scientifically validated science and a minimally viable product, Mivium remains a very risky investment.

Before investing, I urge you to consider how much you want to risk.

If there's one thing I've learned from trading stocks for a living for twenty years, it's that risk management is the key to success. The simplest way to manage risk when investing in private companies is to diversify your investments across many companies and never invest more than you are willing to lose.

If you think you will need the $1,500, $3,000, or $5,000 you are about to invest in Mivium in the future for any reason, consider reducing the size of your investment to an amount you won't need or skipping the investment altogether.

Simply put, never invest more than you are willing to lose.

Below are five risk points that could lead to poor performance or a complete investment loss.

Of course, I considered all of these risks during the due diligence before making the recommendation. Still, you need to read through these risks and make your own assessment based on your risk tolerance.

Liquidity risk: When you invest in Mivium via the company's Regulation CF equity raise, you are tying up your money for an indeterminable amount of time. No one can tell you with a high degree of certainty if or when Mivium's shares will be listed and traded on a public stock exchange. Even if Mivium grows into a strong enterprise, the company could decide to remain private for many years, giving you no opportunity to profit from your investment.

Company Risk: Most venture capitalists assume that 8 out of 10 companies they invest in will fail. Mivium is a startup company. While the management team has an impressive pedigree and a lifetime of experience in the semiconductor industry, the odds are stacked against every startup.

Product/Business Risk: Mivium is raising money via the Regulation Crowdfund pathway to fund the bench test of its patented process. If the bench test fails, the company may not raise sufficient capital to try again.

From a risk standpoint, I consider an investment in Mivium binary.

If the bench test is successful, the company's value will likely spike. However, your investment could be worthless if the test fails and management cannot raise additional capital.

Go-to-Market Strategy: Management believes they can secure future offtake agreements with sample GaN particles. If the marketplace isn't ready for its product, Mivium could have plenty of inventory, few customers, and dangerously insufficient working capital.

Dilution risk: Even if Mivium's bench test is successful, its capital needs will be substantial over at least the next five-plus years. While the company will likely explore non-dilutive financing options, I expect the company to continue to raise money by selling equity.

Future equity raises aren't a bad thing. If Mivium is successful, it will need additional funding to accelerate its growth. As milestones are reached and success is documented, I hope to make additional follow-on investments into the company!

I have weighed these risks against this deal's potential and believe the benefits outweigh the risks. But as we've discussed, the key to success is risk management. Don't invest capital that you aren't willing to lose.

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Deal Terms and How to Invest

The semiconductor industry is reaching a critical point.

While silicon has been the backbone of integrated circuits and transistors for decades, it is nearing its physical and technological limits regarding heat tolerance, speed, size, and energy efficiency.

As technological innovation advances, especially in areas like AI and space exploration, a new material is needed.

Thanks to its superior electrical, thermal, and mechanical properties, Gallium nitride (GaN) is the cutting-edge material semiconductor engineers have searched for. But until now, the costs, complexities, and toxicity of manufacturing GaN prevented it from replacing silicon in the supply chain.

Mivium changes this.

With its patented physics-based manufacturing process, the team at mivium believes it can manufacture GaN particles at scale, cost-effectively, and without the toxins associated with the chemical-based process.

Simply put, Mivium is poised to change the world.

Mivium is raising $5 million via this Regulation CF opportunity. While the company's primary purpose is to fund a bench test to validate its technology further, the funds will also be used to outfit its lab, purchase and modify highly specific equipment, and pay salaries.

	If Target Offering Amount is Sold	If Maximum Amount is Sold(1)(2)
Total Proceeds	$20,000	$5,000,000
Less: Offering Expenses	$81,400	$691,666
(A) Intermediary Commissions (7%)	$1,400	$350,000
(B) Legal Expenses	$50,000	$50,000
(C) Accounting Expenses	$25,000	$25,000
(D) Miscellaneous Offering Expenses	$5,000	$266,666
Net Proceeds	$-61,400	$4,308,334
Use of Net Proceeds		
(E) Building facility/plant (M1): Land	$0	$330,500
(F) Employees, Scientists & Consultants	$0	$1,862,000
(G) Equipment, Equipment Design, Fabrication and Testing	$0	$1,150,000
(H) Raw Materials (gallium & nitrogen)	$0	$144,000
(I) IP development and protection, cybersecurity	$0	$50,000
(J) Working Capital	$0	$771,834
Total Use of Net Proceeds	**$0**	**$** 4,308,334

As you know, semiconductors are embedded in nearly everything. With silicon reaching its physical and technological limits, material scientists need an alternative. And Mivium's GaN is the solution.

As promised, the deal terms are below. And if you're ready to invest, click here to be redirected to the Equifund website.

You'll find everything you need to participate in the Mivium Reg. CF offering below:

Company Name: Mivium
Offering Type: Regulation Crowdfund
Securities Type: Common stock
Price per share: $0.10
Minimum Investment: $500 (5000 shares)
Fundraising Maximum: $5 Million
Valuation: $22.6 Million

Disclosure: Tim Collins, James Altucher, Bob Byrne, and Doug Hill are invested in Mivium via their ownership interests in an unrelated investment venture.

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